DETERMINANTS OF INCOME DIVERSIFICATION AMONG RURAL HOUSEHOLDS: THE CASE KEMBATA TEMBARO ZONE, SNNPRS, ETHIOPIA

MA THESIS

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DETERMINANTS OF INCOME DIVERSIFICATION AMONG RURAL HOUSEHOLDS: The case Kembata Tembaro zone, SNNPR, Ethiopia

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Contents

List of Tables **Page**

List of Figures **page**

ACRONYMS

ADLI:	Agricultural Development Industrialization
DA:	Development Agent
ETB:	Ethiopian Birr
EC:	Ethiopian Calendar
FGD:	Focus Group Discussion
GOF:	Goodness of Fit
GDP:	Gross Domestic Product
HH:	House Hold
HHH:	House Hold Head
KI:	Key Informative
KM:	Kilo Meter
RPEDB:	Regional Plan and Economic Development Bureau
SNNPR:	South Nation, Nationalities and Peoples Region
TLU:	Tropical Livestock unit
VIF:	Variance Inflation Factor

Declaration

I hereby declare that this MA thesis is my original work and has not been presented for a degree in any other university, and all source of materials used for the thesis have been appropriately acknowledged.

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This is to certify that a thesis entitled ''DETERMINANTS OF INCOME DIVERSIFICATION AMONG RURAL HOUSEHOLDS: The case Kembata Tembaro zone, SNNPR, Ethiopia" is submitted as part of the requirement for the quest of the research which has been carried out by student Yerusalem kidanemariam ID. No. GPCodek/011/11, under our supervision. Therefore, we recommend that the student can submit the thesis for open defense.

Name of major advisor	signature	date
Name of co- advisor	signature	date

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ABSTRACT

The purpose of this study was identifying determinants income diversification of rural households in Kembata Tembaro Zone, SNNPRS. The study employed descriptive research design with mixed quantitative and qualitative approaches. Data were collected by identifying 397 sample respondents through multistage stratified sampling mechanisms. In qualitative analysis 12 key informants were purposively selected. During data analysis both descriptive statistics and inferential statistics were employed by using statistical tool named as STATA 16 version. The results of the study revealed that majority of rural households in the study area lead their life by on farm activities of either crop farming, animal husbandry or mixed agriculture. Relatively rural households in the study area earn better mean income from on-farm activities compared to off farm and non-farm activities. Supplementing household income and insufficient agricultural production were primary motive for few rural households to engage in off farm and non-farm activities in the study area. Based on the findings 68.5 % of the respondents have alternative sources of the income and the remaining 30.5% of the respondents merely depends on single income source. Regarding with the major determinants of income diversification, marital status, education status the household head, household income, participation of training on income diversification and infrastructure access were the major determinants of income diversification among rural households in the study area. The study recommends a strengthening adult literacy program, provision of credit access, providing trainings, improving rural infrastructure etc to enable rural household to engage in different activities and enhance income of the rural household in the study area.

Key words:- Income, Income diversification, Participation, On- farm, Off-farm

CHAPTER ONE
INTRODUCTION

This chapter introduces the background of the income diversification, the statement of the problem, the objective of the study, the significances, scope and the limitations of the study, which was conducted in the Kembata Tembaro zone of South Nation, Nationalities and Peoples Region (SNNPR hereafter).

1.1. Background of the Study

Income diversification is a process by which rural households construct a diverse portfolio of activities and social support capabilities in their struggle for survival and improvement in their standards of living (Gebru, et al, 2018). It can also be defined as 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 (Alobo, 2015).

The livelihoods of rural households in developing countries are largely dependent on subsistence agriculture. However, now a day rapid population growth and a declining ratio of agricultural land to population have made these economies more vulnerable and less resilient to poverty and food insecurity. Therefore, diversification of income sources, assets and occupations is very important for individuals and households in developing countries (Adugna, 2005). Rural households have been trying to diversify their sources of income, risks and stabilize consumption pattern throughout the year in a variety of situations (Awoniyi & Salman, 2008). According to Davis et al. (2010) one of the most striking features of rural households in developing countries is that they earn income from many different sources of income. Diversification of household income is common in rural societies, with the exception of work specialization (Dimova & Sen, 2010). Decentralization has been suggested to weaken household income sources by diversifying risks.

Diversification refers to increasing sources of income and balancing different sources of income (Ellis, 2000; Minot, 2006). Therefore, single-income households are less diverse than double-income households, and it is diversified that both double-income households contribute equally to total income. Agricultural households are diversifying their sources of income for at least two reasons. Pull factor and push factor. The pull factor is the diversification done for wealth

accumulation goals, and the push factor is the diversification done to reduce vulnerability and increase resilience to shock (Malek & Usami, 2010).

Previous studies in sub-Saharan Africa has shown that rural households have been increasingly diversifying their sources of income by combining agricultural and non-agricultural activities to support their livelihoods (Losch et al. 2011; Winters et al. 2010). That asset, activity and income diversification characterize the livelihood strategies of rural households in rural Africa (Abdul Malek & Usami, 2010). Incomes from non-farm sources have grown importance and account for between 35–50% of rural household incomes in Africa (Haggblade et al. 2010), with reliance on non-farm income sources higher in some areas (as high as 80–90% in southern Africa) (Losch et al. 2011). But the common pattern is for such activities to be prevalent in areas with good agricultural potential, good market access, close to urban centers and those with better infrastructure (Losch et al. 2011).

In Ethiopia, over the past three decades, people have increasingly recognized the importance of income diversification for rural households. With the dominance of the agricultural economy, Agricultural Development Industrialization (ADLI), the government`s main strategy for sustainable economic growth, focuses on the development of rural areas. An important aspect of ADLI is promoting the rural nonagricultural sector and allowing it to interact with agriculture (Demissie, 2003). As a result, diversification of off farm activities is often seen as an opportunity to supplement or replace income from agriculture, or as an option for those who cannot or do not wish to earn a living from agricultural sources. Similar studies in SNNPR has revealed that due to erratic nature of rainfall and the resulting crop failure, land resource has not been effectively utilized and the livelihood of the community was characterized with variety of problems (Amanuel, 2012). Therefore, households tend to diversify their sources of income (Degefa, 2005). As a result, rural households are often involved in a variety of activities, both in the agricultural and non-agricultural sectors. Some households rely entirely on agriculture for their livelihoods, while others engage in mixed farming and seek to take advantage of non-farm activities in rural areas of the region. As a result, off-farm and off-farm activities have recently become one of the major income diversification strategies adopted by most farmers in the region including the study area, Kembata Tembaro Zone.

1.2. Statement of the Problem

As per to the previous literatures (Todaro & Smith, 2012) one of the basic causes of the sluggish growth of agricultural productivity in many areas of Sub-Saharan Africa was that the population has reached a size where the traditional slash-and-burn agricultural practices are no longer feasible without reusing land after too little rest, resulting in significant deterioration of soil nutrients, which are the pillars for productivity increase. In addition to this the subsistence farmers of the area cannot purchase improved seeds, fertilizers, and other essentials of modern agricultural inputs, the result can be a poverty and low, even some times decreasing agricultural productivity.

Therefore, the alternative source of the livelihood in the rural agriculture based economy is going to be the copying mechanism to defend the risks related with agriculture. Rural households participating in many sources of income are more diverse than households with one source and households with many sources, each contributing half of the total income, are more diverse than households (Joshi, 2002; Ersado, 2003) with single income sources. In agricultural production, the transition from traditional subsistence food production to modern commercial agriculture is often used to describe the growing importance of off -farm or on- farm income. In broad sense, non-farm income includes both non-farm salaried workers and non-farm self-employed workers (Escobal, 2001).

In Ethiopia, increasing rural household income especially through agricultural productivity has attracted the attention of governments and policy makers in last few decades. However, in recent years the ever increasing population growth and its replicative decrease in agricultural land, the irregular rainfall, which was characterized by either *Elilno* or *Lalina* resulted with diminish in agricultural productivity. Indeed, those rural households who merely depend on the single sources, especially agriculture faced with livelihood difficulties and on the other hand the others with diversified income sources tried to smooth their consumption (Amanuel, 2012). But the issues of income diversification, which is a means of smooth income and consumption, have not received much attention at government and non-government development partners. Even so, most analyzes of income diversification in Ethiopia focus on poverty and inequality and emphasize the importance of different income sources for livelihoods (Fasil & Elias, 2016, Engidayehu & Sivakumar, 2017) rather the determinant factors.

Moreover, besides agricultural activities, some rural households engage in non-agricultural and these non-agricultural activities uses as their main source of income, especially the local livestock through a traditional management system. Given the situation of frequent droughts, shrinking agricultural land and grasslands, reduced land productivity, current prices and market failures and other factors, depending on the limited source of income is very risky and difficult for rural households.

Many studies have been done on the determinants of income diversification in different regions of Ethiopia at different times (Amanuel, 2012, Bezu, Barret & Holden, 2012; Demissie & Legesse, 2013; Yishyak, 2016; Eshetu & Mekonen, 2016; Fassil & Elias, 2016; Yohannes & Tafese, 2017; Engdayehu & Sivakumar, 2017; Mesfin & Osman, 2020 etc) pointed out the leading factors for rural areas of household income diversification, such as the geographical location of the household, institutional factors and labor markets, human and social capital, and frequent political changes, access to infrastructure, distance from market centers, land size of the household, family size and age structure, household education level, access to capital, access to labor, capital social networks in the form of family and gender networks, membership and relationships, household farmer ration cooperative membership, etc.

In the study area, agriculture is mainly concerned with crop production and animal husbanding. The production of crops includes red peppers, wheat, barley, maize, beans, potatoes, tomatoes, onions, cabbage and some other garden spices. In likewise, animal husbanding practices in the area includes cattle, sheep, goat, poultry, donkey, mule, horse and bee farming. In last decade these two main components of the economic activities tackled by different challenges. Indeed, rural households in the study area have attempted to diversify their incomes, although this is mainly for subsistence diversification and the degree of diversity is negligible as a large proportion of households participate in income-generating activities from agriculture, mainly crops and livestock, are generally unpredictable.

Although households have made efforts to diversify their incomes, and few studies was conducted on the problem, neither of the above literatures postulated the relationship between having Tropical Livestock unit (TLU) and income diversification in the study area.

In addition to this, there is also no previous research conducted in the study area on the determinants of income diversification and the contribution of different income sources to the overall household income. Therefore, this study was conducted to fill this gap in general in the

study area and to add information to the current literature. These gaps require further research and empirical evidence to highlight the determinants of rural household income diversification. With this in mind, the aim of this study was identifying determinants of income diversification among rural households in selected Woredas of Kembata Tembaro Zone, SNNPRS.

1.3. Objectives of the Study

1.3.1. General Objective

The study's general objective was identifying the determinants of income diversification among rural households in Kembata Tembaro Zone, SNNPRS.

1.3.2. Specific Objectives

The study has the following specific objectives,

- ✓ To assess the socio-economic and demographic characteristics of respondents
- ✓ To assess the type of on farm , off farm and non-farm activities in rural households in the study area;
- ✓ To identify the income level of rural households from off farming and on farm activities in the study area;
- ✓ To examine the major factors that affecting the income diversification in the study area;

1.4. Research Questions

The study tried to answer the following research questions; -

- ✓ What are the socio-economic and demographic characteristics of the respondents?
- ✓ What is the type of on farm off farm and nonfarm activities in rural households in the study area?
- ✓ What is the income level of the rural households from off farming and on farm activities in the study area
- ✓ What are the major factors affecting the income diversification in the study area?

1.5. Significance of the Study

This study has paramount importance over increasing the understanding of the people over the determinants of income diversification which can affect the well-being of the rural household in the study area. It is also hoped that the results of this study will help rural development planners, policy makers, and NGOs as input to provide appropriate policies to diversify incomes in the

area in particular and in other areas of the region and country in general. Identifying the determinants of income diversification helps agricultural development agencies to design policies that increase the pattern of household diversification, which ultimately leads to an increase in total household income and food security status. Special this study will enable the researcher to partially fulfill the requirements for the award of the Master of Arts in Community Development from Hawassa University. Since the research includes both quantitative and qualitative questions, institutions and researchers interested in the field can obtain both aspects of the literature. Furthermore, it will be used as a reference for researchers who want to do research on a similar topic.

1.6. Scope of the Study

Under this sub section the area scope, the conceptual scope and the methodological scope which was addressed. Geographically, the study was delimited to Angecha, Doyogena and Danboya Woredas of the Kembata Tembaro Zone of SNNPRS, Ethiopia.

Conceptually, this study was delimited to the current status of the off and non-farm activities, the socio-economic determinants such as livestock ownership, farm income and farm size of the respondent households. The institutional factors such as access to credit, access to agricultural input, access to extension service, training, access to irrigation, and distance to town, and the access to information. Finally the demographic factors such as age, gender, educational level, and dependency ratio as predictors of income diversification were analyzed.

Methodologically, the study was followed both quantitative and qualitative approaches to analyze the data that was obtained from semi structured interview and key informant's interview. The study was also employed both descriptive and explanatory research design. The study was accomplished within the time frame from September 2022 to June 2023.

1.7. Limitation of the Study

The limitations of the study were related with firstly time and budget constraint. These constraints were tackled during data collection with strict schedule and disciplining to the prioritization of activities in the work plan. Due to inadequacy of budget (to pay per Diem for enumerators), and logistics (transportation facility to cover the three Woredas with scattered settlements of farmers s in Kebele level for fulfillment of research questionnaire), the researcher couldn't cover all farmers in the study areas.

Secondly respondents were also become reluctant to provide accurate information on the variables such as income level, farm size; livestock number...etc., due to the fact that taxes and other development contributions are distributed among them based on these factors. Also due to subsistence living and the irregularity of rural expense categories, the information was expected to be not accurate. Nevertheless, the problem was mitigated through establishing rapport within individual farmers and groups about the objectives of the study and

The other limitation was also related with lack of secondary data, which is lack of physical records, data collected on households' income on from farm activities. Such data sets were based largely on recalls which are subject to bias on the part of the respondents. This problem was also minimized by cross-checking the adult family members in the household.

1.8. Organization of the thesis

This thesis is organized in to five chapters. The first chapter was dealt about introduction part which comprises the background of the study, statement of the problem, objectives of the study, research hypothesis, and significance of the study, scope and limitation of the study.

Chapter two discussed on both theoretical and empirical review of literatures and theoretical framework of income diversification among households from international and national perspectives.

Chapter three was devoted on the study area, research design and strategy, types and source of data, sample design and sampling techniques, target population of the study, data collection methods, and methods of data analysis.

Chapter four was presented the data analysis, presentation, interpretation of the finding, and discussions of the finding and finally chapter five was about conclusions derived from the empirical findings, sets out recommendation of the study, and directions for future research.

CHAPTER TWO
REVIEW OF RELATED LITERATURE

2. Introduction

This chapter deals with the theatrical and empirical literatures related with overview of income diversification, approaches of diversification, reasons for income diversification, determinants of household income diversification, empirical review and conceptual framework of the study.

2.1. Concepts of Household Income

The term income diversification has been given extensive various definitions. According to Mengistab (2020), the expansion of ranges of rural livelihood activities other than rural subsistent farm activities through pressure and or opportunities. In this regard, the concept of income diversification refers to an increase in the alternative sources of income or the balance among the different sources in order to smooth the livelihood.

Income diversification additionally described because the method of switching from low fee crop manufacturing to higher fee vegetation, livestock, and nonfarm sports. “High fee vegetation” are frequently described in phrases of the fee according to unit of weight, however it might be extra beneficial to outline them as vegetation that generate excessive monetary returns according to unit of hard work or land. This definition specializes in diversification as an offer for an income boom and as a way to reduce poverty (Demissie and Legesse, 2013).

