



**DETERMINANTS OF RURAL HOUSEHOLDS
LIVELIHOOD DIVERSIFICATION: IN CASE OF KEBENA
DISTRICT, GURAGE ZONE**

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DETERMINANTS OF RURAL HOUSEHOLDS LIVELIHOOD
DIVERSIFICATION: IN CASE OF KEBENA DISTRICT, GURAGE ZONE

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This is to certify that the thesis entitled “The Determinant of Rural Households Livelihood Diversification: In Case of Kebena District, Gurage Zone” submitted in partial fulfilment of the requirements for the degree of Master's with specialization in Developmental Economics, Department of Economics, College of Business and Economics School of Graduate Studies, and has been carried out by Mekiyou Arebo ID .No BEGR/010/13, under my supervision. Therefore, I recommend that the student has fulfilled the requirements and hence hereby can submit the thesis to the department.

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We, the undersigned, members of the Board of Examiners of the final open defence by Mekiyou Arebo have read and evaluated his thesis entitled "The Determinant of Rural Households Livelihood Diversification: In Case of Kebena District, Gurage Zone", and examined the candidate. This is, therefore, to certify that the thesis has been accepted in Partial fulfilment of the requirements for the degree masters of Science in economics specialization in developmental economics.

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Declaration

I hereby declare that this MSc thesis is my original work and has not been presented for a degree in any other university, and all sources of material used for this thesis have been duly acknowledged.

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This MSc thesis has been submitted for examination with my approval as Thesis advisor.

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DEDICATION

This thesis is dedicated to: The wonderful people reside in Kebena district of Gurage zone.
The Aid Workers and the informants, who willingly participated in this study, keep on with the hard work!!

LIST OF ABRIVIATIONS AND ACRONYMS

ANOVA	Analysis of Variance
AU	African Union
CSA	Central Statistics Agency
DFID	Department for International Development
FAO	Food and Agriculture Organization
GDP	Growth Domestic Product
GOE	Government of Ethiopia
GPS	Global Positioning System
HH	Household Head
IFPRI	International Food Policy Research Institute
IIA	Independence from Irrelevant Alternative
ILO	International Labor Organization
KDOARD	Kebena District Office of Agriculture & Resource Development
KDOFED	Kebena District Office of Finance & Economic Development
MASL	Meter above Sea Level
MCCO	Membership in Consumer Cooperative
MFI	Micro Finance Institution
MOANR	Ministry of Agriculture and Natural Resource
MOFED	Ministry of Finance and Economy Development
UNDP	United Nation Development Program
UNECA	United Nations Economic Commission for Africa
UNHCR	United Nation High Commissioner for Refuges
VIF	Variance Inflation Factor
WB	World Bank
WFP	World Food Program

Table of Contents

ACKNOWLEDGMENTS	IV
STATEMENT OF DECLARATION	V
DEDICATION	VI
LIST OF ABRIVIATIONS AND ACRONYMS	ERROR! BOOKMARK NOT DEFINED.
TABLE OF CONTENTS.....	VIII
LIST OF TABLE	ERROR! BOOKMARK NOT DEFINED.
LIST OF FIGURE	ERROR! BOOKMARK NOT DEFINED.
CHAPTER ONE:	1
1. INTRODUCTION	1
1.1. BACKGROUND OF THE STUDY	1
1.2. STATEMENT OF THE PROBLEM	5
1.3. RESEARCH QUESTIONS	6
1.4. OBJECTIVES GENERAL OBJECTIVE OF THE STUDY	6
1.4.1. GENERAL OBJECTIVE OF THE STUDY	6
1.4.2. The Specific Objectives of the Study are:.....	6
1.5. SIGNIFICANCE OF THE STUDY	6
1.6. SCOPE OF THE STUDY	7
1.7. LIMITATION OF THE STUDY	7
1.8. ORGANIZATION OF THE STUDY	8
2. REVIEW OF RELATED LITERATURE	9
2.1. THEORETICAL LITERATURE REVIEW	9
2.1.1. DEFINITION AND CONCEPTS OF THE KEY TERMS.....	9
2.1.2. THE ROLE OF LIVELIHOOD DIVERSIFICATION.....	9
2.1.3. SUSTAINABLE LIVELIHOOD FRAMEWORK	11
2.1.4. HOUSEHOLD DETERMINANTS OF LIVELIHOOD DIVERSIFICATION.....	14
2.2. EMPIRICAL REVIEW	25
2.3. CONCEPTUAL FRAMEWORK OF THE STUDY	27
CHAPTER THREE	28
3. RESARCH METHODOLOGY	28

3.1. DESCRIPTION OF THE STUDY AREA	28
3.3. DATA TYPES, SOURCE AND METHODS OF COLLECTION	30
3.4. SAMPLING TECHNIQUES AND SAMPLE SIZE DETERMINATION	30
3.5. METHOD OF DATA ANALYSIS.....	31
3.5.1. ECONOMETRICS MODEL SPECIFICATIONS.....	32
3.6. DESCRIPTION OF MODEL VARIABLE.....	34
3.6.1 DEPENDENT VARIABLE	34
3.6.2. INDEPENDENT VARIABLE	35
3.7. POST ESTIMATION TESTS/OR DIAGNOSTIC TESTS	38
3.7.1. CHECKING MULTICOLLINEARITY	38
3.7.2. CHECKING HETROSKEDASTICITY	38
4. RESULT AND DISCUSSION	40
4.1 DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS	40
4.1.2. Descriptive statistics for dependent variable.....	43
4.2. THE CONTRIBUTION OF LIVELIHOOD DIVERSIFICATION TO HOUSEHOLD INCOME.	44
4.3. THE DETERMINATES OF LIVELIHOOD DIVERSIFICATION.	46
5. CONCLUSION AND RECOMMENDATION.....	54
5.1. CONCLUSION	54
5.2. RECOMMENDATION	55
REFERENCE.....	56
APPENDIX;-	66

LIST OF TABLE

Table 1 Distribution of Kebeles and Household.....31

Table 2 Description of Variable, Measurement and their expected sign.....38

Table 3 Descriptive statistics of sex of household.....40

Table 4 Descriptive statistics of Education level.....41

Table 5 Descriptive statistics of continuous Explanatory variable.....43

Table 6 Descriptive statistics of livelihood diversification.....44

Table 7 The contribution of each income sources to the total household net annual income.....46

LIST OF FIGURE

Figure 1. Conceptual framework of the study..... 27

Figure 2. Map of study area..... 29

Abstract

The study examined the determinants of livelihood diversification of farm households in case of Gurage Zone Kebebadistricts. The specific objectives were identifying the factors influencing farm household livelihood diversification as well as to examine the contribution of livelihood diversification on household income. For achieving these objectives primary data was collected. The data were obtained from 376 sample household heads that were selected through a combination of two-stage, purposive and simple random sampling techniques, and also analyzed with both descriptive and econometric analysis. The descriptive statistics were used to assess the livelihood strategies and their contribution. The finding of the study indicates that households in Kebena district engage in various livelihood activities such as on farm only, on-farm plus off-farm, off-farm and the combination of all (on farm plus off-farm and non-farm). From the sampled households 40.5% work exclusively on-the farm, 31.4% On-farm plus Off-farm, 21.5% on Off-farm and 6.6% On-farm plus Off-farm plus Non-Farm. Multinomial logit model applied to investigate the determinant factors influencing the household's livelihood diversification. In this regard, the econometric analysis demonstrated that out of the total eleven variables included in the model only nine variables including farm size, livestock holding, gender, age, education level, market distance, dependency ratio, access to credit, and access to extension service are found to be the significant determinants up to 10% probability levels. Finally the study recommends government and focusing group expand and strengthening the agricultural extension service for rural households so as to create a diversified livelihood activity and improve the livelihood of the farmers household and extension on off-farm and non-farm opportunities and on the role of participating in cooperatives, facilitating the availability of credit, and enhancing elder farmers' knowledge.

KEY WORD: - Determinant, Logit, Non-Farm, On-Farm, Off-Farm

CHAPTER ONE:

1. INTRODUCTION

1.1. Background of the Study

Agriculture is an important sector for majority of the rural populations' livelihood in developing countries. It has been the predominant activity for most rural households in Africa which offers a strong option for spurring growth, overcoming poverty, and enhancing food security (World Bank, 2008). However, the sector has been continually blamed for its failure to guarantee sufficient livelihood for smallholder farm households in the region because of decreasing farm sizes, low productivity and high degree of subsistence farming (Jirström M., 2010). Although enhancing agricultural production is conceived to improve and sustain the lives of rural people, agriculture on its own is unable to provide sufficient means to escape out of poverty for majority of the poor rural households (Asmah E., 2011). In view of this, studies conducted by Barrett *et al.* (2005) and Winters *et al.* (2010) indicate that diversifying rural economy is one of the pathways out of poverty reduction and to ensure food security for the rural inhabitants in Sub-Saharan Africa.

Ethiopia is one of the Sub-Saharan Africa countries where majority of the population lives in the rural areas mainly depending on agriculture for their livelihoods. Agriculture is the mainstay and backbone of the country's economy as it accounts for nearly 41% of GDP, employs about 85% of the labor force and contributes around 90% of the total export (Abebe *et al.*, 2018). Despite its high contribution to the overall economy, the sector is overwhelmingly dominated by small-scale and still predominant subsistence agriculture with traditional farming systems (Francesconi G., 2011). As pointed out by Bazezew A. (2013) agricultural activities in rural Ethiopia are highly characterized by rain fed, traditional, low productive, fragmented land size, subsistence oriented and dominated by smallholders where majority cultivating less than 0.5 ha. Besides, agricultural production and productivity is being challenged by recurrent drought occurrence compounded with poor usage of improved agricultural inputs, land degradation and high population growth. Hence, most rural households of the country are exposed to food insecurity and chronic poverty (Mota *et al.*, 2019).

Today, agricultural sector alone cannot be relied upon as the core activity for rural households as a means of improving livelihood and reducing poverty (Bekele S., 2017). Consequently, rural people partake in a number of strategies including agricultural intensification and livelihood diversification which enable them to fulfill livelihood requirements and attain food self-sufficiency. Most importantly, livelihood diversification has received much attention from researchers and policy-makers in the past two decades, with high hopes that promoting it can offer a pathway for poverty reduction and economic growth in Africa countries (UNECA and AU, 2007). It's the process by which rural families construct a diverse portfolio of activities and social support capabilities in their struggle for survival and to improve their standards of living. It is an attempt by individuals and household to find new ways to raise incomes and reduce environmental risk which differ sharply by the degree of freedom of choice (to diversify or not) and reversibility of the outcome (Devarajaiah *et al.*, 2016).

Rural livelihoods diversification generally occurs as a result of the increasing importance of off-farm and wage labor in household livelihood portfolios or through the development of new forms of on-farm production. In both cases, diversification ranges from a temporary change of household livelihood portfolio to a deliberate attempt to optimize household capacity to take advantage of ever-changing opportunities and cope with unexpected constraints (Warren P, 2020).

Livelihood diversification (LD), which is defined as “the process by which rural families construct a diverse portfolio of activities and social support capabilities in order to survive and to improve their standards of living”, has attracted widespread attention from scholars and policymakers in developing countries. However, farming as a primary source of income has become failed to guarantee sufficient livelihood for most farming households in African countries (Babatunde, 2013). This is because the agricultural sector in the African countries is highly characterized by decreasing farm sizes, low levels of output per farm, and a high degree of subsistence farming (Jirstrom *et al.*, 2011).

Diversification refers to the allocation of production assets among different income-generating activities, that is On-farm, off-farm and non-farm activities. On-farm income sources: this refers to income generated from farming activities such as the production of unprocessed crops, fruits, livestock, fish, and forestry. Off-farm income activity: its

agricultural activities take place outside households own farm area. Also refers to wage or exchange labor on other farms, and labor payments in kind such as harvest sharing and other non-wage labor contracts(Baharu, 2016). Non-farm income sources: its non-agricultural activities take place outside agricultural sectors. It includes income generated from agro-processing activities, transport service, petty trade, construction, cottage industries, and mining (Ellis, 2005).

Livelihood diversification strategies in Ethiopia were on-farm, nonfarm, and off-farm. However, on-farm livelihood activities were the most practiced livelihood strategies. From the point of view of reducing poverty and food insecurity in rural Ethiopia, it is extremely important to reduce vulnerability of the poor through diversification of the sources of their livelihoods. Thus, it needs the analysis of off/non-farm livelihood diversification opportunities available in rural areas, the productivity and returns offered by such activities, especially those in which the poor are engaged, and an identification of the factors that may affect the ability of the poor to raise productivity and returns in their activities (Devereux S., 2011).

Furthermore, it is crucial to recognize that rural people have their own strategies to secure their livelihoods which vary from household to household depending on numerous factors such as their socio-economic status, education and local knowledge, ethnicity, stage in the household life cycle, and most studies report that livelihood diversification is beneficial for relieving pressure on the environment, reducing livelihood risks and vulnerabilities, improving livelihood resilience and sustainability, and alleviating poverty (Wagayehu, 2014).