The term income diversification is most often used in the context of livelihood diversification for ease of analysis and interpretation. However, Ellis (2000) distinguishes between the two, defining income diversification as the composition of household income at a particular point in time, and making livelihood diversification an increasingly complex activity portfolio over time.

2.2 Theories of Rural household Income Diversifications

2.2.1Classification of Household Income

Household income is categorized by its source sector, source function, and area (source location). Household income is divided into agricultural income and non-agricultural income based on the sector of income source (Ellis, 2000). Depending on the function, household income can be divided into dependent income and self-employed income. Spatial classification is whether the household's income source is rural or immigrant (Barrett & Reardon, 2000; Barrett et al. 2001).

Gero et al. (2007) also found that rural income-generating activities include agricultural production (harvesting, livestock), agricultural wage labor, non-agricultural wage labor, non-agricultural enterprises, and relocation. Ellis (2000) classified household income as:

A) On-farm income

Income derived from "own account" farming (on own farm or rented in or rented out landholdings). Farm income includes all income from agricultural activities (cropping and livestock husbandry). Broadly defined, farm income includes the consumption of one's own livestock and crop output as well as the cash income earned from the sale of such outputs. Net income calculated as cash income from sales and value of food produced for consumption or exchange in kind at market prices, less the cost of inputs including hired labor.

B) Off-farm income

income from work conducted off the household farmland but still within the agricultural sector, income from wage or exchange labor on other farms about in exchange for food, share of a harvest, hiring of oxen) and also includes income from environmental resources (sale of firewood, charcoal, house building materials, wild plants, medicinal plants...etc).

C) Non-farm income

Refers to all non-agricultural sources of income; including non-agricultural wage/salary or labor employment, income from rental of land, other property, and equipment, income from production and/or sales of non-agricultural products, engagement in petty trade/self-employment/business enterprises, within both formal and informal economies, remittances from family members, and transfers from other sources, including pensions and welfare assistance.

Classification of income as nonfarm involves making sector distinctions. Depending mainly on the nature of the activity, within the non-farm income category we distinguish between unskilled labor for wages or salary and income from trade, commerce, or skilled labor employment (Amanuel 2015).

2.2.2 Approaches of Diversification Analysis

There are different approaches for diversification analysis i.e. Asset based approach, Activity based approach and Income based approach. The selection of an object for diversification analysis is discussed in a relatively detailed manner (Barrett & Reardon, 2001).

A. Asset based approach

An asset is an item that directly or indirectly generates income in cash or in kind. In portfolio

theory, based on the diversified investment literature, assets are emphasized as the choice of agents for maximizing income, minimizing risk (reducing income volatility), or both. Therefore, assets can be selected for analysis of variance, and many authors use assets to characterize and study variances. However, Barrett and Reardon (2001) also point out two drawbacks to using assets to tackle diversification. First, it is relatively difficult to group assets into a single activity because productive assets are not always used by a particular activity, rather than being used throughout the activity. Second, calculating the true value of some assets is difficult due to insufficient development of asset markets in developing countries. Consequently, it is argued that in order to study asset diversification, assets must be treated as a vector of physical quantities rather than a single, money metric aggregate (Barrett & Reardon, 2001).

B. Activity based approach

Given the shortcomings of the asset and activity-primarily based totally approaches, profits have regularly been utilized in empirical paintings on diversification. Using profits might also additionally provide numerous advantages. First, because the essential reasons of diversification are maximization of profits and stabilization of profits, or each, discussing diversification in phrases of profits diversification seems to be an herbal candidate (Ellis, 2000; Barrett et al., 2001). Second, profits are the quit final results of profits-producing activities, to which each effective and non-effective property are allocated, and of unearned profits options, as an instance transfers, as well. It is likewise simpler to transform in-type bills right into a money-metric because of better improvement of products marketplace as compared with asset marketplace (Barrett & Reardon 2001). Third, profits are carefully associated with the idea of absolute poverty as its miles extra or much less used to outline the poverty line and degree family wealth. Due to those reasons, it appears that, defining diversification in phrases of profits can be the maximum appropriate approach (for assessment of numerous empirical researches that used profits approach).

C. Income based approach

Given the shortcomings of the asset and activity-based approaches, income has often been used in empirical work on diversification assessment. Using income may offer several advantages. First, since the two main motives of diversification are maximization of income and stabilization of income, or both, discussing diversification in terms of income diversification appears to be a natural candidate (Ellis, 2000; Barrett et al., 2001). Second, income is the end outcome of

income-generating activities, to which both productive and non-productive assets are allocated, and of unearned income options, for example transfers, as well. It is also easier to convert in-kind payments into a money-metric due to higher development of goods market compared with asset market (Barrett & Reardon 2001). Third, income is closely related to the concept of absolute poverty as it is more or less used to define the poverty line and measure household wealth. Due to these reasons, it seems that, defining diversification in terms of income may be the most suitable approach (for a review of various empirical studies that used income approach).

2.2.3 Reasons for Income Diversifications

According to some studies, rural households have different incentives to diversify their sources of income and production patterns, rather than focusing on agriculture with the potential benefits of specialization. From some studies, like (Amanuel, 2015 & Seid, 2017) noted diversification to non-agricultural activities can be caused by diminished or time-varying agricultural labor or income from land, market failure, or the need to introduce risk management or response mechanisms.

Ellis (2000) cites seasonal labor development, differentiated labor markets, household risk strategies and coping behavior, credit market imperfections, household savings and investment strategies as the main drivers of income diversification. Therefore, non-agricultural income helps to overcome credit and insurance problems. It may also hire additional domestic work, manage weather and other risks, and provide off-season income opportunities to ensure smoother consumption throughout the year.

The causes of diversification could be categorized in terms of push factors, such as environmental risks and falling income, and pull factors, such as changing terms of trade or perceptions of improved opportunities (Tau, 2017). Similarly, Tau (2017) found that push factors such as external shocks could lead to large numbers of people being drawn into poorly remunerated low entry barrier activities, while the pull effect is likely to offer a route to improved wealth status through better paid nonfarm activities. In the absence of credit and insurance markets, the rural poor have to find other ways of spreading their consumption and for many of them income diversification is a potential option (Barrett et al, 2001).

The Leading theories are not included in this part

2.3. Empirical Review

2.3.1The Nature and Types of On-farm and Off-farm Participation

Previously conducted empirical literatures on the nature of on-farm participation in Ethiopia has shown that the country is a rural and agrarian society where nearly 85% of the population is directly dependent on agriculture and livestock for their livelihood, and therefore, Agriculture is the mainstay of the economy(Beyene, 2010). As per to the report of the Regional Plan and Economic Development Bureau (RPEDB, 2021) Agriculture accounts for about 50% of the GDP and 90% of the total foreign exchange earnings. The main types of farming activities are crop production, mainly the production of cereals, pulses, vegetables and root crops. Similar report also argued that livestock husbandry is also the dominant economic activity at which the cattle products and by products and poultry farming is took place in different parts of the region.

Non-farm activities have a great potential to provide employment and additional incomes during the slack season to rural households. In addition, given rising population pressure on agricultural land which results in a decline in land holding per individual, off-farm activities can provide alternative employment. Despite their great potential, rural non-agricultural activities account for less than 3% of the rural labor force (CSA, 1999b as cited in Beyene, 2010). However, over the last two decades, the nonfarm economy has increasingly become the central focus of attention in rural development policy, due to its positive contribution to poverty reduction and food security (Bezabih et al, 2010).

Empirical research has shown that nonfarm sources contribute 34–58 percent to average rural household incomes across the Sub-Saharan Africa countries Broeck& Kilic (2018)). In Ethiopia, according to Broeck & Kilic (2018) some 34% of rural income originates from nonfarm sources. Compared to other African countries, the proportion of the rural labor force engaged in non-farm activities in Ethiopia is too low.

According to Broeck & Kilic (2018) share of the working-age population that is involved in off-farm employment was estimated to be 40% in Uganda, 47%in Nigeria, 52% in Tanzania and 58% in Malawi, and which corresponds to a cross-country weighted overall share of 44%.

Other studies conducted on the off farm participation has shown that among the major activities took place in Ethiopia includes trades in grain/general trade, making and selling firewood, dung cakes, charcoal, weaving/spinning, collecting and/or selling straw, and trade in livestock/livestock products (Amanuel, 2015). In the same approach other activities are handicrafts, making and selling of farm implements, broker, selling araki, bakery, salt trade, shuriba sira and pottery.

2.3.2. Determinants of Income Diversifications

Rural families earn their dwelling from farm sports. However, farming on my own does now no longer offer enough profits for sustenance amongst rural dwellers (Oluwatayo, 2009). Besides, farming sports in maximum components of the growing global are characterised through seasonality implying that families must rely upon specific alternatives for his or her livelihoods in specific instances throughout the year. To secure and stable their livelihood structure, if environmental and financial conditions are converting smallholder farmers have an incentive to take part in non-farm sports and get non-farm profits. On the alternative hand, elements like obstacles to go into non-farm sports and hazard aversion behaviour of families also can maintain them again from taking part in non-farm sports. The reasons are generally divided into categories: “pull elements” and “push elements” (Barrett Christopher, Mesfin, & Abdillahi, 2001; Barrett, Thomas, & Webb, 2001).

In Ethiopia, the pastoral (rural) economic system generally examine as agrarian economic system wherein big quantity of small-holder farmers (families) are usually in farming sports like crop manufacturing and farm animals rearing with small quantity of small-holder farmers take part in non-farm/off-farm enterprise sports. In Ethiopia, 83% of small-holder farmers participated in farming sports and most effective 27% have been engaged in non-farm/off-farm financial enterprises (Nagler & Naudé, 2013).

Amsalu, Kindie, Belay, and Chaurasia (2013) studied elements figuring out the choices to take part in off-farm paintings in western Ethiopia. The locating in their observe indicates that variables on get entry to for credit score and length of farm land are principal determinants of choices to take part in off-farm sports.

According to Amsalu et al. (2013) at the paintings of determinants and styles of profits diversification amongst smallholder farmers in Akaki district, Ethiopia, -level random sampling

with proportionate possibility sampling became used to acquire cross-sectional facts from a hundred and fifty-five farm families the use of established questionnaire. The facts have been additionally supported with files from agricultural and rural improvement workplace and farmers cooperatives with inside the observe area. The Tobit version became used to examine the elements figuring out the profit's diversification. From the descriptive statistics, income of homemade farm implements and drinks, and non-farm employment became discovered to be the maximum crucial reasserts of off-farm profits with inside the observe area. The effects from Tobit version imply that, own circle of relative's length; quantity of extension go to according to 12 months and training stage has a superb big impact over profits diversification. On the alternative hand, age of the family head; land length and common distance from marketplace have terrible and big effect at the family`s choice closer to diversification.

Gecho (2017) identifies elements which have an effect on rural farm families` profits diversification with inside the case of Wolaita, his survey end result additionally indicates that out of the overall pattern families (300), approximately 246 families (82%) pursued agriculture as a number one profits supply. About fifty-one respondents (17.3%) suggested that agriculture became their 2nd opportunity giving first precedence to both non-farm and off-farm sports whilst most effective 3 respondents (1%) positioned agriculture with inside the 0.33 place. On the alternative hand, 37 respondents (12.3%) suggested that non-farm hobby became their number one profits supply. Within the non-farm class approximately ninety respondents (30%) claimed non-farm is the second one profits supply, subsequent to farm. Out of the overall pattern respondents, approximately 134 pattern families (44.6%) pursue non-farm sports beside agriculture. Off-farming is a supply of profits for negative families on which they especially rely for his or her livelihood because of low useful resource endowment, especially farm land. Out of overall sampled families, approximately 17, 33, and 12 respondents ranked off-farm hobby as first, 2nd and 0.33 in that order. By making use of binary logit version to analyse elements influencing the families` participation in profits diversification 8 variables have been big with appreciate to profits diversification with much less than 10% of the possibility stage. These variables consist of sex, training, oxen ownership, tropical farm animals, farm length, distance to marketplace, participation in nearby management and annual farm profits.

According to Demissie and Legesse (2013) at the studies titled determinants of profits diversification amongst rural families: The case of small-holder farmers in Fedis district, Eastern

Hararghe zone, Ethiopia through the use of Tobit version Participation in non/off-farm employment sports and the extent of profits derived are discovered to be motivated through human capital associated variables (gender and age of family head, quantity of economically energetic own circle of relatives members, training stage of family head and presence of youngsters attending school), livelihood assets (farm animals holding, length of cultivated land), livelihood diversifying strategy (crop primarily based totally diversification thru quantity of plants grown and harvested) and infrastructure associated variable (proximity to marketplace). The effects suggest that those elements want to be taken into consideration through coverage maker's with inside the making plans of agricultural and non-agricultural tasks on this observe area.

Ahmed (2016) tested what elements make contributions to the profit's differential, with the proof from east Hararghe, Oromia, Ethiopia, he used linear regression version to pick out contributing elements and the version output indicated that, irrigation use, farm animals holding, training stage of family head, cultivated area, age and quantities of fertilizer used have been the big variables that make contributions to farm profits differential with inside the observe area.

A. Socio-Demographic factors

Socio-demographic factors affecting income diversification include gender, age, education level, marital status and number of dependents (Mengistu, et al, 2013). Indeed, here are some of the socio-demographic factors that were included in this study and considered from different literatures.

According to Gedela (2012), gender, age, education level, marital status and family size of rural household heads significantly influence household income diversification. In addition, Aron (2013) the education level of the household head is also another variable that has a positive effect on increasing income diversification.

B. Economic factors

Economic factors determine income diversification in the study area. In this research paper, livestock ownership, farm size and farm income were discussed to influence income diversification. Among other determinants in Ethiopia, Gecho (2016) assessed the income diversification of rural farm households in the Wolaita area, confirming that gender, farm size, ownership Livestock, cow ownership, education, leadership, annual cash income and distance to market are the main determinants of farmers' participation in income diversification.

In addition, Ghimire et al., (2014) clearly state that in determining rural household income, household characteristics such as age, sex and education level of the household head and household size Family plays an important role in off-farm employment decisions. Households with larger farms are less likely to engage in off-farm work than households with small farms. In developing countries, rural households engage in agricultural activities to sustain livestock, Obi and Njoku (2014) studied the socioeconomic determinants of the choice of livestock livelihood activities of rural people in southeastern Nigeria. Conventional least squares multiple regression estimates show that age, years of education, and monthly income are the main socioeconomic factors affecting livelihoods and agriculture and trade are main activities live in the study area.

C. Institutional factors

According to Bezabih et al, (2010) revealed from the studies consider a variety of household characteristics such as age, gender, farm size, education and asset, along with other environmental characteristics such as credit access, distance to the nearby market and location. These studies help us to understand factor determinants of livelihood diversification in Ethiopia by providing a lot of compelling and insightful results.

According to previous studies, income diversification patterns, determinants and trends vary across regions (Davis et al., 2010). Lemi (2005) argues that the extent and extent of participation of rural households in diversification is uneven. For example, research conducted on four continents (Eastern Europe, Latin America, Africa, and Asia) by Davis et al. (2010) determined that the share of agricultural income decreases and the share of non-farm income increases as the level of gross domestic product (GDP) per capita increases. According to Schwarze and Zeller (2005), poor households often engage in a number of different incomes generating activities and have fewer opportunities to engage in off-farm activities due to their low physical capital. However, poorer households have less access to off-farm activities than richer households (Reardon, 1997). The propensity to be off-farm is highest in middle-income households, while law and high-income beneficiaries diversify the least (Smith et al., 2001). Pujiriyani et al. (2019) concludes that there is emerging elite that tries to manifest their prosperity through the accumulation of capital from the remittances they bring in from emigration. A study by Davis et al. (2010) shows the largest proportion of households in most countries with diverse income sources.