Diversification activities are critical to livelihood in southern Ethiopia. Southern Ethiopia has long been at the center of trading networks and there is a long history of trading in the area. Broad trends and events create the condition for diversification at the level of the community, establishing the parameters of choice about potential diversification activities. Several different historical events have had an impact on opportunities to diversify. Such events do not have a uniform impact but affect different households and individuals in different ways. While a large number of policies in southern Ethiopia have a major influence on agriculture, many fewer directly related to livelihood diversification and migration(grace, 2005)

Livelihood diversification in Gurage zone in general and Kebena district in particular households are struggling to diversify.

The rural farm households also in Gurage zone in general and the study area Kebena district in particular are producing cereal crops which have low economic returns and are highly dependent on the rain-fed agricultural production systems. Furthermore, due to the insufficient land resource to absorb the household's full labor force and the rain fall pattern variability, the smallholder farming households in the study area are becoming unable to meet the annual family food requirements. As a result, they are obliged to engage in low return daily labor works, harvest sharing and other non-wage labor contracts and firewood selling, petty trading, to supplement their fragmented land based livelihoods and to cope up with the agricultural risks (KDOARD, 2021).

The motive behind this study in Kebena district is due to the existence of thin or missing credit markets in which case off/non-farm earnings can be a crucial means of overcoming working capital constraints. That is, to purchase necessary variable in puts for farming or to make capital improvements. On the other hand, farm cash income may not be sufficient to satisfy the households' cash requirements (for taxes, consumption goods purchases, school fees, medicines, etc.). In this case also, off/non-farm earnings may be essential to finance the family cash requirement. When agriculture becomes risky, farmers need to reduce income and consumption variability by engaging in off/non-farm livelihood activities which have low or negative correlation with returns to agriculture (KDOARD, 2021).

In the study area, even though, the smallholder rural farm households are involved in diverse livelihood activities, the households access to different income sources beyond agriculture vary across the ownerships of different livelihood assets. Moreover, the participation of smallholder farming rural households into off/non-farm activities is determined by complex and yet empirically untested factors in the study area. It is thus, so important to identify the determinant factors of off/non-farm livelihood diversification strategies in the study area to improve smallholder rural farm households' livelihood diversification.

1.2. Statement of the Problem

There is a strong consensus that any development intervention to improve the livelihood situation of the rural poor needs to take agriculture along with the non-farm and with off-farm livelihood diversification, without undue preference being given to farming as the unique solution to rural poverty.

Currently, there is growing evidence that rural households in Ethiopia have participated in diverse livelihood strategies away from pure crop and livestock production towards off/non-farm activities that are undertaken to broaden and generate additional income for survival and cope with different livelihood shocks, trends, and seasonality associated with agricultural production (Anshiso and Shiferaw, 2016). Ambachew (2016) Employed multinomial logit to empirically examine the determinants of rural household livelihood diversifications strategy in South Gondar zone using cross sectional data.

Birhanu and Getachew(2017) investigated livelihood diversification status, challenges and factors influencing pastoral household's engagement in livelihood diversification activities in Bale zone, Ethiopia pastoral livelihood by using multinomial logistic model. Those studies seen above are emphasized on the determinants of livelihood diversification strategies at zone level and didn't classify determinants of livelihood diversification according to socio-economic, demographic and institutional factors.

Likewise Ambachew (2016) in southern Gondar zone used and categorized the dependent variable diversification simply as on-farm, off-farm and non-farm but in this study the researcher used and categorized the dependent variable diversification in multi-dimensional way as on-farm, on-farm plus off-farm, off-farm and on-farm plus off-farm plus non-farm. Moreover, the study by Birhanu and Getachew (2017) in Bale zone the econometric result shows that the independent variable gender of households negatively and significantly relationship to on-farm plus off-farm plus non-farm livelihood diversification. But in this study the result shows that gender of household has positive and significant relation to on-farm plus off-farm plus non-farm livelihood diversification.

There are also gaps related with conceptualization of variable of interest and choice of covariates (i.e. the main variables of interest – assets and incomes – mediated by productive activities). So this study was aimed to fill the research gaps that were not

addressed by other scholars. Moreover, since explanatory variables were being varied from one local area to another, the empirical study can contribute its part for the existing literature. Therefore, this study aimed to examine the rural household livelihood diversification strategies and their main determinants using purposively collected primary data from Kebena district.

1.3. Research Questions

1. Which type of livelihood activities are dominantly practiced by rural households in the study area?
2. What are the contributions of livelihood diversification on total household income?
3. What factors determine livelihood diversification strategies in the study area?

1.4. Objectives

1.4.1. General objective of the Study

The general objective of this study is to identify determinants of rural household livelihood diversification in Kebena district.

1.4.2. The Specific Objectives of the Study are:

1. To assess the factors that determines rural household's livelihood diversification.
2. To identify the dominant livelihood diversification of the rural household in study area.
3. To examine the contribution of livelihood diversification on total household income.

1.5. Significance of the Study

These studies aimed to identify the existing livelihood diversification strategies of rural households and determinants for rural livelihood. Therefore, this study will be significant to inform policymakers particularly on factors that affect choices of rural livelihood diversification and what will be a possible solution to the problem in the study area.

The findings of this study will be expected to contribute towards adding the existing literature gap on understanding the rural household's livelihood diversification. In addition, its determinants by providing baseline information for researchers who need to undertake

similar researches. Local planners, also may utilize it as well as International NGOs interested in intervening to promote livelihood development Programs.

Further, the study was expected to investigate areas of intervention that would have been helping to contribute policy implication to encourage the livelihood diversification of the rural society in on-farm, non-farm and off-farm livelihood activities in using the available human, social, economic, and financial resources to increase productivity and income sources.

1.6. Scope of the Study

This study was undertaken in Kebena district in terms of scope, although the various factors that determine the livelihood diversification strategy choice of a rural household, the scope of this study was bordered to the factors that determine the livelihoods diversification of rural household in Kebena district. It also specified only livelihood assets, such as human, natural, physical, social and financial assets, which affect livelihood Diversification.

Another important point is that, the conceptual scope of this study was limited merely on the function of Kebena district for occupational livelihood diversifications of the rural communities; that is diversifying from the very usual agricultural activities to the off/non-farm occupational practices.

1.7. Limitation of the Study

The study encountered the following limitations. The respondents were busy of their daily agricultural tasks. Therefore, was lacking of time to respond appropriately. Moreover, sufficient secondary data that could be helpful for this research were not available as required due to poor documentation and weak data handling system commonly observed in government offices. So as to solve the above problems the researcher took proactive solutions such as dealing with respondents to confirm which time and day is relatively convenient to them; that's why all the expected questionnaires fully responded. With regard to secondary data, the researcher worked more or less by using his maximum effort in order to obtain recent and relatively accurate secondary data by discussing the importance of this research to the concerned persons or organization leaders. In general

however, the researcher was doing his best on the above problems it does not mean that all the troubles were fully puzzled out.