Ellis (2000) also argues that classical household models do not capture the interdisciplinary aspects of livelihood strategies and do not describe the circumstances of survival under stress. He stated that the following key factors should be considered as causes of diversification: seasonality, risk strategies, coping strategies, as well as labor and credit market conditions. Seasonality refers to agriculture's high reliance on weather conditions and/or price fluctuations in response to changing supply and demand conditions. The seasonality of agricultural production and income leads to off-seasons in which farmers can have time to engage in off-farm activities. It is also possible that households diversify their activities to reduce the threat to their overall health by concentrating many of the risks on a single activity (i.e. farming). This coping strategy argument resembles the necessity argument, which states that household diversification is a vital response to a crisis or disaster. Market failures, which in the case of rural Africa are often related to credit, labor and land markets, leave households with limited scope to engage in off-farm activities to compensate for the failures of the market. The absence of such markets forces households to take advantage of their demographic composition to efficiently use their resources and respond to market failures. The lack of market activity, coupled with cross-sectoral decision-making and stressful decisions, requires factors that are not normally present in standard household models. In addition to these key factors, other factors outside the control of households, including regional and local features, environmental factors, social and governmental factors, should also be considered in addressing the question of rural households` decision process.

Studies in Africa and other developing economies provide support for the significance of the above factors. For instance, access to public assets such as roads, and private assets such as education and credit, are pointed out as factors that encourage more participation and intensity (Escobal 2001; Lanjouw et al, 2001). These studies conclude that under the precarious conditions that characterize rural survival in many low-income countries, diversification has positive attributes for livelihood security that outweigh any implied cost associated with it. A study in Burkina Faso and Guinea shows that harvest shortfalls and terms of trade are found to drive diversification towards off farm activities (Reardon, et. al 1992). Other studies indicate that a relative lack of capital (Abdulai & CroleRees, 2001), entry barriers, lack of liquidity, market access, and skill constraints (Barrett, Reardon, and Webb, 2001) are some of the impediments to diversification, and to breaking the poverty trap in rural Africa. Barrett et al. (2001a)

summarized various studies on Africa and concluded that there is a positive relationship between nonfarm income share and total household income and land holdings. They contend that, in Africa, investment or asset (such as education, credit) requirement is a barrier to entry. Several studies echo similar sentiment about the impact of access to both public and private assets (Matsumoto et al, 2006; Kijima et al, 2006; Bezuneh et al., 2001). However, a recent study in Ethiopia suggested that barriers to entry into non-agricultural activities are low and that the overall growth of the non-agricultural subsector benefits the poor (Berg & Kumbi, 2006).

Only a few studies specifically address the importance of off-farm activities in Ethiopia. Studies can be regional (Woldenhanna & Oskam 2001; Carswell, 2002; Holden et al., 2004; Berg & Kumbi, 2006) or focus solely on drought-affected villages (Block & Webb, 2001). The latter two studies used national household survey data similar to those used in this study, but limited their analysis to a very small number of sampled households in different drought-stricken areas of the country. Using data from southern Ethiopia, Carswell (2002) reports that women play an active role in income diversification; In particular, they contribute to diversifying activities towards cash income for the poorest households. Block and Webb (2001) analyzed different household income categories using survey data from Ethiopia and Tanzania. Their research results show that the different portfolios of households cannot be explained by their behavior in the face of risk; it is best explained by differences in capacity, location, and access to credit. Their results, regarding risk, contrast with theoretical explanations (Ellis, 2000) and empirical results (Block & Webb, 2001).

The degree and type of income diversification depends on the accessibility and availability of different sources of income and the type of risk to which household's respond, which in turn may depend on geographic location of households, access to factors and the labor market, human and social capital and periodic policy changes. Empirical studies show that education level and access to infrastructure are strong determinants of diversification (Lemi 2009).

Sarah (2012) investigated the determinants of income diversification using data from rural households in two sub-Saharan African countries; Senegal and Kenya. The study concludes that factors related to education, market access and agricultural potential are important in determining the degree of income diversification. Specifically, the study showed that completion of secondary education, completion of higher education, market access for agricultural products,

farm characteristics (farm size and irrigation capacity) a) and access to agricultural capital (availability of animal plows).

Damite (2006) examine the determinant and the impact of income diversification in Ethiopia the case communities in southern nation, nationalities peoples of the regional state. To analyses the determinants of household`s level of income diversity, multinomial logit model that corrects selection bias was estimated for five distinct livelihood strategies. The effects of income diversification on rural equity and consumption insurance against idiosyncratic income shock were analyzed using Gini decomposition technique and linear regression model, respectively. The results indicated that, the asset endowment of the household has a significant effect on households` the level of income diversity. Empirical evidences revealed that farm land holding, distant to market, involvement in cash crop production, ox holding, use of agricultural extension and possession of senior secondary education by head lower the likelihood of involvement in livelihood diversification.

Lemi (2006) analyzed the dynamics of income diversification in Ethiopia by using 1994 and 1997 ERHS panel data. The results show that participation in off farm activities is mainly driven by demographic factors, whereas land and other asset ownership as well as crop production and income affect intensity of off farm activities. The dynamic model results show that farm families who have initially diversified to more off farm activities subsequently realized less income diversification. Families with more initial crop production from slack harvest season subsequently realized greater income from off farm activities in 1997. The study also confirms that it is only during slack harvest season that off farm and on farm activities are complement each other. Income diversification affects the stability of consumption and the general welfare of households.

Oyewole (2012) conducted a study analyzing income diversification strategies and food security strata of farmers in Oyo State, Nigeria. The determinants of income diversification in the study area are education level, household size, credit and extension contacts. These variables are positively related to income diversification. In addition, income diversification has a significant effect on food security. The estimated income diversification coefficient is positive and significant at the 5% probability level, implying that as income diversification increases, so does the food security of farmers. Zeraia and Gebreegziabher (2011) studied the effect of off-farm income on food security using Hickman's two-step methodology in the eastern Tigray region.

The results indicate that off-farm employment provides additional income allowing farmers to spend more on their basic needs, including food, education, farming and healthcare. This shows that this off-farm employment plays an important role in maintaining household food security.

According to Degefa (2005), households pursuing sustainable livelihoods often feel food security throughout the year by rearranging crops and/or livestock or managing their own non-agricultural businesses. on their own or work with others. As he further explains, a household is food insecure when it is incapable of sufficiently feed its household members from its own production or purchase from the market in return to own cash, which may be earned from the exchange of self-endowment.

Study made with the aid of using Yishyak(2016) on determinants of income diversification amongst rural families in Lemo Woreda, Hadiya Zone, SNNPRS counseled profits diversification reasserts became appreciably inspired with the aid of using intercourse of family head, training stage of family head, farm size, farm profits and distance to marketplace middle, even as intercourse of family head, training stage of family head and distance to marketplace middle have been inspired the variety of diversification reasserts positively. On the other hand, years of schooling (level of education) of head, farm size/land holding size, farm income, membership in farmers cooperatives and distance to market center were found the main determinants for households' probability to participate on nonfarm activity. Years of schooling (level of education) of head and farm income were influenced participation positively while the remaining significant variables were influenced negatively.

2.4. Conceptual Framework of the study

Based on the various sources reviewed, the researcher made an attempt to construct the following conceptual framework of the study. The framework includes the relationship among independent variables (socio-demographic variables, economic variables, and institutional variables), and dependent variable (Income diversification) of the study. The framework is presented in Figure 1 as follows:

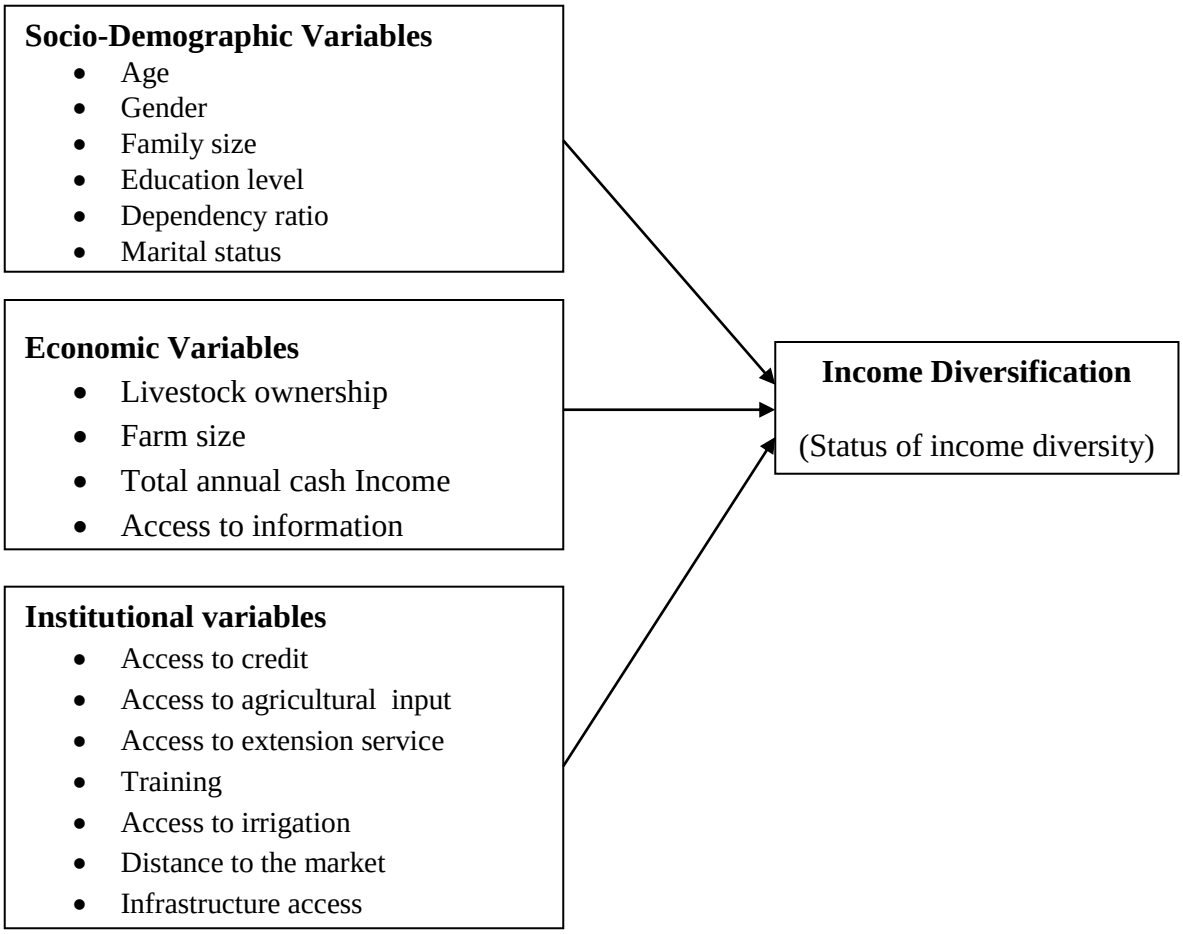


Figure 2.1**:** Conceptual framework of the study

Source: Constructed by the researcher based on literature review (2022)

CHAPTER THREE
METHOLOGY OF THE STUDY
3.1 Description of the Study Area

The study was conducted in three selected woredas of Kembata Tembaro Zone, namely Damboya, Hangecha and Doyogena, which are one of the eleven rural districts and four town administration of zone. Based on the 2007 Census conducted by the CSA, this district has a total population of areas were accounted as 21025, 33490 and 21978 households in Damboya, Hangecha and Doyogena respectively.

The areas are characterized by three agro-ecological zones: *Dega* (highland), *Woinadega* (midland) and *kola* (low land). Damboya woreda has agro-ecological zone classification of 25%,71% and 4% dega, woinadega and kola climatic zones and similarly Hangecha woreda has 25%, 69% and 6% dega, woinadega and kola zones. Finally, 25% and 75% of the doyegena woreda was found to be kola and dega respectively. Regarding with the geographical location the areas was shown that 1501-2500 m.a.s.l, 1501-3000 m.a.s.l and 2001-3000 m.a.s.l respectively in Damboya, Hangacha and Doyogana.

Mixed farming is the dominant economic activity of the study areas. The main crops grown are maize, potato, false banana (inset) and Cabbages. Animals predominantly reared are cattle, horse, mule, goats and sheep. Like other parts of the regional woredas, agriculture is the main means of income source/ livelihood for the population both in terms of crop production and livestock. As far as the distance from the center is concerned, Damboya woreda is located in 257 KM, 125 KM and 32KM far from Addis Ababa, Hawassa and Durame respectively.

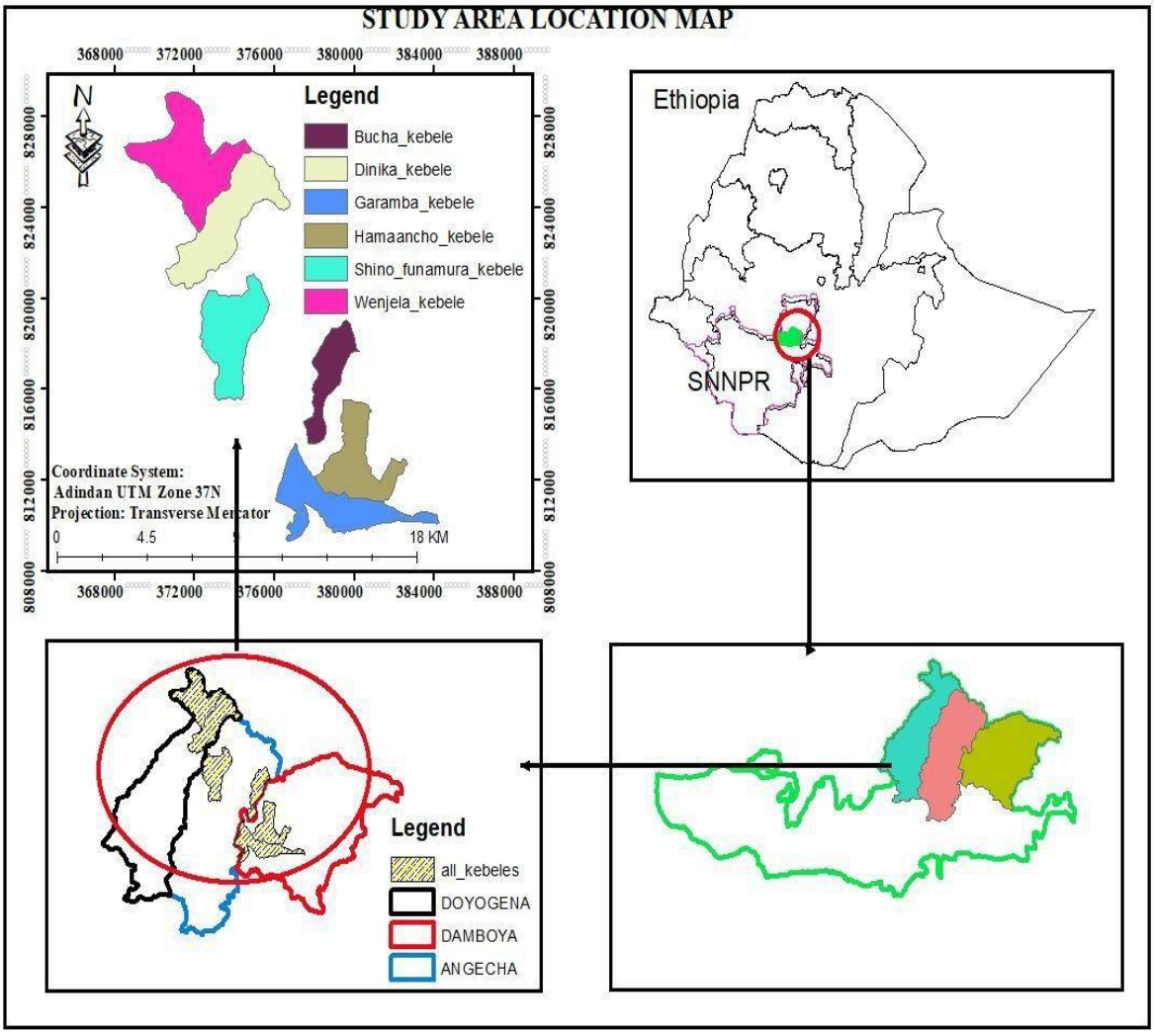


Figure 3.1 The map of study area

Source:- Zone Plan and Development Depertment (2023)

3.2 Research Design and Approaches

A research design is the general plan of how a researcher can go about answering the research question(s). The central theme of the study is to assess the determinants of rural household income diversification in selected woredas of Kembata Tembaro zone in SNNR, Ethiopia. For the full attainment of the research objectives and relation to the theme of the study the study followed the descriptive survey research design.