Furthermore, this study may come across with following limitations; the final finding of this research may not necessarily represent to all kebeles which are found in the Kebena District of the study area as well as to all Gurage Zonal Districts and the other limitation could be since, the livelihood diversification strategies categorize into three (i.e. intensification, migration and occupational diversification). However, this study deals only with the occupational diversification strategies. Consequently, the two livelihood diversification strategies are not included in this research. Therefore, this can also take as one limitation of this research.

The Studies also pointed out that household are unwilling to provide accurate information during data collection process on the variables such as average annual income, size of land, the amount of livestock and dependency ratio due to the fact that taxes and other development contributions are distributed among them based on these factors. This study may not be free from these limitations. But to mitigate this problem as much as possible it was tried to convince farmers individually and collectively about the objectives of the study. Finally, the findings, conclusions, and recondition of this study are the emanated from the concept of occupational rural livelihood diversification strategies and are limited to the households in the study area.

1.8. Organization of the study

The thesis consists of five main chapters including this chapter, which provides general information in its introduction. Chapter two is a review of literature (empirical and theoretical). Chapter three presents the methodology used in this study while the fourth chapter is about the results and discussion. The last chapter, chapter five, presents the summary, conclusion and recommendations drawn from the result.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

2.1. Theoretical Literature Review

2.1.1. Definition and Concepts of the Key Terms

Livelihoods refer to it comprises the capabilities, asset (including both material and social resources), and activities required for a means of making a living (Chambers, 2009). Diversification refers to the allocation of production assets among different income-generating activities, that is off-farm and non-farm activities. On-farm income sources: this refers to income generated from farming activities such as the production of unprocessed crops, fruits, livestock, fish, and forestry. Off-farm income activity: its agricultural activities take place outside households own farm area. Also refers to wage or exchange labor on other farms, and labor payments in kind such as harvest sharing and other non-wage labor contracts(Baharu, 2016).

Non-farm income sources: its non-agricultural activities take place outside agricultural sectors. It includes income generated from agro-processing activities, transport service, petty trade, construction, cottage industries, and mining (Ellis, 2005).

2.1.2. The Role of Livelihood Diversification

In developing countries, agriculture is an important sector for majority of the rural populations' livelihood as it is a source of income, employment and foreign exchange (Minten B., 2008).It has been the predominant activity for most rural households in Sub-Saharan Africa (SSA) which offers a strong option for spurring growth, overcoming poverty and enhancing food security as stressed by the World Bank Report (World Bank, 2008).However, the sector has been continually blamed for its failure to guarantee sufficient livelihood for smallholder farm households in the region because of decreasing farm sizes, low productivity and high degree of subsistence farming (Jirström M., 2010).As pointed out by Owusu et al. (2011) reducing hunger and food insecurity has, therefore, remained an essential part of international development agenda since the World Food Summits in 1996 and 2001.Godfray et al. (2010)have also noted that ensuring food security is the challenge of feeding 9 billion people, and it is a major issue in academic and international debates.

Food security exists when all people at all times have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, (2020)). The growing demand of food with raising population has worsened the problem of food insecurity which is found to be the most prevalent in Africa countries (Cafero C., 2018). Although enhancing agricultural production is conceived to improve and sustain the lives of rural people, agriculture on its own is unable to provide sufficient means to escape out of poverty for majority of the poor rural households (Asmah E., 2011). In view of this, studies conducted by Barrett *et al.* (2005) indicate that diversifying rural economy is one of the pathways out of poverty and to ensure food security for the rural inhabitants. Nevertheless, the contribution made by livelihood diversification to rural livelihoods has often been ignored by policy makers who have chosen to focus their activities on agriculture (Ellis F., 2007)

Ethiopia is one of the Sub-Saharan Africa countries where majority of the population lives in the rural areas mainly depending on agriculture for their livelihoods. Agriculture is the mainstay and backbone of the country's economy as it accounts for nearly 41% of GDP, employs about 85% of the labor force and contributes around 90% of the total export earnings (Abebe A., 2018). Despite its high contribution to the overall economy, the sector is overwhelmingly dominated by small-scale and still predominant subsistence agriculture with traditional farming systems (Francesconi G., 2011). As pointed out by (Bazezew A., 2013) agricultural activities in rural Ethiopia are highly characterized by rain fed, traditional, low productive, fragmented land size, subsistence oriented and dominated by smallholders where majority cultivating less than 0.5 ha. Besides, agricultural production and productivity is being challenged by recurrent drought occurrence compounded with poor usage of improved agricultural inputs, land degradation and high population growth. Hence, most rural households of the country are exposed to food insecurity and chronic poverty (Mota A., 2019).

Today, agricultural sector alone cannot be relied upon as the core activity for rural households as a means of improving livelihood and reducing poverty (Bekele S., 2017). Consequently, rural people partake in a number of strategies including agricultural intensification and livelihood diversification which enable them to fulfill livelihood requirements and attain food self-sufficiency. Livelihood diversification is a process by which household members construct a diverse portfolio of activities and social support

capabilities in their struggle for survival and to improve their standards of living(Ellis, 2005). It is an important survival strategy for the rural households that augment sustainable livelihoods, reduce vulnerability, and improve income and well-being. Sources revealed that the diversification of livelihood strategies enables the farm households to have better incomes, enhance food security and better cope with environmental stresses(Kassa W., 2019)

2.1.3. Sustainable Livelihood Framework

The Sustainable Livelihood Framework is composed of Livelihood outcomes, Livelihood assets, and Livelihood strategies, Policies and institutions (DFID, 2010).

Vulnerability Context

Vulnerability context refers to seasonality, trends, and shocks that affect people's livelihoods and have a direct impact upon people's asset status and the options that are open to them in pursuit of beneficial livelihood outcomes. The key attribute of these factors is that they are not susceptible to control by local people themselves (Ellis F and Allison E., 2004).

Livelihood Resources or Assets

Livelihood Assets are the resources on which people draw to carry out their livelihood strategies (Farrington *et al.*, 2012). The members of a household combine their capabilities, skills and knowledge with the different resources at their disposal to create activities that will enable them to achieve the best possible livelihood for themselves. The term capital refers to tangible or intangible assets that are held by a person or household for use or investment; wealth, in whatever form, capable of being used to produce more wealth; any source of benefit or assistance (Cars, 2005).

Human capital; encompasses the abilities, experience, work skills and the good health that, when combined, allow populations to engage with different livelihood strategies and reach their own objectives. At the household level human capital is a factor, which determines the quantity and quality of the available workforce. This varies according to size of family unit, level of education, leadership ability, health status, and so on. Human capital appears in the framework for sustainable livelihoods as an asset which affects livelihoods. Aside from its intrinsic value, human capital is needed in order to leverage all other forms of

capital. Because of this, whilst not sufficient as a stand-alone resource, it is vital for the achievement of positive results in any dimension regarding livelihoods (UNDP, 2015).