Regarding with the approaches of the research this study employed both quantitative and qualitative approach so as to answer the proposed research questions. The reason for the use of

mixed approach is to get precise summaries and comparisons from quantitative data and to access general elaboration, explanations, meanings and a relatively new idea from the qualitative data.

3.3 Data type and source

Both qualitative and quantitative data was collected from primary and secondary sources to identify major factors affecting the income diversification of the rural households in the study areas. The primary data was collected from the sample households using structured interview schedule. The primary was supplemented by secondary data was gathered from published and unpublished documents from different governmental and non-governmental office regarding with the objective of the study.

3.3.1 Data collection tools

Questionnaire, Focus Group Discussion (FGD) and key informative (KI) was employed as tolls of primary data collection.

Questionnaire

To meet the research objectives and question, the study used a questionnaire which included open and close ended question. Hence, it helped to acquire primary data from individual households from the kebeles. Questionnaire is selected by considering the benefits that the method has compared to other methods of primary data collection tools in terms of time and cost. Questionnaire enables to collect more information from large respondents with limited period of time. In addition, it can minimize bias of the interviewer and allows the use of large sample size that can result in more dependable and reliable results (Kothari, 2004).

To check the validity and reliability of the instruments, pilot test was conducted before administering to the final questionnaire. The pilot test will be conducted on 10% of the total sample i.e. 30 respondents were selected randomly from three kebeles which are out of the sample kebeles.

The model questionnaire was developed and administered to non-sampled kebele households with the objective of pre-testing whether the questionnaire can generate clarity in the relation to the topic. The final version of the questionnaire was prepared in English and transcribed to

Amharic which is the language of the people clear way for easy understanding of the respondents.

Focus Group Discussion (FGD)

In addition to questionnaire, focus group discussion was conducted to substantiate the response acquired through questionnaire. The group discussion was conducted with elderly peoples of both sexes and religious leaders who can give their past experience with present trends and others who have expected knowledge about the concepts of income diversification.

Key Informant Interview (KI)

A group including experts from selected each kebele DAs (development agent) and others who are expected to give better information about the income diversification was included while collecting data.

3.4. Sampling and sampling size Determination

Before determining the sample size of the study it is necessary to understand the number of Kebeles in each woreda. Accordingly, based on data from each woredas there are 20, 21 and 20 rural kebeles were located in Damboya, Hangecha and Doyogena respectively.

Due to and shortage of time to cover all woredas 2 rural kebeles from each and total 6 kebeles were selected to be included as the sample unit of the study. Multi-stage sampling method was employed to select respective agro-ecologies, kebeles and households. In the first stage, the study areas were selected randomly due to the homogeneity of the areas in their agro ecology at which more than 70% of the Woredas in Zone are located in woinadega agro ecology zone.

In the second stage, the rural kebeles in each woreda were stratified in to highland, midland and lowland in order to agro-ecological heterogeneity in study area. In the third stage, two rural kebeles from each were selected randomly. In the fourth stage**,** sampling household lists was obtained from each kebele administrative office; then using systematic random sampling technique taking into account probability proportional to size of the population in each of six selected rural kebeles sample household was selected. Then the sample size for the study was

determined by using Yemane formula, a total of 398 HH respondents were select from the six rural kebeles as follows.

According the data from Plan and Development Office of respective woredas, the total household size of Damboya, Hangecha and Doyogena was 21025, 33490 and 21978 respectively and it sum up76493 households. Finally by using the simplified sample size determination formula by Yemane Taroe (1967, as cited in Israel and Glenn, 2014)

$$\mathbf{n} = \frac{\mathbf{N}}{\mathbf{1+N(\partial)2}}$$

Where,

n = is the sample size of the study

N = is the total households in sample woredas

e = is the level of precision defined at 5%

$$\mathbf{n} = \frac{\mathbf{76493}}{\mathbf{1+76493}(0.05)2} = 398$$

Therefore, 398 households were selected for this study. Then, using probability proportional to the size of population in each kebeles was addressed in the study as it is presented in table below with its return rate.

Table 3.1 The number of sample unit households

Sample woredas	**Sample Keble**	**Household**			**Sample**			**Return**		
		M	**F**	**T**	**M**	**F**	**T**	**M**	**F**	**T**
Doyogena	Wonjela	234	99	333	26	10	36	32	4	36
	Dinka	793	278	1071	84	30	114	84	30	114
Angecha	Bucha	297	44	431	35	11	46	35	11	46
	Shino Funamura	507	206	713	54	22	76	54	21	75
Damboya	Garamba	328	128	456	35	14	49	35	14	49

	Hamancho	519	202	721	57	21	77	57	21	77
Total		2678	1047	3725	290	108	398	291	107	397

Source: - Kebele administrative, (2023)

Finally two kebeles from each woreda and sample unit households were selected by using population proportional to sample size.

3.5. Methods of Data Analysis and Interpretation

The analysis of data was carried out by using both qualitative and quantitative methods. For analyzing quantitative data both descriptive statistical tools like frequency, percentage, mean and standard deviation was employed. In addition, to descriptive statistical tools, inferential statistical tools like binary logit model was used since the dependent variable is dichotomous (Gujarati, 2004; Woodridge, 2002). Statistical Program STATA 16 was used to process and analyze the data. Also, qualitative data was analyzed by using descriptive, narrative and thematic methods to identify information that is relevant to the research questions and objectives presented concurrently with quantitative data.

Descriptive Analysis

According to Kothari (2004), descriptive statistics concern the development of certain indices from the raw data. Descriptive statistics based on the data obtained through the questionnaire was used to obtain preliminary findings that informed further analysis. Such descriptive analysis provided simple summaries of the characteristics of the sample such as measures of central tendency, frequencies, and percentages, among others. Therefore, with the quantitative data collected through the closed-ended questionnaire, a descriptive statistical analysis method was employed.

Inferential Analysis

According to Kothari (2004), inferential analysis is concerned with the various tests of significance for testing hypotheses in order to determine what validity data can be said to indicate some conclusion or conclusions. It is also concerned with the estimation of population values. The study employed Pearson's correlation coefficients and Binary Logistic Regression Model to test the research hypotheses formulated for this study.

3.6 Model Specification

According to Maxwell (2009), the logistic regression model or the logit model as it is often referred to be a special case of a generalized linear model was used to predict the relationship between predictors (our independent variables) and a predicted variable (the dependent variable) where the dependent variable is binary. It is common practice to assume that the outcome variable, denoted as Y, is a dichotomous variable having either a success or failure as the outcome. As such, the logistic regression model developed and used to predict the probability of the dichotomous dependent (response) variable (income diversification) in the administration, using the 15 independent variables in the study.

Since our response variable (dependent variable) is dichotomous (it is coded '1'= diversified, if not '0' = Not diversified), we cannot use the usual OLS estimations. This is so because the strict assumptions in OLS violated when the dependent variable is not continuous variable. For instance, the basic assumptions of the dependent variable to be normally distributed cannot hold in a dichotomous dependent variable (Maxwell, 2009). Thus, we need to transform the usual equation to linear, using log transformation. Therefore, the Binary Logistic Regression Model, which was used to estimate the relationship between the dichotomous dependent variable (income diversification) and independent variables of the study. Then the equation for Binary logistic regression has been formulated as follows.

O'Connell (2006) gave the general expression for the logistic regression model as:

$$L_i = L_n\left[\frac{Yi}{1-Yi}\right] = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} + \beta_{14} X_{14+} \epsilon_i$$

Where, α = intercept of the regression; β1, β2, β3, β4, β5, β6, β7, β8, β9, β10, β11 and β12 β13 β14 are the regression coefficients of the independent variables and ϵ = Error term.

In order to appropriately consider all factors that are believed to determine rural household's income diversification, factor analysis was used to select those significant variables which determine income diversification, while at the same time removing those variables which have a lesser impact. After these factors were identified for the model, the logistic regression procedure was employed.

The likelihood ratio test was used to test the overall logistic regression model of the study. That is, this test was used to see whether there is an improvement in the fit that explanatory variables

make compared to the constant only model (null model). And its significance will tested, using a chi-square and independent sample t-test statistic at p (α) value of 5% or lower.

3.7. Variable Definitions and Hypothesis of the study

Variable defining is one of the tasks during research work hence; the data covered the necessary information on socio-demographic, economic and institutional characteristics and income diversity in the study area. Both continuous and categorical/dummy variables were used on economic theories and the findings of different empirical studies. Consequently, to investigate the research questions of this study, the following variables were identified.

3.8. Dependent Variable

- **Income diversification;** It refers to selecting different sources of income by a household. Determinants of rural household income diversification will be assessed by using two categories of income diversification namely "Diversified" and "Non-Diversified". Diversified households refers to rural households engaged more than one livelihood activities like on farm, off farm and non-farm whereas, non-diversified refers those rural households engaged in only one of livelihood activities. It is a dummy variable which was coded it is coded '1' for Diversified and '0' for Not diversified.

3.10. Independent (Explanatory) Variables

- **Sex of Household Head:** This refers to the characteristics of farm household; that is whether the household is male headed or female headed. Thus, its sign was expected to be positive for male headed households than female headed households.
- **Age of Household Head**: It is a continuous variable showing general experience that increases the marginal value of time in each activity. At the younger age the probability of diversify income increases and it decreases at older age.
- **Marital status of head**: is controlled to see whether the married or the single household are more engaged in income diversifying activity. This is a categorical variable, 0 is assigned to a single 1 is assigned to married 2 is assigned for widowed and 3 bellowing to divorced. Unmarried households are expected to be less committed to income diversification than married households.

- **Education status of Household Head**: A continuous variable that represents the educational status of HHH. Education is expected to show positive signs of income diversification. It was measured by years of the schooling.
- **Dependency ratio**; is a continuous variable that is a measure of the number of dependents aged 0-14 and 65+ compared to the total population aged 15-64. Negative signs are expected for income diversification of both farmers.
- **Distance to market**: A continuous variable that indicates the relative distance of the market closest to the market. Long distances (measured minutes) can adversely affect income diversification.
- **Farm size:** This refers to the cultivable land size measured in hectares. Small size of land is expected to encourage the participation of HHs in off farm activities.
- **Training**: It is dummy variable and it takes a value of 1 if the rural household head has participated in training on generating income and, 0 otherwise. Access to training is expected to influence the probabilities of diversifying income.
- **Agricultural Extension service:** It is continuous variable measured in number of contacts with development agents per month. It has a positive effect on income diversification
- **Total annual cash income; -** This is a continuous variable that indicates the household's total annual cash income. Households with high cash income are likely to diversify their income-generating activities into non-agricultural activities, which is expected to have a positive impact on income diversification
- **Livestock ownership:** is continuous variable refers to the total number of animals possessed by the household. Ownership of livestock expected to affect income diversification positively.
- **Credit Access:** This is dummy variable the access to formal credit for rural households. Thus, the presence of credit was expected to affect income diversification positively.
- **Family Size:** is continuous variable which refers to the number of family member in the household. Large size of family expected to affect income diversification positively.
- **Access to infrastructure;**- is dummy variable referring to households' access to infrastructures (communication, roads, transport). It takes a value of 1 if the rural

household having infrastructural access and, 0 otherwise. It expected to affect income diversification positively.

3.11. Pilot Test

To check the validity and reliability of the instruments, pilot test was conducted before administering to the final instrument. The pilot test will be conducted on 10% of the total sample i.e. 30 respondents were selected randomly from three kebeles which are out of the sample kebeles.

To check its reliability the researcher used Cronbach's alpha since it is the most commonly accepted measures of reliability. It measures the internal consistency of the items in a scale. It indicates that the extent to which the items in a questionnaire are related to each other. It also indicates that whether a scale is one dimensional or multidimensional. The normal range of Cronbach's coefficient alpha value ranges between 0-1 and the higher values reflects a higher degree of internal consistency. The average Cronbach's Alpha of questionnaire was equals to **0.78** for the average for the pilot questionnaire. This range is considered as reliable and acceptable.

3.12. Ethical Considerations

According to Saunders & Thornhill (2009), research ethics deal with how we treat those who participate in our studies and how we handle the data after we collect them. The researcher was kept privacy (that left any personal questions), anonymity (protecting the identity of specific individuals from being known) and confidentiality or keeps the information confidential.

Before writing the thesis, the researcher was considered the ethical issues that can be anticipated and described in the study. In understanding the importance of ethics in academic writing, all ethical issues observed in this study. From the beginning and prior to visiting the surveyed organization, an introduction letter obtained from Hawassa University, school of Governance and Development Studies. Participants of the study will also be asked to disclose their personal names anywhere in the questionnaire document. In connection with the interview part, all participants has been informed the same information as in the case of the questionnaires and got their approval. Generally, in this study, ethics and confidentially seriously observed from the preparation of the instruments, actual data collection, analysis, and interpretations.

CHAPTER FOUR
RESULTS AND DISCUSSIONS
INTRODUCTION

In this chapter the result and discussion of the study is presented under different sections. It has three parts. The first part is discussion on socio-demographic, economic and institution characteristics of sample respondents. Second part deals with type of on-farm, off farm and non-farm activities in rural households engaged in the study area. The third part deals with determinants of income diversification among rural households in Kembata Tembaro Zone, SNNPR.

A total of 398 questionnaires were distributed to sample respondents. Out of this 397 (99.7%) questionnaires were filled and returned to the researcher. In addition, qualitative data collected from key informants using key informant interview guide has been analyzed thematically.

4.1. Characteristics of Sample respondents

This section deals with socio-demographic, economic and institution characteristics of sample respondents. In this section of analyses descriptive statistics such as mean, standard deviation, percentage and chi square test were employed.

4.1.1. Socio-Demographic Characteristics of respondents

In this sub section socio-demographic characteristics of sample respondent's like sex, age, marital status, household size, dependency ratio and level of education has been discussed with respect to respondent's status of income diversification.

i) Sex of respondents and Income Diversity Status

Among the sample households 198 (72.8%) and 74 (27.2%) were male and female respectively were diversified and the remaining 89 (71.2%) and 36 (28.8%) male and female were non-diversified households, respectively. Finally, among the sample respondents from study area, 287 (72.3 %) were male headed and the remaining 110 (27.7%) were female headed households.

Table 4.1: Sex composition across income diversity status

Variable		Diversified		Not diversified		Total		χ^2	P value
		No	**%**	**No**	**%**	**No**	**%**		
Sex	Male	198	72.8	89	71.2	287	72.3	0.108	0.74
	Female	74	27.8	36	28.8	110	27.7		
	Total	**272**	**100**	**125**	**100**	**397**	**100**		

Source: *Survey data (2023)*

The chi-square test of sex distribution between the diversified and non-diversified indicated that sex of household head was found to be insignificant between income diversified and non-diversified households and there is weak statistical difference between diversified and non-diversified households in terms of sex composition.

ii) Age of respondents and Income Diversity Status

Table 4.2: Age of respondents and income diversity status

Variable	Age intervals	Diversified		Not diversified		Total	
		No	**%**	**No**	**%**	**No**	**%**
Age	< 30	0	0	0	0	0	0
	30-39 year	80	29.4	26	20.1	106	26.7
	40-49 year	152	55.8	56	44.8	208	52.3
	50-59 year	40	14.7	40	32.0	80	20.2
	> 60 years	0	0.0	3	2.4	3	0.7
	Total	**272**	**100.0**	**125**	**100.0**	**397**	**100**

Source: Survey data (2022)

As indicated on Table 2 above, most of the respondents i.e. 152 (55.8%) diversified and 56 (44.8%) non-diversified were aged 40-49 years, followed by 80 (29.4%) diversified and 26 (20.1%) of non-diversified respondents aged 30-39 years while those aged 50-59 accounts 80 (20.2%) 40 (14.7%) diversified and also 40 (32.0%) non-diversified. Another 3 (0.7%) were at the age of 60 years and above.