Social capital relates to the formal and informal social resources that people draw upon in pursuit of their livelihoods. People develop these social resources by investing time, effort and other resources in membership of formal groups or organizations, informal social interactions in and outside the workplace and relationships of reciprocity, including gift exchange and mutual assistance. Such investments may help to build trust and facilitate co-operation. They can increase access to information and reduce transactions costs. They may allow people to make claims on other people's obligations to support them, and can help in the development of informal safety nets amongst the poor. Finally, they can increase people's power and influence.

Social capital is closely linked with structures and processes for transformation. As a result, it can be helpful to conceive of social capital as a product of these structures and processes, although this may simplify the relationship between the two. Structures and processes can themselves be a product of social capital. The relationship works in both directions and can be self-perpetuating. As with human capital, social capital is a good in itself but it also impacts directly on the accrual of other forms of capital, through improvements in the efficacy of economic relationships and in equal access to resources and public goods.

Social networks facilitate innovation, knowledge gains and the exchange of these. Because of this there is a close relationship between human and social capital (UNDP, 2015). Natural capital is the term used to describe the stocks of natural resources from which further resources and services can be developed which may prove useful to livelihoods. A broad variety of resources fall within this category. Within the framework for sustainable livelihoods, the relationship between natural capital and the Context of Vulnerability is especially close. A large number of shocks which devastate the livelihood strategies of the most disadvantaged in a society are themselves naturally occurring processes which also destroy natural resources, such as forest fires, droughts, floods and earthquakes. Their timing is also often the result of seasonal changes in the value of different natural capitals. Examples of natural capitals and the services they contribute to include: Land and soils, food production, woods, marine and forest resources, water, air

quality, protection from erosion, waste disposal, storm protection, water supply, carbon storage and sequestration (UNDP, 2015).

Physical capital comprises the basic infrastructure and producer goods needed to support livelihoods. The infrastructure looks at changes in the environment which affect communication and access to basic services. Production goods are the tools and equipment which increase productivity. The following components of infrastructure are typically essential for sustainable livelihoods: access to road and transport; housing and safe buildings; access to water and sanitation; clean and affordable energy; and access to information (Kassie *et al.*, 2017).

Financial capital refers to the financial resources that people use to achieve their livelihood objectives. The definition used here includes flows as well as stocks and it can refer to consumption as well as production. This definition has been adopted to capture an important livelihood building block, namely the availability of cash or equivalent that enables people to adopt different livelihood strategies (Sarah *et al.*, 2015).

There are two main sources of financial capital firstly available stocks: Savings are the preferred type of financial capital because they do not have liabilities attached and usually do not entail reliance on others. They can be held in several forms: cash, bank deposits or liquid assets such as livestock and jewelry. Financial resources can also be obtained through credit-providing institutions. Secondly, Regular inflows of money: Excluding earned income, the most common types of inflows are pensions, or other transfers from the state, payments for environmental services and remittances. In order to make a positive contribution to financial capital these inflows must be reliable (while complete reliability can never be guaranteed there is a difference between a one-off payment and a regular transfer on the basis of which people can plan investments (Haggblade *et al.*, 2011).

Policies, Institutions and Processes

The importance of policies, institutions and processes cannot be overemphasized, because they operate at all levels, from the household to the international arena, and in all spheres, from the most private to the most public. They effectively determine access (to various types of capital, to livelihood strategies and to decision-making bodies and source of influence), terms of exchange between different types of capitals, and returns to any given livelihood strategy (DFID, 2010). Policies, institutions and processes have a direct impact

upon weather people are able to achieve a feeling of inclusion and well-being. Because culture is included in this area they also count for other ‘unexplained’ differences in the ‘way things are done’ in different societies (Woldegioregis, 2007).

Livelihood Strategies

According to Ellis F. (2007) Livelihood strategies are the combination of activities that people choose to undertake in order to achieve their livelihood goals such as food or income security and it include coping strategies. Ellis also defined Livelihood strategies as the activities realized by household members resulting in outcomes such as food or income security and it include coping strategies designed to response shocks in the short term and adaptive strategies designed to improve circumstances in the long term.

Livelihood Outcomes

Livelihood outcomes are the achievements or outputs of Livelihood Strategies (DFID, 2010). These are the achievements of livelihood strategies. Such as more income (Cash), increased well-being (non-material goods like self-esteem, health status, access to services, and sense of inclusion), reduced vulnerability (better resilience through increase in asset status), improved food security (increase in financial capital in order to buy food) and a more sustainable use of natural resources (appropriate property rights).

2.1.4. Household Determinants of Livelihood Diversification

Rural livelihoods diversification has generally occurred as a result of an increased importance of off-farm wage labor in household livelihood portfolio or through the development of new forms of on-farm/on-site production of non-conventional marketable commodities. In both cases, diversification ranges from a temporary change of household livelihood portfolio (occasional diversification) to a deliberate attempt to optimize household capacity to take advantage of ever-changing opportunities and cope with unexpected constraints (strategic diversification) (Warren p. , 2020).

As agricultural specialization can start from an initial diversification move, also livelihoods diversification can eventually lead to some form of household specialization. For instance, in particular circumstance migratory wage labor may result so cost/effective to push the household away from conventional on-farm activities. Conversely, the identification of a particular niche commodity that the household to invest all its labor and other assets in it, disregarding both conventional farming activities and wage labor (Warren p., 2020).

The basis of a livelihood strategy is the asset position of the household at a given point in time (Ellis, 2005). On the other hand the ability to pursue different livelihood strategies is dependent on the basic material and social, tangible and intangible assets that people have in their possession (funikan, 2008).

Ellis F. (2007) On the other hand, identified two types of livelihood strategies namely: natural resource based strategies and non-natural resource based strategies. The natural resource based activities include collection or gathering (e.g. from woodlands and forest), food cultivation, non-food cultivation, livestock keeping and pastoralism, and non-farm activities such as brick-making, weaving, thatching and so on. Non-natural resource-based activities include rural trade (marketing of farm outputs, inputs and consumer goods), other rural services (e.g. vehicle repair), rural manufacture, remittances (urban and international), and other transfer such as pensions deriving from past formal sector employment.

World Bank (2008) also in world development report identified five types of livelihood strategies: They are (1) agricultural markets (market-oriented small holders), (2) farming (subsistence-oriented farmers), (3) labor-oriented households (wage work in agriculture, rural non-farm economy, or from nonagricultural self-employment), (4) migration and remittance, and (5) diversification; which combine (agricultural markets, farming, labor-oriented strategy, and migration).

Diversification among rural households is mainly influenced by differences in resource endowments such as land, labour, capital including access to markets and institutions (Barrett et al., 2005). Opportunities to diversity vary among households with asset portfolios determining whether the effects of diversification are positive or negative. Households may have similar endowments and opportunities but do not always select the same portfolio of activities. Differences occur in preferences for income, consumption, wealth and status and risk in addition to subjective elements such as enterprise styles. However, a household's ability to adopt more profitable diversification strategies is also determined by it having the skills, location, capital and social connections to pursue other activities (Hussein K and Nelson J., 2009). In general, increased diversity promotes greater flexibility because it allows more possibilities for substitution between opportunities that are in decline and those that are expanding (Ellis, 2005). Improving household food

security and incomes may motivate a household to diversify, but the selection of actual strategies by a household is determined by some of the factors explained below.

Access to Markets

Diversification may be used as a risk management and survival strategy in instances where the absence of markets compels self-provision of some goods and services by households through diversification. To further explain this, Barrett et al.(2005)provides a hypothetical example on why a skilled blacksmith spends his scarce time farming even though his comparative advantage lies in smith work. Missing land markets are used to explain his behavior given that if land markets are operational, he might rent out or sell his land and devote all his time to blacksmithing. But in the absence of land markets, and in the presence of labour market imperfections that preclude his simply hiring others to work his land for him, his optimal use of labour time may well include time spent on relatively less productive farming, else his land asset returns nothing to him (Barrett *et al.*, 2005). Therefore, diversification of labour activities and income in this instance would be driven by the absence of markets.

Several studies have also noted that where physical access to markets is costly and causes product markets failures, households diversify production patterns partly to satisfy own demand for diversity in consumption. In addition earnings from diversification where access to credit is non-existent can enable overcoming working of capital constraints, purchasing necessary inputs, equipment or capital improvements on one's farm (Barrett *et al.*, 2005).

Closeness to urban markets may create opportunities for diversification into rural non-farm activities such as peri-urban areas where possibilities exist for earnings from commuting (Davis, 2004). However, it should not be overlooked that in some cases, closeness to urban areas exposes rural non-farm manufacturers to high competition from factory-made substitutes sold in rural market centers. This may lessen the extent to which rural households can diversify.

Climate Variability

Climate variability affects farm production especially for smallholder farmers. Persistent diminishing returns from agriculture which threaten food security may prompt household to diversify. This implies that a key motivation for diversification is environmental

uncertainty related to unreliable rainfall or drought which makes diversification “a form of self-insurance” (Barrett et al., 2005). In their study of livelihoods in India and Tanzania, Jodha and Mascarenhas (1983) refer to "household risk strategies" rather than livelihood diversification or livelihood strategies. Berry 1980 expands on this notion of risk (cited in Bernstein et al., 2012:81) that “...diversification of income-earning activities is a key factor because farming in Africa is usually so risky: crop yields are subject to the uncertainties of rainfall and input supply, and farming incomes are subject to the uncertainties of both yields and prices.”

This means the decision to diversify may also be driven by the need to cope with climatic variability or extreme weather patterns such as drought. Diversification is then seen as a natural response to climatic risk and transactions costs in lower potential agricultural areas (Haggblade et al., 2010). When crops fail or livestock die, households respond by reallocating labour to other pursuits such as formal employment off-farm, informal employment off-farm (e.g. hunting), or non-agricultural activities on-farm (e.g. weaving, brewing). This is confirmed by Reardon (2005) findings from Burkina Faso, revealed that off-farm employment provided cash income in labour earnings to weather the effects of drought, thereby giving those with rural nonfarm incomes superior coping capacity.

Notwithstanding the aforementioned, whilst diversification is a natural response to climatic risk evidence, from Africa reveals that non-farm activity highest in areas of better-than-average agricultural productivity, which underscores the importance of taking into consideration intersectoral linkages (Haggblade, 2007). Depending on the context, this may mean nonfarm livelihood diversification maybe undertaken to complement farming activities rather than a substitute them. Climate variability may drive households towards diversification or hinder it.

Available Asset Portfolios

The availability of assets such as savings, land, labour, education, access to market or employment opportunities and other public goods is a primary factor in determining a household’s capability to diversify (Warren P., 2012). Opportunities to diversity vary among households Mutenje et al.(2010), with differences in resource endowments (land, labour, capital) and access to markets and institutions playing a central role in the extent to which diversification occurs (Barrett et al., 2005). The extent of diversification of the household portfolio of activities is determined not only by asset portfolios but also by it

having the skills, location, capital, credit and social connections to pursue other activities (Hussein K and Nelson J., 2009). Consideration should also be given to how assets can be complemented given that some assets are only effective if combined with others (Barrett et al., 2005). Diversification may also develop as a coping response to the loss of capital assets needed for undertaking conventional on-farm production. As households face decreased availability of arable land, increased producer/consumer ratio, credit delinquency and environmental deterioration, diversification can be an immediate response (Warren P., 2012). Consequently, the choices that people employ regarding the use of their asset portfolio in pursuing income, security, wellbeing or other productive and reproductive goals define their livelihoods.

A study by Webb C. and Kevern J. (2011) on diversification in Ethiopia revealed that level of assets owned i.e. livestock ownership is positively and significantly associated with income diversification, even controlling for level of income. Assets are not only an essential factor of production representing the capacity of the household to diversify but indicators of improved household income. The findings confirm that households surviving the famine with higher than average income and food consumption levels also had a more diversified income base and more valuable assets in hand (especially livestock). In addition, greater income diversification (out of cropping) was positively associated with per capita income level, higher dependency ratio, location in the highlands, and ownership of non-farm assets.

Warren P. (2012) Points out that diversification can be undertaken with the specific aim of strengthening the household asset base through accumulating savings needed to expand the land holding, offer education opportunities to the young generation, or insure themselves against illness and aging. This includes diversification occurring as a means to enhance the environmental sustainability of a particular livelihood strategy. However, one of the key questions facing researchers concerned with understanding livelihoods is about how diversification contributes to survival, asset accumulation, and the relative proportions of diversification income which are used for consumption versus investment Hussein K and Nelson J. (2009). Whilst it can be demonstrated that diversification provides income some of which is used for consumption, but researchers are at odds over the degree to which the remainder is used for investment in assets.

Education & Skills

Educational attainment has been identified as one of the most important determinants of non-farm earnings. The skilled and educated maybe self-employed or can secure stable long-term employment at relatively high salaries, while the unskilled and uneducated depend on more erratic, lower paying casual wage labour in the farm sector. Educational attainment can therefore serve as an entry barrier to better paying nonfarm employment or self-employment in rural Africa (Barrett et al., 2005). Education is also critical since the better-paid local jobs require formal schooling and that there is a correlation between education with rural non-farm business success (Davis, 2004). With the necessary education, migration is more likely to be successful. In a study on non-farm work and food security in Ghana, (Owusu et al., 2011) pointed out that schooling was an important determinant of participation in non-farm work. In particular, education and access to credit were found to be positively and significantly related to participation in non-farm work. However, the same authors note that it is not clear how schooling beyond primary level and the achievement of literacy and numeracy, provides skills that matter in the majority of rural non-farm activities.