Table 4.3: The Two Sample t-test Statistics

Household	Frequency	Mean	Standard deviation	P- value
Diversified	272	43.2	0.33	
Not diversified	125	44.9	0.66	
Combined	397	43.7	0.32	0.0035

Source: - *Authors own survey, (2023)*

Based on survey result in Table 3 above the average age composition of sampled respondent is 43.7 years, with the standard deviation of (0.32), minimum year of 27 and maximum 80 years. The mean of respondent households with alternative sources of income were 43.2, while households without alternative sources of income are 44.9 years. The mean difference between the two sample mean is 1.2 (44.9-43.2) represents that there is a mean difference between the age composition among diversified and non-diversified households with the p-value of (0.0035).

The result is consistent with this finding previous studies like Destaw (2003) and Mulat (2006) indicated that the age of household head is found to negatively influence household's decision to diversify income, in a household with older age, asset accumulation is lower and some productive family members may leave their family and this may lead to lower probability of participating in various types of livelihood activities and diversify their income.

iii) Education Status of respondents across Income Diversity Status

As indicated in Table 6 below, totally 140 of which 41 (15.1%) and 99 (79.2% diversified and non-diversified respondents did not attained formal education as a result they were unable to read and write, followed by 112 (41.2%) and 15 (12.0%) diversified and non-diversified respondents who attend lower class level (grade 1-4). Moreover, 84 (30.1%) diversified 11 (8.8%) non-diversified respondents had attained 5-8 schooling and the remaining 31 (11.3%) diversified respondents completed secondary education (grade 9-12) and only 4 (1.5%) have attend the schooling level more than secondary school.

Table 4.4: Educational Status and the across Income Diversity Status

Variable	Schooling interval	Diversified		Not diversified		Total	
		No	**%**	**No**	**%**	**No**	**%**
Education status	Unable to read/write	41	15.1	99	79.2	140	35.3
	1-4	112	41.2	15	12.0	127	31.9
	5-8	84	30.1	11	8.8	95	23.9
	9-12	31	11.4	0	0.0	31	7.8
	Above secondary school	4	1.5	0	0.0	4	1.0
	Total	**272**	**100**	**125**	**100**	**397**	**100**

Source: *Survey data (2023)*

Thus, most (35.3%) of respondents in the study area were having low level of education i.e. unable to read and write.

Table 4.5.The two sample t-test statistics

Household	Frequency	Mean	Standard deviation	P- value
Diversified	272	4.1	3.5	
Not diversified	125	1.9	2.7	
Combined	397	3.3	3.4	0.000

Source: - *Authors own survey, (2023)*

Based on survey result in Table 5 above the average schooling completion of sampled respondent were 3.3, with the standard deviation of (3.4), minimum year of 0 and maximum more than secondary school. The mean schooling of respondent households with alternative sources of income was 4.1, while households without alternative sources of income are 1.9. The mean difference between the two sample mean is -2.2 (1.9-4.1) represents that there is a mean difference between the age composition among diversified and non-diversified households with the p-value of (0.000).

The t-test result of education status between the diversified and non-diversified indicated that education status of household head was found to be significant between income diversified and non-diversified households and there is statistical difference between diversified and non-diversified households in terms of household head education status. Studies indicate that as the years of schooling increases, the probability for households to participate in different income generating activities (Berhanu, 2007; Schwarze, 2004). Similarly, Wionishet (2010) noted that

households with more years of schooling have greater probability of participating in different income generating activities than engaging only in agriculture.

iv). Marital Status of respondents and Income Diversity Status

Table 4.6: Marital Status across income diversity status

Variable		**Diversified**		**Not diversified**		**Total**		χ^2	**P value**
		No	**%**	**No**	**%**	**No**	**%**		
Marital status	Single	17	6.2	2	1.6	19	4.7	4.5	.20
	Married	234	86.1	115	92.0	349	87.9		
	Divorced	17	6.2	7	5.6	24	6.0		
	Widowed	4	1.4	1	0.8	5	1.2		
	Total	**272**	**100**	**125**	**100**	**397**	**100**		

Source: Survey data (2023)

Another demographic variable analyzed is marital status of sample respondents. From the findings as depicted in Table 6, above the majority 234 (86.1%) diversified and 115 (92.0%) non-diversified respondents were married followed by 17 (6.2%) diversified and 7 (5.6%) non-diversified were divorced, 17 (6.2%) diversified and 2 (1.6%) non-diversified were single and finally 4 (1.4%) diversified and 1 (0.8% non-diversified were widowed. Thus, the result implied that majority of the respondents were married. The chi-square test of marital status between the diversified and non-diversified indicated that marital status of household head was found to be insignificant between income diversified and non-diversified households and there is no statistical difference between diversified and non-diversified households in terms of household marital status.

v) Household Size across Income Diversity Status

Table 4.7: Household size across income diversity

Variable	**Family size**	**Diversified**		**Not diversified**		**Total**	
		No	**%**	**No**	**%**	**No**	**%**
	1-3 persons	6	2.2	3	2.4	9	2.3

Sex	4-9 persons	205	75.4	85	68.	290	73.0
	>10 persons	61	22.4	37	29.6	98	24.6
	Total	**272**	**100**	**125**	**100**	**397**	**100**

Source: Survey data (2023)

As indicated in Table 7, majority 205 (75.4%) diversified and 85 (68.0%) non-diversified households had household size which is between 4-9 persons, followed by large size household, which is above 10 person per household size which accounted 61(22.4%) diversified and 37 (29.6%) non-diversified while households with small household size (1-3 members) which represent only 6 (2.2%) diversified and 3 (2.4%) non-diversified. Thus, majority of the households (73.0%) had 4-9 persons per household.

The mean family size of the sample households is 8.3 per household which is even higher from regional average household size 4.9 (CSA, 2007). The minimum household size is 2 where the maximum household size is 17. The two sample t-test result in table 8 below also shows that there is the mean divergence between the family size of diversified and non-diversified households in the study area.

Table 4.8: The two sample t-test statistics

Household	Frequency	Mean	Standard deviation	P value
Diversified	272	7.8	2.2	0.0001
Non-diversified	125	8.7	2.5	
Combined	397	8.1	2.3	

Source: - own survey, (2023)

Based on survey result the combined average family size of sampled respondent is 8.1 persons, per household with the standard deviation of (2.3), minimum of a person and maximum of 17 person per household, which exceeds the national average family size (5.1) in rural Ethiopia and 5.3 in SNNPR (CSA, 2013). The mean difference of respondent diversified households was 7.8, while non-diversified households are 8.7 persons per household was (0.95), which represents that there is a mean difference between family size of households among two sample means (p-value (0.001).

v) Dependency Ratio and Income Diversity Status

Table 4.9: Dependency ratio across income diversity status

Variable		**Diversified**		**Not diversified**		**Total**	
		No	**%**	**No**	**%**	**No**	**%**
Dependency ratio	0.1-0.5	172	63.3	74	59.2	246	61.9
	0.51-1	100	36.7	51	40.8	151	38.1
	Total	**272**	**100**	**125**	**39.6**	**397**	**100**

Source: Survey data (2023)

Among the sample households, 172 (63.3%) and 74 (59.2%) diversified and non-diversified had dependency ratio between 0.1 and 0.5 respectively, whereas the remaining 100 (36.7%) and 51 (40.8%) diversified and non-diversified households, had the dependency ration between 0.51 and 1 respectively.

Based on survey result in the average dependency ratio of sampled respondent was 0.53 persons were economically illegible and consequently, they lead their livelihood by others. The standard deviation of the survey indicated that (0.23), minimum of (0.1) and maximum (1) per household. The mean dependency ratio of respondent households with alternative sources of income was 0.54, while households without alternative sources of income are 0.5. The mean difference between the two sample mean is -0.04 (0.5-0.54) represents that there is a mean difference between the age composition among diversified and non-diversified households with the p-value of (0.94).

4.1.2. Economic Characteristics of respondents

In this sub section economic characteristics of sample respondent's like land size, livestock size and annual cash income has been discussed with respect to respondent's status of income diversification.

i) Household Farm Size and Income Diversity Status

Land is perhaps the single most important resource, as it is a base for any economic activity especially in rural agricultural sector. Access to land is an important asset for the majority of

study area people who, one way or the other, depend on agricultural production for their income and subsistence.

Table 4.10: Household farm size across income diversity

Item		**Diversified**		**Not diversified**		**Total**	
		No	**%**	**No**	**%**	**No**	**%**
Farm size	< 0.5 ha	70	25.7	34	27.2	104	26.2
	0.5-1 ha	145	53.3	66	52.8	211	53.1
	1.1-2 ha	57	20.9	25	20.0	82	20.6
	Total	**272**	**100**	**125**	**100**	**397**	**100**

Source: Survey data (2023)

The distribution of respondents by land holding size was shown in Table 9 above. In this regard of the sample households, majority 145 (53.3%) of diversified and 66 (52.8%) of non-diversified of respondents have 0.51- 1 hectare land followed by 70 (25.7%) of diversified and 27.2% of non-diversified respondents who had less than 0.5 hectare land and the remaining 57 (20.9%) diversified and 25 (20.0%) of non-diversified respondents had 1.1-2 ha land. The mean size of the sample households was 0.91, while it is about 0.90 persons for diversified households and 0.97 for not diversified households.

Studies indicated that farm size of a household gets smaller, farm households should force to participate in different activities to generate additional income (Tesfaye, 2013; Chang & Mishra, 2008). Thus, the result of t-test test revealed that there is no significant difference in farm land ownership between diversified and non-diversified households in the study area. That means there is strong statistical difference between diversified and not diversified households in terms of household size.

ii) Household Livestock ownership and Income Diversity Status

Rural households in the study sites own different types of livestock. Cattle (including oxen, cows, bulls, heifer and calves) poultry, sheep, goats and donkey are owned by most farm households as it was indicated in Table 10 below.

Table 4.11: Household TLU ownership

Variable	Number	Diversified		Not diversified		Total	
		No	**%**	**No**	**%**	**No**	**%**
TLU	0-2	13	4.7	8	6.4	21	5.3
	2.1-5	144	52.9	37	29.6	181	45.6
	5.1-8	96	35.3	48	38.4	144	36.3
	Above 8	19	6.9	32	25.6	51	12.8
	Total	**272**	**100**	**125**	**100**	**397**	**100**

Source: Survey data (2023)

The distribution of respondents by tropical live stock ownership was shown in Table 10 above. In this regard of the sample households, majority 144 (52.9%) of diversified and 37 (29.6%) of non-diversified respondents have TLU 0- 2 land followed by 96 (35.3%) diversified and 48 (38.4%) of non-diversified respondents who had 2.1-5 TLU and the remaining 19 (6.9%) diversified and 32 (25.6%) of non-diversified respondents had TLU more than 8. The mean TLU size of the sample households was 5.2, while it is about 5.1 and for diversified households and 5.5 for not diversified households. This indicates that there is the mean difference between the mean ownership of households with alternative income sources and no alternative income sources with the p-value of (0.09).

iii) Household Annual income across Income Diversity Status

Table 4.12: Average annual income of the household across income diversity

Variable		**Diversified**		**Not diversified**		**Total**	
		No	**%**	**No**	**%**	**No**	**%**
Annual income	< 10,000 ETB	21	7.7	6	4.8	27	6.8
	10000-50000 ETB	127	46.7	95	76.0	222	55.9
	50001-100000 ETB	91	33.6	13	10.4	104	26.2
	100001-200000 ET	29	10.2	11	8.8	40	10.1
	> 200000 ETB	4	1	0	0	4	1.0
	Total	**272**	**100**	**125**	**100**	**397**	**100**

Source: Survey data (2023)

With regards to amount of income received from different livelihood activities indicated, the abundant share 127 (46.7%) of diversified and 95(76.0%) of non-diversified of the respondents earn annual income 10,000 - 50,000 ETB respectively. In the same fashion 91 (33.6%) of diversified and 13 (10.4%) of non-diversified households earned cash income ranges between 50,001 - 100,000 ETB in the last year from different rural livelihood activities. Whereas, 29 (10.2%) of diversified and 11 (8.8%) of non-diversified households earned cash income ranges between 100,001 -200,000 ETB. In likewise, 21 (7.7%) of diversified and 6 (4.8%) of non-diversified the households earned cash income less than 10,000 ETB. Thus, the majority of the respondents (55.9%) earn less than 50,000 birr per annum and 26.2% of the survey respondent has income level 50,001-100,000.

The T-test statistics in table 13 below indicates that there is mean deference between the mean income of diversified and non-diversified households. The mean household income of the survey respondent was found to be 51,587.5 ETB with the standard deviation 40,568. The mean annual income of diversified household was 57,813, while non-diversified household was 38,040.9 with the mean difference (-19,772) and p-value (0.000). Thus, the result of t- test in Table 13 below revealed that there significant difference on average annual income between diversified and non-diversified households in the study area.

Table 4.13: The two sample t-test

Household		Frequency	Mean	Standard deviation	P-value
Annual income	Diversified	272	57,813.0	40,437.5	0.000
	Non-diversified	125	38,040.9	37,579.5	
	Combined	397	51,587.5	40,568	

Source:- survey, (2023)

4.1.3. Institutional Characteristics of respondents

i) Household's Access to Credit and Income Diversity Status

Table 4.14: Credit access across income diversity

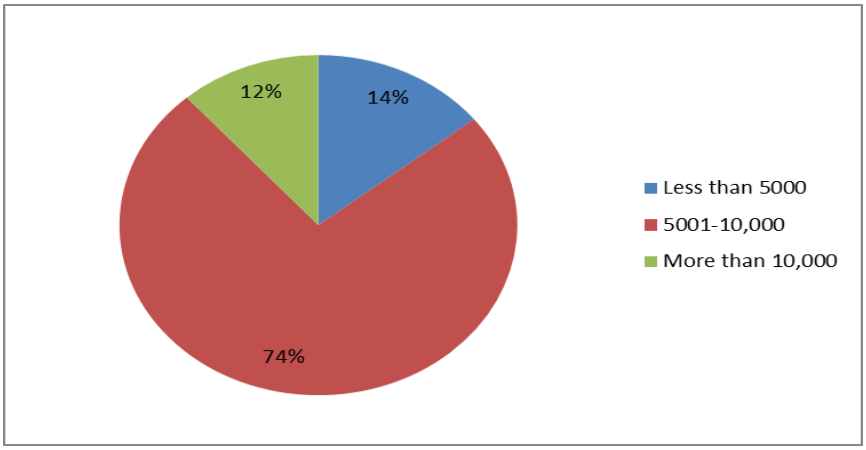
Credit access	Diversified		Not diversified		Total		χ^2	P value
	No	%	No	%	No	%		
Yes	26	9.6	4	3.2	30	7.5	11.9	.001
No	246	90.4	121	96.8	367	92.5		
Total	**272**	**100**	**125**	**100**	**397**	**100**		

Source: Survey data (2023)

The survey results indicate that only 26 (9.6%) diversified and 4 (3.2%) non-diversified respondents has access to credit. However, majority 246 (90.4%) diversified and 96.8% non-diversified respondents did not have any access to credit. Thus, the result of chi-square test revealed that there is significant difference in credit access between diversified and non-diversified households. Level of income diversity was also greater for households with access to credit than with no access despite households with any access to credit were few in number.