Since access to education and low wealth status limits opportunities to diversify for poor households (Hussein K and Nelson J., 2009).Diversification can also take the form of investing in human resources in the present in order to diversify the future resource-base of the (parental) household. Several studies have shown that investment in children's education can be a long-term livelihood strategy aimed at creating a source of income transfers for the parents when they reach old age(Niehof A., 2004).

Access to Credit Markets

Constrained access to credit and financial savings can hinder acquisition of assets necessary to diversify out of crop agriculture to non-farm activities. Restricted access to capital is the major obstacle to investment and entrepreneurship (Davis, 2004). The poor are consequently left with less diversified asset and income portfolios, forcing them to bear both lower returns and higher variability in earnings. Ellis(2005)attributes low rural credit availability to high costs of setting up banking operations in rural areas, the difficulty and cost of securing adequate information on potential borrowers, the risk of default on loans, and the absence of collateral to put up against loans. This means credit market failures can also provide another motivation for diversifying livelihoods. In the absence of lending

facilities, households will engage in activities that generate cash funds to be utilized in purchasing agricultural inputs or farm equipment (Ellis, 2005).

Smith(2011) identifies lack of access to financial services or the lack of credit as a constraint to potential diversification into non-farm economic activities in two districts of Kumi and Rakai in Uganda. Despite the number of institutions engaged in this activity, lack of knowledge about credit providers, tight repayment schedules, high initial capital requirements, and the lack of loans for agricultural purposes represent barriers to access.

Gender Relationships

Diversification is also shaped by gender relationships. Women have the potential to undertake a similarly wide range of diversification activities as men, but in many contexts, men are able to avail themselves of diversification opportunities that are not open to women due to cultural constraints (Hussein K and Nelson J. 2009). Gender relationships can constrain or promote access to some household assets or the mobility of certain gender and age groups. This means that the degree of involvement in diversification activities and the unequal distribution of their benefits vary between genders (Ellis, 2005). A study by Smith(2011) on determinants and patterns of diversification across two districts in Uganda revealed that, “in both districts, men had a greater degree of occupational livelihood diversification than women. Within the ‘poor’ and ‘average’ well-being groupings, women were mainly engaged in agriculturally-related activities, crop and small livestock production, cottage industries and some farm laboring. The men within these groupings were identified as the most active diversifiers, both in the range of livelihood activities, and the number practiced by individuals.”

Historically African women are known to have been active in combining farm and non-farm income-earning activities as an adaptive strategy during periods of chronic or transitory food insecurity (Devereux S., 2011). Impediments to effective diversification by women are deeply ingrained in the cultural and socio economic set up in many societies where perceptions are that cash crops and income-earning activities are part of the male domain; while production of subsistence food crops consumed in the household are in the female domain. This means women food producers do not have access to cash from the sale of cash crops with which to buy yield increasing inputs (Due, 2011). African women tend to define themselves by their roles and social identities as the food providers in the household.

Gender is also a factor in the ability to access income-earning opportunities Niehof A. (2004) as women's ability to engage in income generation is also constrained by time-consuming activities they engage in due to a lack of environmental resources. In a study in Northwest Von Braun (2011) discovered that women's opportunities to find additional or alternative sources of income are limited by this external gender division of labour. Women grow food crops for subsistence and market excess food crops, on the other hand men engage mainly in cash cropping and off-farm activities. Fetching water and collecting fuel wood are activities that absorb most of the time of women and children.

Smith(2011) have argued that though women dominate many of the non-farm activities such as food processing and preparation, tailoring, trading etc., they still face powerful constraints which prevent them from generating much if any cash income. It must still be emphasized that the greater body of evidence suggests that diversification activities open to women are often less lucrative than those pursued by men (Smith, 2011).

Seasonality

Seasonality, as an inherent feature of rural livelihoods is evident through varying returns to labour time i.e. income that can be earned during the year in both on-farm and off-farm labour markets (Ellis, 2005). Furthermore, Niehof A.(2004) based on a paper on how the seasonal calendar explains the timing of migrant labour in India indicates that in rural communities the need for and possibilities of livelihood diversification depend on seasonal time. Seasonality causes changes in occupation to occur as labour time is switched from lower to higher return activities (Alderman, 2009). For this reason, an important motive for income diversification associated with seasonality is to reduce seasonal income variability which then requires income earning opportunities which are not synchronized with the farm's own seasons. Livelihood options for households that are influenced by seasonality include seasonal migration to other agricultural zones, circular or permanent migration to non-farm occupations (Alderman, 2009).

Adaptation to Risk

One rationale for diversification is to create a portfolio of livelihoods with different risk attributes. Hussein K and Nelson J.(2009). This implies that diversification may mean that households accept lower economic returns as long as there is greater security and lesser risk. Previous experience of crop or market failure can provoke diversification as a means of spreading perceived risk and reducing the impact of total or partial failure on household

consumption (Warren P., 2012). However such a decision may compromise productivity gains from specialization. In situations where there are decreasing or seasonally varying returns to labour or land; imperfect markets for assets, finance and commodities, diversification can be an immediate response (Barrett *et al.*, 2005). With diversification, risk adverse households may choose the second best income-generating alternative which entails giving up a certain amount of income by diversifying rather than face a total failure hazard (Warren P., 2012).

An example drawn from drought shocks of the mid-1980s in Burkina Faso reveal that households' capacity to cope with were strongly associated with the extent of their non-farm diversification patterns (Webb C and Kevern J., 2011). Therefore diversification maybe a response to shocks to income such as crop failure or livestock losses which may force households to reallocate labour to other pursuits, such as wage labour, informal employment off-farm or non-agricultural activities on-farm (e.g. weaving, beer brewing).

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According to Ellis (2005) whether or not risk spreading involves a fall in income, one of the critical motives of livelihood diversification for risk reasons is "the achievement of an income portfolio with low covariate risk between its components." Put simply, this means a household will try to ensure that that the factors that create risk for one income source are not the same as the factors that create risk for another income source. Diversification on the farm whereby a farmer takes advantage of differences in the risk-proneness of crops to adverse weather is only partial. By contrast non-farm livelihoods also help in ensuring low risk correlations between livelihood components.