The survey respondents also responded that the amount of the credit they obtained in last year and the result has indicated in figure 3 below.

Figure 4.1: Amount of credit used by respondents



Source: Survey data (2023)

As depicted on Figure 3 above of the total 30 households who receive credit, majority 22 (74.2%) of respondents received 5,001-10,000 birr as a loan in 2014 EC, followed by 4 (14%)

who borrowed less than 5,000 ETB and the remaining (12%) of the respondents borrowed above 10,000 ETB. In line with this the finding by Khatun and Roy (2012) found that poor asset base, lack of credit facilities, lack of awareness and training facility, lack of rural infrastructure, lack of opportunity in non-farm sector are major challenges for off-farm diversification. Here again, the survey result is supported by the findings of the in-depth interviews.

In relation with the credit access to households, there are few credit institutions, which are cooperative association and microfinance institutions including Omo microfinance and Vision Microfinances. In this regard the secondary data from the respective study woreda has shown that the amount of the loan advance in the area was found to be very low and even out of the existing the largest share was distributed around town, rather than rural area. The last year data on loan distribution from Omo microfinance institution has shown that more than 79% of the outstanding loan has been distributed in the urban centers and the remaining 21% has distributed in rural areas.

ii) Household's Farm Distance from the Market and Income Diversity Status

Table 4.15: Distance from market in minutes in walking time across income diversity

Distance to the market	**Diversified**		**Not diversified**		**Total**	
	No	**%**	**No**	**%**	**No**	**%**
< 30 minutes	11	5	4	3.2	15	3.7
31-60 minutes	28	10.3	74	59.2	102	25.7
More than 60 minutes	233	85.7	47	37.6	280	70.5
Total	**272**	**100**	**125**	**100**	**397**	**100**

Source: Survey data (2023)

Data in Table 14 above highlight that the minority 11 (5.0%) of diversified and 4 (3.2%) of non-diversified respondents were near the market center (take less than 30 minutes in walk), while 28 (10.3%) of diversified and 74 (59.2%) of non-diversified households which are far from the market center (31-60 minutes) and the remaining majority 233 (85.7%) diversified and 47 (37.6%) non-diversified respondent take more than 60 minutes to reach to the nearest market.

iii) Access to Training on income diversity and Income Diversity Status Household's

Table 4.16: Credit access across income diversity

Training access on income diversity	Diversified		Not diversified		Total		p-value	X^2
	No	**%**	**No**	**%**	**No**	**%**	0.000	333.5
Yes	267	98.1	8	6.4	275	69.3		
No	5	1.9	117	93.6	122	30.7		
Total	**272**	**100**	**125**	**100**	**397**	**100**		

Source: Survey data (2023)

Training delivered by government and non-government organization is another factor that had contribution for rural household's income diversification. The survey results in Table 15 above indicated that the majority 267 (98.1%) of diversified and 8 (6.4%) of non-diversified respondents took training on how to diversify their income. However, the remaining i.e. 5 (1.9%) of diversified and 117 (93.6%) of non-diversified respondents (did not take any training on how to diversify their income. This indicates there is high gap on equipping the rural households on basics of how to diversify their income by involving in different activities. Thus, the result of $\chi 2$ test revealed that there is significant difference in accessing training on how to diversify their income between diversified and non-diversified households. According to the key informants lack of vocational skill training is a serious obstacle to increase rural households to diversify their income source in the area. They further confirmed that those illiterate rural household heads were mostly reluctant for the application of new technologies than the literate ones. The result was consistent with the finding of Yohannes and Tafese (2017) which stated training significantly influences income diversification strategies.

iv). Household's Access to Agricultural Extension Service and Income Diversity Status

Table 4.17: Contact with DA's across income diversity

Access to extension service	Diversified		Not diversified		Total	
	No	**%**	**No**	**%**	**No**	**%**
Yes	266	97.8	118	94.4	384	96.7
No	6	2.6	7	5.6	13	3.3
Total	**272**	**100**	**125**	**100**	**397**	**100**

Source: Survey data (2023)

Table 4.17 above indicates households contact with development agents (DA's) has shown that majority i.e. 266 (97.8%) diversified and 118 (94.4%) non-diversified respondents has contact with development agents. However, few 6 (2.6%) diversified and 7 (5.6%) non-diversified

respondents did not have any contact with DA's. During survey the respondents also replied the frequency of the contacts with DAs per month as it was represented in Table 4.18 below.

Table 4.18: Frequency of contact with Development agents across income diversity

Frequency of DAs contact	**Diversified**		**Not diversified**		**Total**	
	No	**%**	**No**	**%**	**No**	**%**
No contact within a month	3	1.1	4	3.2	7	1.7
Once per month	2	0.7	1	0.8	3	0.7
Twice per month	110	40.4	31	24.8	141	35.5
Three times per month	4	1.5	7	5.6	11	2.8
Four times and above per month	153	56.2	82	65.6	235	59.1
Total	**272**	**100**	**125**	**100**	**397**	**100**

Source: Survey data (2023)

Of the total 384 respondents who had contact with development agents or access to agricultural extension service, majority 153 (56.2%) diversified and 82 (65.6%) non-diversified respondents contact Development Agents (DA's) four times per month, 110 (40.4%) of diversified and 31 (24.8%0 non-diversified respondents contact DA's twice per month, 4(1.5%) diversified and 7 (5.6%) of non-diversified respondents contact DA's three times per month, 2(0.7%) diversified and 1(0.8%) of non-diversified respondent contact DA's once per month and finally 3 (1.1%) of diversified and 1 (0.8%) of non-diversified respondent did have contact with DA's per month. Thus, frequency of contacting with DA's was high in which they access agricultural extension service at least weekly. According to Lemi (2009) and Yishak (2017) households with less frequent contact with development agents had high level of income diversity while households with frequent and very frequent contact had lower level of income diversity. They also added household heads with more frequent contact more of focus in on-farm activities than shifting to other income sources as extension encourage improved way on-farm production and increase agricultural production and productivity which induce households to further investment of time and capital on on-farm activities.

vii) Infrastructural Access and Income Diversity Status

Table 4.19: Access to infrastructure across income diversity

Access to infrastructure	Diversified		Not diversified		Total	
	No	%	No	%	No	%
Good	2	0.7	4	3.2	6	1.5
Moderate	229	84.2	103	82.4	332	83.6
Poor	41	15.1	18	14.4	59	14.8
Very poor	0	0.0	0	0.0	0	0.0
Total	**272**	**100**	**125**	**100**	**397**	**100**

Source: Survey data (2023)

From the total 397 respondents, majority 229 (84.2%) diversified and 103 (82.4%) non-diversified stated that the condition of infrastructure was moderate followed by 41 (15.1%) of diversified and 18 (14.4%) non-diversified respondents who stated the condition of infrastructure was poor and the remaining 2 (0.7%) diversified and 4 (3.2%) of non-diversified stated that the condition of infrastructure in the study area was good. Thus, most of the respondents reported that infrastructure is one the major problem in the study area that prevents them to involve in different income generating activities because of poor infrastructure development in the area. Thus, the result of $\chi 2$ test revealed that there is no significant difference in access to infrastructure between diversified and non-diversified households.

4.2. Type of on-farm, off-farm and non-farm activities in the study Households

In this section rural household involvement experience in on-farm, off-farm and non-farm activities has been discussed.

Table 20: Participation on farm activities

Item	Frequency	Percent
Yes	397	100
No	0	0.0
Total	**397**	**100**

Source: Survey data (2023)

The survey results indicate that all (397) respondents engaged in on farm activities either farming, animal husbandry or mixed agriculture. These indicate that rural households in the study area lead their life by on farm activities like farming, animal husbandry or mixed

agriculture. Out of the 397 survey respondents 36 (9.3%) responded as they participate only in crop production. In other way 4 (1%) and 357 (98.7%) of the survey respondents responded as they lead their livelihood by animal farming and mixed farm respectively.

Table 4.21. On farm activities in the study area

On farm Activities	Frequency	Percent
Crop farming	36	9.3
Livestock ownership	4	1
Mixed Farming	357	89.7
Total	397	100

Source: Survey data (2023)

This indicated that most of the respondents engaged on mixed (farming and animal husbandry) activities. Being smallholder farmers in the study area in all woredas grow different perennial and permanent crops including red pepper, maize, sorghum, haricot bean, barely, wheat, teff, avocado, mango, coffee, *chat* etc.

Table 4.22: Types of off-farm activities rural household engaged

Item	**Frequency**	**Percent**
Piety trade	8	2.0
Carpentry/Masonry	5	1.2
Daily labor	13	3.3
Tannery/ Black smith	3	0.7
Renting of land/pack animals	15	3.7
Preparing food/local drink	16	4.0

Source: Survey data (2023)

Regarding type of off-farm activities respondents engaged, 8(2.0%) of the respondents engaged in piety trade. Similarly, 5(1.2%) of the respondents were engaged in carpentry/masonry work. 13(3.3%) of the respondents engaged in daily labor. However, 3(0.7%) of the respondents engaged in tannery/black smith and 15 (3.7%) of the respondents were engaged in renting of

land/pack animals. In likewise, 16(4.0%) of the respondents were engaged in preparing food/local drinks in the study area.

Generally, it was 15% of the respondents participate in off farm activities which are lower compared with the study of Bedemo et al. (2013) which reported that about 73.5 percent of households participate in off-farm activities and higher than Beyene (2008) reported that 5.3 percent of farm households are participants in off-farm activities.

Table 4.23: Types of non-farm activities rural households engaged

Item	**Frequency**	**Percent**
Production of construction materials	12	3.1
Furniture	7	1.7
Maintenance(mobile, motor bike etc)	4	1.0
Beauty salon(men/women)	8	2.0
Photo studio	4	1.0
Transport	70	21.4
Food and drink sale	12	3.0
Employee	49	12.3
Trade(wholesale/piety)	40	10.1
Religious	8	2

Source: *Survey data (2023)*

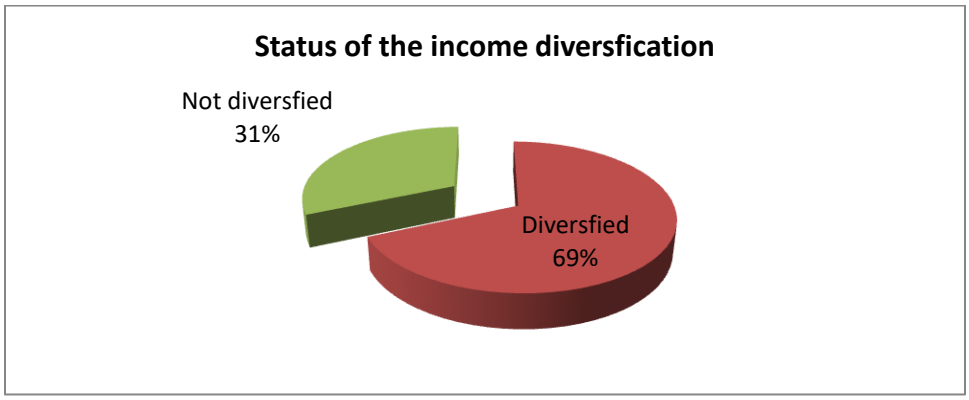
Regarding type of non-farm activities in the study area, 12 (3.1%) of the respondents engaged in production of construction materials. 7(1.7%) of the respondents engaged in Furniture. However, 1% of the respondents engaged in Maintenance (mobile, motor bike etc). Similarly, 8(2.0%) of the respondents were engaged in Beauty salon (men/women) and 4(1.0%) of the respondents engaged in Photo studio. 70(17.6%) of the respondents engaged in Transport service. 12(3.0%) of the respondents engaged in Food and drink sale. 49(12.3%) of the respondents were Employee. 40(10.1%) of the respondents engaged in Trade (wholesale/piety). However, 2(2.0%) of the respondents were engaged in religious activities in the study areas.

Generally, majority 214 (53.9%) respondents participate in non-farm activities and the most important non-farm activities in the study area includes Production of construction materials, making of Furniture, Maintenance (mobile, motor bike etc), Beauty salon(men/women), Photo studio, Transport service, Food and drink sale, Trade (wholesale/piety), black smith, Leadership(administrative) and religious activities.

Key informants also added that majority of the respondents in the study area engaged in mixed agriculture like they cultivate perennial crops like red pepper, Teff, Haricot bean, maize and Sorghum. In addition rural households produce permanent crops mainly fruits like mango, avocado, papaya etc and Khat is another crop used for home consumption as well as for sale and brought to the market for sell. In addition, there are several rural households that engaged in animal husbandry and them rare livestock like cow, oxen, bull, heifer, calf and poultry and brought the livestock and their products like milk and egg for market. Also there are households that engaged non-farm activities in piety trade like crop sell, daily labor, merchandize etc and off farm activities like tannery, furniture making, motor bike transport service etc.

Based on the data from the field 272 (68.6%) of the respondents responded as they have alternative source of income/diversified and the remaining 125 (31.4%) were responded as their livelihood is merely depends on a single source of the income/ not diversified.

Figure 4.2: The status of income diversification



Source: Field survey data (2023)

Among the total respondents as indicated in the above Figure 1, majority 272 (68.6%) of respondents were having diversified income of which 15% engaged in off farm, 57.2% engaged in non-farm and 8.0% of respondents engaged both off farm and non-farm activities. But 125 (31.4%) of the respondents were having a single income source. This shows that in the study area majority of respondent's income was diversified.

4.3 The Income Level of Rural Households from Farm, Off Farm And Non-Farm Activities

Because of disparity in asset endowment and other socio-economic factors, households in different areas earn different amount of income share from different income source activities.

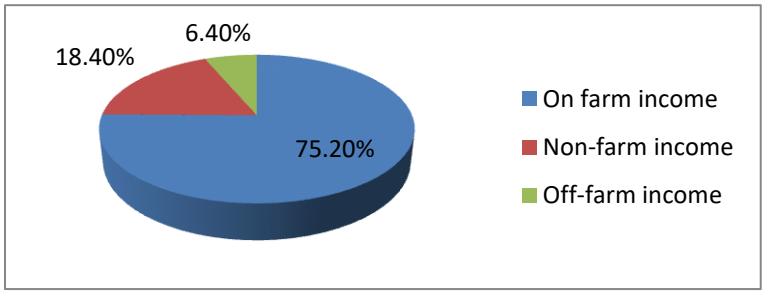
Table 4.24: Contribution of different income sources

Income category	Share of different income sources in percent (%)			Average
	Doyogena	Hangecha	Damboya	
On farm income	75	77.2	73.5	75.2
Non-farm income	19.2	16.7	19.4	18.4
Off-farm income	5.8	6.1	7.1	6.4
Total	100	100	100	100

Source: Own survey (2023)

On-farm income was most important income source in all survey weredas by accounting 75%, 77.2% and 73.5% in Doyogena, Hangecha and Damboya woredas respectively. Based on the data from field the second largest source of income was non-farm income.

Figure 4.3: The contribution of the different income sources



Source: - Survey (2023)

Accordingly, based on the data from respondents 19.2%, 16.7% and 19.4% income sources in Doyogena, Hangecha and Damboya respectively was found to be from non-farm incomes. Finally, 5.8%, 6.1% and 7.1% of the income source was from off-farm income sources in three respective Woredas, namely Doyogena, Hangecha and Damboya.

Table 4.25. Income source activities and their Contributions

Category	Income source	Contribution of income sources (%)		
		Doyogena	Hangecha	Damboya
On farm		**75**	**77.2**	**73.5**
	Crop	2.3	7.4	9.9
	Livestock	9.2	3.2	1.3
	Mixed	63.5	66.6	62.3
Off farm		**5.8**	**6.1**	**7.1**
	Piety trade	0.8	0.4	1.3
	Masonry	0.8	1.3	0.7
	Daily labor	0.9	1	0.5
	Black smith	0.08	0.2	0
	Renting	1.5	1.6	2
	Food and drink sales	1.2	1.1	1.7
	Others	1.42	0.5	0.9
Non-farm		**19.2**	**16.7**	**19.4**
	Production of construction materials	1.7	0.5	0.8
	Furniture	0.4	0.9	1
	Maintenance	0.5	0.7	0
	Beauty salon	0.1	0	0.1
	Black smith	0.3	1.1	0.7
	Transport	7	5.1	8.1
	Remittance	3	1.9	0
	Trade	2.5	3.7	3.5
	Religious	0.5	0.1	0.8

	Others	3.3	2.7	4.4

Source: - survey (2023)

Based on Table 24 above six (6) off-farm income sources were identified in study area. As per to the survey result from field 1.5% of household's income in Doyogena woreda was derived from renting of land and cart animals followed by sales of local food and drinks (1.2%), daily labor (0.9%), piety trade and masonry (0.8%) and black smith (0.08). In likewise, the survey result has shown that from field 1.6% of household's income in Hangecha woreda was derived from renting of land and cart animals followed by 1.3%, 1.1% and 1% masonry, sales of food and drinks daily labor respectively. Similarly, the survey result in Damboya woreda has shown that 2% of the off-farm income was derived from renting and followed by 1.7% and 1.3% sales of food and drink and piety trade respectively.

Table 24 above also indicated that non-farm income sources were most important income sources in three survey conducted woredas. Among ten non-farm income sources, transport was most important non-farm income (7%) of total non- farm household income in Doyogena woreda followed by trade (2.5%), production of construction materials including wood and stone. The status of the non-farm income in Aangecha woreda is also similar to that of Doyogena, in which 5.1% of non- farm income was from transport service, 3.3% trade and 1.9% from remittance respectively. Based on Table 6 above, the status of non-farm income in Damboya woreda has shown that 8.1%, 3.5% and 1% of the non-farm income sources of the rural households in Damboya woreda wos come from transport, trade and furniture respectively.

4.4. Major Determinants of Income Diversification

Despite the fact that the descriptive statistics from the household survey gave us the overall picture of the data set, it is so difficult to make inference about the population without appropriate econometric estimation. Therefore, binary logistic regression model was applied to look at the effect of each explanatory variable on the dependent variable (income diversification).

In this section an attempt has been done identify the explanatory variables that have significant difference with the response variable i.e income diversity. In addition, multicollinearity, general

goodness of fit (GOF) diagnostic test has been calculated. Thus, binary logistic regression model was used for further analysis of the subject matter.

4.3.1. Post Estimation Diagnostics

To investigate factors related to income diversity among rural households in the study area. Data collected from 397 sampled respondents were subjected to binary logistic regression analysis using STATA 16. Prior to the situation, the researcher employed the model for explanatory variables were checked for existence of multi- co-linearity problem. The problem arises when at least one of the independent variable is linear combination of the others. The existence of multi-co-linearity might cause the estimated regression coefficient to have the wrong signs and smaller odds ratio which lead to wrong conclusion.

There are two measures often suggested to test the presence of multi-co-linearity. Variance Inflation Factors among association among continuous explanatory variables and Contingency coefficient for dummy variables.

As ‘a rule of thumb’, if the mean VIF of variables exceeds ten, that variable is said to be highly collinear and it can be concluded that multi-co-linearity is a problem. The average value of VIF for variables was 1.4 which is less than ten which indicate that multi-co-linearity is not a problem for this data set.

The goodness of the fit test (GoF) with the p-value of (1.0) indicates that the model has specified well. The Hosmer and Lomshow test for goodness of the fit above 50% indicates that the model is well specified. The other diagnostic test employed was link test for model specification. The logic behind the link test is that if the model is properly specified, one cannot be able to find additional statistically significant predictors except by chance. In logit regression, link test command uses the linear predictor value (_hat) and linear predicted value square (_hatsq) as the predictors of the model. The variable _hat should be statistically significant, unless the model is completely miss-specified. On contrary, if the model is properly specified, the variable _hatsq should not have much predictive power except by chance. In our model _hat is significant (0.000) and _hatsq (0.11) is insignificant, hence, all the relevant variables are included in model and the model is correctly specified.

Table 4.26: Binary logistic analysis of determinants of income diversity

Variable	Coefficient	Std. Err.	Z	P –value	Marginal effect
Sex of the respondents	1.344	.8178	1.64	0.100	.722
Age of respondents	-0.052	.0789	-0.66	0.507	43.77
Education level	.371**	.1379	2.81	0.005	3.35
Marital Status	-1.425	.5875	-2.42	0.015	1.037
Family size	0.0722	0.164	0.44	0.66	8.11
Dependency ratio	1.267	1.016	0.63	0.53	.527
Training on income diversification	9.13	1.398	6.53	0.000	.692
Land size	-0.897	1.035	-0.87	0.386	.92
Distance to the market	0.0086	.0291	0.30	0.766	75.76
Annual income	0.00004**	.000012	3.07	.002	7.900
Total Livestock Unit	-0.210	.1659	-1.29	0.195	5.25
Access to credit	4.052*	3.267	1.24	0.215	.075
Infrastructure access	-4.200**	1.428	-1.29	0.003	.866
Access to extension service	0.0032	.3468	.01	0.99	3.17
Constant	-1.165	4.139	-0.28	0.778	
Number of Obs = 397					
LR chi2(15) = 416.3					
Prob > chi^2 = 0.000					
Pseudo R^2 = 0. 84					

***, ** and * indicate significance at 1, 5 and 10% probability levels, respectively.
Dependent variable: Income diversification
Source: - Survey data (2023)

4.3.2. Discussion on Binary logistic model result

The model result indicates that out of 14 explanatory variables which were considered in the econometric model five variables were found to significantly influence the probability of being income diversification. These are marital status, education level of household, household annual income, training on income diversification and infrastructure whereas, the remaining eight explanatory variables were found to have no statistically significant influence on income diversity in the study area. These variables include; sex of the respondents, age of the household, farm size and distance to the market, Total Livestock Unit, family size, dependency ratio, access to credit and contact with extension experts are not statistically significant for rural household's income diversification in the study area.

Pseudo R-square with value (R^2=0.8417) shows that about 84.17 percent of change on income diversity of rural households is explained by independent variables incorporated with in the

model i.e. As indicated in the above table, the pseudo R^2 value of the model used to measures to what extent the independent variables explained the dependent variable is 84.14%. This implies that 84.14% of the variation in income diversity is explained by the aforementioned explanatory variables i.e. the variables collectively explains 84.14% of changes in income diversity. Thus, these variables collectively are good explanatory power. While, the remaining less than half percentage i.e. 15.83% variation in income diversity of rural households in the study area could be explained by exogenous variables which are outside the model.

4.4.3. Explanation of significant explanatory variables

Educational status of respondents: It is obvious that education increases the knowledge and skill of the peoples in a society. Therefore, the more education to a society means the more intervention in different economic activity by that society. Thus, education is a fundamental instrument in equipping farmers with necessary skills which enables them to diversify income sources than uneducated ones. Consequently, Education has been hypothesized to have a positive relationship with income diversification. The Binary logit regression result has shown that, education status has positive influence on dependent variable with ($_{\beta}$= .37) and statistically significant at 5% level. As the level of education of the household increases, the probability of the household participation on nonfarm and off farm activity increases. In fact, the odds ratio of education implies that if education of the farmer increases by one year, the likelihood of the farmer participation increases by a factor of 3.35 times , ceteris paribus. The result of this study on relation between educational level and income diversification were consistent with the findings of several studies (Bogale & Hagedorn, 2003; Dercon & Krishan, 1996; Abdulai & Crole Rees, 2001; Babatunde & Qaim, 2009; Minot et al., 2006; Babatunde et al, 2010; Amare & Legesse, 2013). Education increases human capital and hence, increases the skill of the farmer to secure non-farm jobs rather than retaining only in farm activities.

Household income: this variable was found to have positive and significant influence of income diversification at 1% probability level. This result implies that households having large cash income are more likely to diversify the income generating activities in the study area. This result shows that those households with low income are less likely to participate in income diversifying income activities than those who have high income. The possible reason might be is that those rural households who have adequate income sources can overcome financial constraints to

engage in alternative income-generating activities. Hence, higher income can encourage them to invest in other income-generating (especially non-farm) activities. From the model result, other things being constant, odd ratio reveals that the probability of a household diversifying into non-farm and off-farm activities increased by 70% for those rural households with higher level of income. This is may be farm income increases financial capacity which in turn helps households to invest on nonfarm activities. This finding appears to confirm the finding of (Adewunmi et al., 2011 and Babatunde and Qaim, 2008). The finding also is in line with the studies of Stefan et al (2015) and Isaac (2019) which revealed income is one of the most important determinants of income diversification.

Infrastructure access: The result of the Binary logit regression model has shown that, access to infrastructure has positive influence over the dependent variable with (β= 4.2) and statistically significant at 1%. The marginal effect of the model result reveals that not employed/ doing any paid work women are less likely to be income diversification by 86%. This indicates the probability of diversifying income for those households having poor infrastructure is less than that of those households who have good infrastructure found to have more income diversity. The result of this study is consistent with finding of other studies done by Babatunde and Qaim (2009), Knudsen and Tidsskrift (2007) and Boohene and Peprah (2011) stated that the nature of roads with regards to availability of tarred was found to positively influence income diversification by farm households in the region. Tarred roads promote business activities and results in a reduction in the transaction cost (transports fares, loading fares etc) associated with doing business. However, in raining seasons, communities with untarred roads experience tardiness in business activities or are cut-off completely from major markets, due to collection of water on the roads. Thus, vehicles which ply such roads do so at immense risk. In some situations long hours are spent on roads and sinking of vehicles into muds is common. Communities with tarred roads were found to be able to diversify their businesses throughout the seasons of the year. Therefore, the hypothesis that stated as rural households with good infrastructures diversify their income than rural households with poor infrastructures is accepted.

Marital status of the household and income diversity

Marital status of the household was founded to one of the main variables affecting the income diversity in the study area. Based on the Logistic regression result by considering other factors

constant, married households were less likely (β=-1.42) to participate in income diversity activities than that of other group of marital status (single, divorced and widowed) and statistically significant at 1%. The reason might be that the married household merely engaged in the on farm activities so as to get surplus agricultural income in comparison with the other groups.

Training on income diversification

Informal training by government and non-government organizations plays vital role in income diversification in the rural areas. In this regard the Binary logistic regression result of the study has shown that rural households who had training on income diversity were more likely (β =9.13) participate in income diversity activities and statistically significant at 1%. Similarly, holding other factors constant, rural households who participate training have more likely participates in rural income diversity and statistically significant at 1%. The reason is that training increases the skill of households to have alternative sources of the income in the rural areas.

CHAPTER FIVE

SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter deals with summary of findings, conclusion and it recommendation forwarded based the findings of the study.

5.1. Summary of Major Findings

The study aimed at identifying determinants of income diversification among rural households in the, Kembata Tembaro Zone, SNNPRS based on the evidences from three woredas. Specifically, it tried to assess type of activities rural households engaged and identify socio-demographic, economic and institutional factors that determine income diversification among rural households in the study area.

For this purpose the researcher collected data from 397 sample respondents and 12 key informants. After data collection from the field, data were analyzed using descriptive and inferential statistics by using STATA 16 version.

Thus the finding of the study revealed that;-

- Majority of rural households in the study area lead their life by on farm activities of farming, animal husbandry or mixed agriculture.
- Relatively rural households in the study area earn better mean income from on-farm activities compared to off farm and non-farm activities.
- Supplementing household income and insufficient agricultural production were primary motive for few rural households to engage in off farm and non-farm activities in the study area.
- Based on the logistic regression results, the education level of the household head, marital status, household annual income, infrastructure and training on income diversification were the major determinants of income diversification among rural households in the study area.

5.2. Conclusion

This main objective of study was identifying determinants of income diversification among rural households in Kembata Tembaro Zone, SNNPRS. To achieve the stated goal and the other four specific objectives, the data collected and analyzed by using both descriptive and inferential analysis. Accordingly, the following conclusion has been reached at from the thorough analysis of the data obtained from these sources.

Descriptive analyses of this study revealed that majority of rural households in the study area lead their life by on farm activities of farming, animal husbandry or mixed agriculture. There were few rural households in the study area who engaged in piety trade followed by off farm activities. Majority of rural households earn less than 50,000 ETB from different activities per annum.

Relatively rural households in the study area earn better mean income from on-farm activities compared to off farm and non-farm activities. Supplementing household income and insufficient agricultural production were primary motive for few rural households to engage in off farm and non-farm activities in the study area.

On the other hand, binary logistic regression models used for the analysis of determinants of off farm participation and determinants of income diversification of off farm activities. As a result binary logit model was employed to analysis the determinants of households' income diversification includes marital status, education status of the household head, household annual income, training on income diversity and infrastructure access were found to be significant explanatory variables.

5.3. Recommendation

Based on the findings of the study, the following policy directions are recommended;

1) Educational level was found to be one of the important determinants the level of household income diversification. The educated peoples diversify their income through opting for salaried jobs, self-employment activities, etc., illiterate persons engage themselves in agricultural activities which are mostly valuable to weather and other damage and partially in wage employment. Therefore, investing in education and increasing access of primary up to secondary education will help the rural households in

getting alternative income. Human capital development through education was found to be important factor for promotion and expansion of rural income diversification sources. This finding implies that education should be given for rural communities to promote and expand off-farm activity and to enhance high income earning capacity of farmers from income diversification strategies. Therefore, enhancing the capability of rural households through education is expected from zoned administration by integrating concerned stakeholders.

2) The finding of this study revealed that annual income of the household, which is mainly dominated by on farm was found positive and significant influence on income diversification in the study area. Therefore, Aids and subsidized inputs should be provided for rural farm households to improve agriculture to increases farm income which in turn improve financial capacity of households to diversify nonfarm activity.

3) The finding of this study revealed that participation of the training on income diversification by different stockholders was found positive and significant influence on income diversification in the study area. It is due to that training increases the human capital, consequently the rural households increase their skills in relation with the having alternative sources of the income. Therefore, government and other stakeholders should increase the awareness for rural households to diversify their income.

4) Rural infrastructure is crucial factor in maintaining sustainable rural livelihood, especially road accessibility, electricity and water plays vital role in facilitating access to markets, which in turn opens up opportunities for households to diversify their economic activities. Therefore, a need for government to provide more rural roads and rehabilitate eroded ones in order to reduce the high transaction cost of buying from or selling to markets, as transaction cost reduces the returns from market sales. This will encourage the development of rural road to facilitate farmers' participation in diversified economic portfolio. Maintaining sustainable rural livelihood, especially road accessibility play vital role in facilitating access to markets. Hence, need to provide more rural roads and rehabilitate eroded ones in order to reduce the high transaction cost of buying from or selling to markets, as transaction cost reduces the returns from market sales. This will encourage the development of rural road to facilitate farmers' participation in diversified

economic portfolio. Therefore, government policy should pay more attention on infrastructure to reduce the entry barriers and facilitate easier access to non-farm activities.

5) Finally, attention should be focused at understanding and developing the rural non-farm sector in the study area to make the sector more jobs providing and rewarding as more farm households members involved in the activities but without jeopardizing the food basket sector of the nation.

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Appendix A

HAWASSA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

MBA IN COMMUNITY DEVELOPMENT

Dear respondents: This questionnaire is designed to collect data to carry out a research entitled "**Determinants of Income Diversification among Rural Households: The Case of Kembata Tembaro Zone, SNNPRS".**The information that you offer me with this questionnaire will be used as a primary data for the study which I am conducting as a partial fulfilment of the requirements for the degree of Masters in Community Development in Hawassa University, Ethiopia. Therefore, I kindly request you to fill the questionnaire honestly and neatly assuring that the data will be used solely for the intended academic purpose only. Any information you provide in this questionnaire will be kept confidential and it will be used only for the academic purpose. I cannot include any information that will make it possible to identify any respondents. Your response is very crucial to gather data for this study.

I would like to express my deep appreciation for your generous time, honest and prompt responses.

Yours Faithfully

Eyerusalem Kidanemariam

251-912243962

Hawassa, Ethiopia

General Instructions

1. You are not required to write your name.

2. All questions are equally important for the completion of the study.

Part I

Demographic profile of the Respondents

1. Age of the household, please indicate in year ----------

2. Gender:

1) Male 2) Female

3. Marital status:

0) Single 1) Married 2) Divorced 3) widowed

4. Family size in age category

No	Age category	Male	Female	Total
4.1	Below 15 years			
4.2	15-29 years			
4.3	30-45 year			
4.4	46-60 year			
4.5	Above 60 years			
	Total			

5. Level of education in year ----------

Part II

A. Types of the on farm and off farm activities

6. What are the types of the on farm and off farm activities practiced in the area? Please indicate your response in table below

No	Types of On farm activities	Types of Off farm activities

B. The level of income from on farm and off farm activities

7. The amount of income you have earned in 2014 E.C from different sources

Category	Income source	Unit	Amount	Unit Price	Income in Birr
On farm					

Off farm					

C. Factors affecting the Income Diversification in the study area

Please indicate your level of agreement with the statements so that your answers to these questions will enable the researcher to assess what you think about the determinants of the income diversification in the study area

1= strongly disagree, 2= Disagree, 3= Neutral, 4=Agree, 5= strongly agree

8. Training

To what extent do you agree with the effect of training on the income diversification in the study area?

No	**Statements**	1	2	3	4	5
8.1	The government bodies **frequently** deliver training to rural households to diversify income					
8.2	I felt government bodies deliver training in **seldom** to rural households					
8.3	I felt there is no training at all in relation with income diversification					

9. Have you ever participated in any training on income diversification? 0. No 1.yes

10. Agricultural Extension services

Do you have contact with development agent in previous time? 1/ yes 0/ no

To what extent do you agree with the following statements in relation with the effect of the agricultural extension over income diversification?

No	**Statements**	1	2	3	4	5
10.1	Access to agricultural extension highly affects the level of income diversification in the study area					
10.2	Agricultural extension services have no effect over income diversification in the study area					

10. How many times do you contact with development agents to get extension services per week? Please indicate in number? ------

11. Agricultural input

To what extent do you agree with the following statements in relation with the effect of the agricultural input application over income diversification?

No	**Statements**	1	2	3	4	5
11.1	Access to agricultural input highly affects the level of income diversification in the study area					
11.2	Agricultural input application have no effect over income diversification in the study area					

12. Have you used any agricultural input in last year? 1. yes 0. No

13. Access to Infrastructure

To what extent do you agree that the impact of access to infrastructure over the income diversification in the study area?

No	**Statements**	1	2	3	4	5
13.1	Access to infrastructure highly affects the level of income diversification in the study area					
13.2	Access to the infrastructure have no effect over income diversification in the study area					

14. How do you consider your access to infrastructure in your village? 1. Good 0. Poor

15. Access to Credit

To what extent do you agree that impact of access to credit over the income diversification in the study area?

No	**Statements**	1	2	3	4	5
15.1	Access to credit highly affects the level of income diversification in the study area					
15.2	Access to credit have no effect over income diversification in the study area					

16. Have you got any credit in last year? 1. yes 0. No

17. If your answer for question 16 above is yes what amount in Birr (---------- Birr)

18. If your answer for question number 16 is "**Yes**", what is the major source of credit?

1) Banks 2) MFIs 3) SAACO 4) Others (Specify)_____

19. Please fill the number of the livestock in table below.

No	Type of livestock	Quantity
18.1	Ox	
19.2	Cow	
19.3	Bull	
19.4	Heifer	
19.5	Calf	
19.6	Goat	
19.7	Sheep	
19.8	Donkey	
19.9	Mule	
19.10	Horse	
19.11	Poultry	

19. Income from livestock products in Birr ----------

20. Farm size _____ (in hectare)

21. Farm distance from market (on walking in minute) _____

22. What should be done to rural households increase income diversification in the study area?

_____
_____
_____
_____
_____

Thank you for your cooperation!!!

Key Informant Interview Guideline for Development Agents, Government Officials and Experts of sample woreda

Position_____

Sex_____

Age_____

Education level _____

1. What are the major livelihood activities in the Woreda?
2. What is the type of on farm and off farm activities in rural households in the woreda?
3. What is the income level of the rural households from off farming and on farm activities in the study area?
4. What kinds of activities do you think are more significant for the household?
5. What are the major factors that affect income diversification in the study area?
6. What should be done to enhance income diversification in the study area?

Appendix B

Logistic Regression Result

```
. logit income_divesfication sexofhousehold martialstatus ageofhousehold educationlevelofhousehold familysize dependancyrat
> io landsize distancefrommarket training extensioncontact creditaccessc accesstoinfrastracture tlu annualincome

Iteration 0:   log likelihood = -247.30532
Iteration 1:   log likelihood = -54.181654
Iteration 2:   log likelihood = -44.323153
Iteration 3:   log likelihood = -39.489669
Iteration 4:   log likelihood = -39.160141
Iteration 5:   log likelihood = -39.152667
Iteration 6:   log likelihood = -39.152665

Logistic regression                             Number of obs     =        397
                                                LR chi2(14)       =     416.31
                                                Prob > chi2       =     0.0000
Log likelihood = -39.152665                     Pseudo R2         =     0.8417
```

income_divesfication	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
sexofhousehold	1.344838	.8178984	1.64	0.100	-.2582137	2.947889
martialstatus	-1.42358	.5875016	-2.42	0.015	-2.575062	-.2720981
ageofhousehold	-.0523771	.0788977	-0.66	0.507	-.2070138	.1022597
educationlevelofhousehold	.3709431	.1319509	2.81	0.005	.1123242	.6295621
familysize	.072254	.1640156	0.44	0.660	-.2492107	.3937187
dependancyratio	1.267526	2.016618	0.63	0.530	-2.684972	5.220025
landsize	-.8975885	1.035914	-0.87	0.386	-2.927943	1.132766
distancefrommarket	.0086808	.0291244	0.30	0.766	-.048402	.0657635
training	9.132228	1.39826	6.53	0.000	6.391688	11.87277
extensioncontact	.0032396	.3468753	0.01	0.993	-.6766235	.6831027
creditaccessc	4.052863	3.267676	1.24	0.215	-2.351663	10.45739
accesstoinfrastracture	-4.200364	1.428757	-2.94	0.003	-7.000677	-1.400051
tlu	-.2147745	.1659083	-1.29	0.195	-.5399488	.1103998
annualincome	.0000362	.0000118	3.07	0.002	.0000131	.0000594
_cons	-1.16561	4.139764	-0.28	0.778	-9.279398	6.948178

Chi test for sex of the respondent

```
. tabulate income_divesfication sexofhousehold, chi2
```

Income_Div esfication	sex of household 0	1	Total
0	36	89	125
1	74	198	272
Total	110	287	397

```
          Pearson chi2(1) =   0.1087   Pr = 0.742
```

t-test for age of household

```
. ttest ageofhousehold, by(income_divesfication)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	125	44.992	.6594715	7.373116	43.68672	46.29728
1	272	43.13603	.3509725	5.788386	42.44505	43.82701
combined	397	43.7204	.3201734	6.379411	43.09095	44.34986
diff		1.855971	.6838702		.5114902	3.200451

```
    diff = mean(0) - mean(1)                                      t =   2.7139
Ho: diff = 0                                     degrees of freedom =      395

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.9965         Pr(|T| > |t|) = 0.0069          Pr(T > t) = 0.0035
```

```
. ttest educationlevelofhousehold, by(income_divesfication)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	125	1.912	.2457421	2.74748	1.425608	2.398392
1	272	4.014706	.2101047	3.465135	3.601061	4.428351
combined	397	3.352645	.1704709	3.396608	3.017504	3.687786
diff		-2.102706	.3519353		-2.794606	-1.410805

```
    diff = mean(0) - mean(1)                                      t =  -5.9747
Ho: diff = 0                                     degrees of freedom =      395

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0000         Pr(|T| > |t|) = 0.0000          Pr(T > t) = 1.0000
```

```
. ttest familysize, by(income_divesfication)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	125	8.768	.2249404	2.51491	8.32278	9.21322
1	272	7.808824	.1374231	2.26644	7.538271	8.079376
combined	397	8.110831	.1197684	2.386369	7.87537	8.346293
diff		.9591765	.2536411		.4605211	1.457832

```
    diff = mean(0) - mean(1)                                      t =   3.7816
Ho: diff = 0                                     degrees of freedom =      395

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.9999         Pr(|T| > |t|) = 0.0002          Pr(T > t) = 0.0001
```

```
. ttest dependancyratio, by(income_divesfication)

Two-sample t test with equal variances

   Group |      Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      125          .5    .0193774     .216646    .4616467    .5383533
       1 |      272    .5397059    .0146365    .2413918    .5108901    .5685216
---------+--------------------------------------------------------------------
combined |      397     .527204    .0117611    .2343387     .504082    .5503261
---------+--------------------------------------------------------------------
    diff |           -.0397059    .0252753               -.0893968    .0099851
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -1.5709
Ho: diff = 0                                     degrees of freedom =      395

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0585         Pr(|T| > |t|) = 0.1170          Pr(T > t) = 0.9415

.


. ttest landsize , by(income_divesfication)

Two-sample t test with equal variances

   Group |      Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      125        .972    .0414667    .4636114    .8899259    1.054074
       1 |      272    .9044118    .0257866    .4252835    .8536442    .9551793
---------+--------------------------------------------------------------------
combined |      397    .9256927    .0219953    .4382528    .8824506    .9689348
---------+--------------------------------------------------------------------
    diff |            .0675882    .0472944               -.025392    .1605684
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =   1.4291
Ho: diff = 0                                     degrees of freedom =      395

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.9231         Pr(|T| > |t|) = 0.1538          Pr(T > t) = 0.0769


. ttest extensioncontact, by(income_divesfication)

Two-sample t test with equal variances

   Group |      Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      125       3.064    .1001573    1.119793    2.865761    3.262239
       1 |      272    3.224265    .0622153     1.02608    3.101778    3.346751
---------+--------------------------------------------------------------------
combined |      397    3.173804    .0530839    1.057689    3.069442    3.278165
---------+--------------------------------------------------------------------
    diff |           -.1602647    .1141516               -.3846853    .0641559
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -1.4040
Ho: diff = 0                                     degrees of freedom =      395

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0806         Pr(|T| > |t|) = 0.1611          Pr(T > t) = 0.9194

.
```

```
. ttest distancefrommarket, by(income_divesfication)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	125	75.24	1.451202	16.22493	72.36766	78.11234
1	272	76.01103	.853107	14.0698	74.33147	77.69059
combined	397	75.76826	.7410796	14.76591	74.31132	77.2252
diff		-.7710294	1.597118		-3.910943	2.368884

```
    diff = mean(0) - mean(1)                                      t =  -0.4828
Ho: diff = 0                     degrees of freedom =      395

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.3148         Pr(|T| > |t|) = 0.6295          Pr(T > t) = 0.6852
```

```
. ttest tlu, by(income_divesfication)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	125	5.4888	.2055934	2.298605	5.081873	5.895727
1	272	5.149265	.1478823	2.438937	4.858121	5.440409
combined	397	5.256171	.1203495	2.397946	5.019568	5.492775
diff		.3395353	.2588813		-.1694221	.8484928

```
    diff = mean(0) - mean(1)                                      t =   1.3115
Ho: diff = 0                     degrees of freedom =      395

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.9048         Pr(|T| > |t|) = 0.1904          Pr(T > t) = 0.0952
```

```
. ttest annualincome, by(income_divesfication)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	125	38040.99	3361.22	37579.59	31388.2	44693.79
1	272	57813.03	2451.887	40437.55	52985.87	62640.2
combined	397	51587.58	2036.069	40568.38	47584.72	55590.43
diff		-19772.04	4275.045		-28176.73	-11367.35

```
    diff = mean(0) - mean(1)                                      t =  -4.6250
Ho: diff = 0                     degrees of freedom =      395

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0000         Pr(|T| > |t|) = 0.0000          Pr(T > t) = 1.0000
```

. tabulate income_divesfication training, chi2

Income_Diversfication	Training 0	1	Total
0	117	8	125
1	5	267	272
Total	122	275	397

Pearson chi2(1) = 338.7665 Pr = 0.000

. tabulate income_divesfication creditaccessc, chi2

Income_Diversfication	Credit accessc 0	1	Total
0	124	1	125
1	243	29	272
Total	367	30	397

Pearson chi2(1) = 11.9232 Pr = 0.001

. vif

Variable	VIF	1/VIF
landsize	2.05	0.486833
familysize	1.68	0.595819
tlu	1.64	0.608103
extensionc~t	1.58	0.633839
ageofhouse~d	1.56	0.642362
annualincome	1.55	0.643860
distancefr~t	1.37	0.731222
dependancy~o	1.27	0.787455
training	1.22	0.818138
educationl~d	1.19	0.836902
accesstoin~e	1.19	0.836968
sexofhouse~d	1.14	0.878271
creditacce~c	1.14	0.879921
martialsta~s	1.04	0.960020
Mean VIF	1.40	

+

```
. mfx

Marginal effects after regress
      y  = Fitted values (predict)
         =  .68513854
```

variable	dy/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
sexofh~d*	.0189589	.02086	0.91	0.363	-.021922	.05984		.722922
martia~s	-.0520647	.02252	-2.31	0.021	-.096194	-.007936		1.03778
ageofh~d	-.0019716	.00171	-1.15	0.250	-.005329	.001386		43.7204
educat~d	.0058996	.00282	2.09	0.036	.000374	.011425		3.35264
family~e	.0021991	.00476	0.46	0.644	-.007121	.011519		8.11083
depend~o	.0310254	.04212	0.74	0.461	-.051535	.113585		.527204
landsize	-.0088201	.02865	-0.31	0.758	-.064965	.047325		.925693
distan~t	-.0002791	.00069	-0.40	0.687	-.001639	.001081		75.7683
training*	.9033006	.02096	43.09	0.000	.862213	.944388		.692695
extens~t	-.0100145	.0104	-0.96	0.336	-.030403	.010374		3.1738
credit~c*	.0084731	.03529	0.24	0.810	-.060687	.077633		.075567
access~e	-.0797148	.02503	-3.18	0.001	-.128782	-.030648		.866499
tlu	-.0028793	.00468	-0.61	0.539	-.012061	.006302		5.25617
annual~e	7.90e-07	.00000	2.94	0.003	2.6e-07	1.3e-06		51587.6

(*) dy/dx is for discrete change of dummy variable from 0 to 1

.

GOF test

```
. estat gof

Logistic model for income_divesfication, goodness-of-fit test

       number of observations =       397
 number of covariate patterns =       311
            Pearson chi2(295) =    189.28
                  Prob > chi2 =    1.0000
```

Linktest for model specification

```
. linktest
```

Source	SS	df	MS	Number of obs	=	397
				F(2, 394)	=	1273.44
Model	74.1685218	2	37.0842609	Prob > F	=	0.0000
Residual	11.4737956	394	.029121309	R-squared	=	0.8660
				Adj R-squared	=	0.8653
Total	85.6423174	396	.216268478	Root MSE	=	.17065

income_div~n	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
_hat	1.291703	.1866312	6.92	0.000	.9247857	1.658621
_hatsq	-.2874804	.1828889	-1.57	0.117	-.6470405	.0720797
_cons	-.0112538	.0175812	-0.64	0.522	-.0458185	.023311