Local Economic Boom Opportunities

Ellis (2005) Points out site-specific opportunities such as local market contingencies, development projects, infrastructure development which plays an important role in pulling

rural household towards livelihood diversification. High returns to local nonfarm activities tend to occur in regions where there are booming activities in agriculture, mining, or tourism. Consequently consumption and production-linkages with the nonfarm sector are created which swell up demand for nonfarm goods and services (Reardon *et al.*, 2006). The interplay among factors such as market dynamics and social capital assets often play a major role in generating opportunities for livelihood diversification.

Determinants of livelihood diversification fall into two broad categories: “push” versus “pull” factors. Diversification may occur either as a deliberate household strategy or as an involuntary response to a crisis (Ellis, 2005). According to Sarah (2015) individuals and households may diversify their assets, incomes and activities in response to incentives that may be classified as push and pull factors. It is simple push–distress vs. Pull–accumulation dichotomy offers a useful way of grouping these motivations (Barrett *et al.*, 2005). However, the processes and outcomes of push and pull factors are different in dynamic and in marginalized or stagnant regions (Haggblade *et al.*, 2005).

Push Factors: Push factors are negative factors that may force farm households to seek additional livelihood activities within or outside the farm (Sarah, 2015). Push factors tend to dominate in high-risk and low-potential agricultural environments, subject to drought, flooding and environmental degradation (Haggblade *et al.*, 2005). According to Sarah push factor is Survival-led diversification which occurs when poorer rural households engage in low-return nonfarm activities by necessity to ensure survival, to reduce vulnerability or to avoid falling deeper into poverty. They are pushed towards diversifying their income sources to manage risks or cope with shocks, such as declines or stagnation in agriculture, differentiated labor markets, credit market imperfections, demographic pressures and land constraints (Reardon *et al.*, 2016). The most common push factors are related to different forms of risk, such as seasonality and climatic uncertainty (Ellis, 2005). Others include land constraints driven by population pressure and fragmented land holdings, missing or incomplete factor markets, and market access problems due to poor infrastructure and high transaction costs (Barrett *et al.*, 2005).

Pull Factors: Pull factors are positive and these may attract farm households to pursue additional livelihood activities to improve their living standards (Sarah *et al.*, 2015). It is Opportunity-led diversification occurs when wealthier rural households engage in high-return nonfarm activities, with accumulation objectives, in order to increase household

income by maximizing returns from their assets (Sarah *et al.*, 2015). They are able to diversify their income activities in more favorable labor markets or take advantage of off-farm opportunities created by technological advances, new market possibilities, proximity to urban centers or improved infrastructure (Losch *et al.*, 2012).

High returns to nonfarm activities may emerge from increased demand for nonfarm goods and services or off-farm opportunities created by growth motors in different rural sectors such as agriculture, mining or tourism (Reardon *et al.*, 2005). Better-off households are those with high endowments of assets such as land, livestock and buildings (Ellis F and Allison E., 2004) and are more likely to engage in diverse high-return nonfarm activities, some of which have similar or higher returns than farming (Barrett *et al.*, 2005). In this way some better-off households are capable of accumulating capital by combining commercial farming and nonfarm activities while still relying more on commercial agriculture (Barrett *et al.*, 2005).

These factors provide incentives for people to expand their range of income activities outside farming by increasing the returns from nonfarm activities. Such factors tend to dominate in less risky, more dynamic agricultural environments (Haggblade *et al.*, 2005). Diversification becomes a deliberate strategy for an individual or household to generate assets for accumulation and reinvestment (Ellis, 2005). Pull factors include the commercialization of agriculture and the emergence of improved non-farm labor market opportunities linked to better market access, improved infrastructure, and proximity to urban areas (Losch *et al.*, 2012).

In addition, when households' livelihood diversification sustained, which improve households' access to quality education, information, technologies and training and better nutrition and health achieved through, for example firstly direct support to asset accumulation: to health/education/training infrastructure; to health/education/training personnel and to the development of relevant knowledge and skills (these should be developed with and made readily available to the poor). Secondly indirect support (through transforming structures and processes): Reform of health/education/ training policies; Reform of health/education/ training organizations and Changes in local institutions – culture, norms – that limit access to health/education/ training (e.g. for women). And finally feedback from achievement of livelihood outcomes (virtuous circles): Health status

is directly related to income/food security (with relevant knowledge); Higher income is often reinvested in education and Reduced vulnerability can reduce the birth rate (with knock-on effects on nutrition and labour) (DFID, 2009).

2.2. Empirical Review

Many livelihoods are largely predetermined by accident of birth. A person may be born, socialized and apprenticed into an inherited livelihood as a cultivator with land and tools, a pastoralist with animals, a forest dweller with trees, a fisherman with boat and tackle, or a shop keeper with shop and stock; and each of these may, in turn, create a new household or households in the same occupation (Chambers, 2012). This premise does not always true in the contemporary world.

According to Adugna (2008), the studies done on identify determinants of livelihood strategies in Wolaita, Southern Ethiopia and used multinomial logit model. The multinomial logit result showed that age, education and sex of household head, credit, land size, livestock and agro-ecology as the factors that reduced the likelihood of diversification; while, family size, dependency ratio, frequency of extension contact, membership to cooperatives, input use, and remittance increased the likelihood of diversification.

According to Wondim A., (2018), the review was done on determinants and challenges of livelihood diversification in Ethiopia. Some determinants, which affect the rural communities, were human, financial, social, natural, and physical capitals/assets. Lack of capital, poor infrastructures, and lack of access to credit service, lack of access to market and marketing service and farmland scarcity were some of the challenges that face rural households to diversify their livelihood.

According to Yenesew et al. (2015), the studies did assess the determinants of livelihood diversification strategies in the study area. The descriptive statistics were used to identify the livelihood strategies and the livelihood assets. In this regard, the econometric analysis demonstrated that out of the total sixteen variables included in the model only seven variables including land size, livestock holding size, sex of household head, mass media, market distance, total annual household income, and urban linkage are found to be the significant determinants up to 10% probability levels.

According to Melese et al. (2019), the studies done examine the existing livelihood strategies and its determinant in Kuarit District, West Gojjam Zone, and Amhara Region, Ethiopia. A Multistage sampling technique was used to select the kuarit district, the study villages and sample respondents. Multinomial logit model results showed that access to credit service, total annual income and total family size have a positive effect on choices of livelihood diversification strategies; while market distance, age, total livestock holding and dependency ratio of the household head have a negative effect on choices of livelihood diversification strategies.

According to Tamrat *et al.*, (2018), the studies done on socioeconomic characteristics of the household and pattern of rural livelihoods in Arsi Woreda were described and the contribution of non-farm and off-farm income sources in livelihood diversification and determinant factors were analyzed. Simpson diversification index was used to estimate the diversification status. A negative binomial regression model was used to identify determinants for a number of non-farm activities.

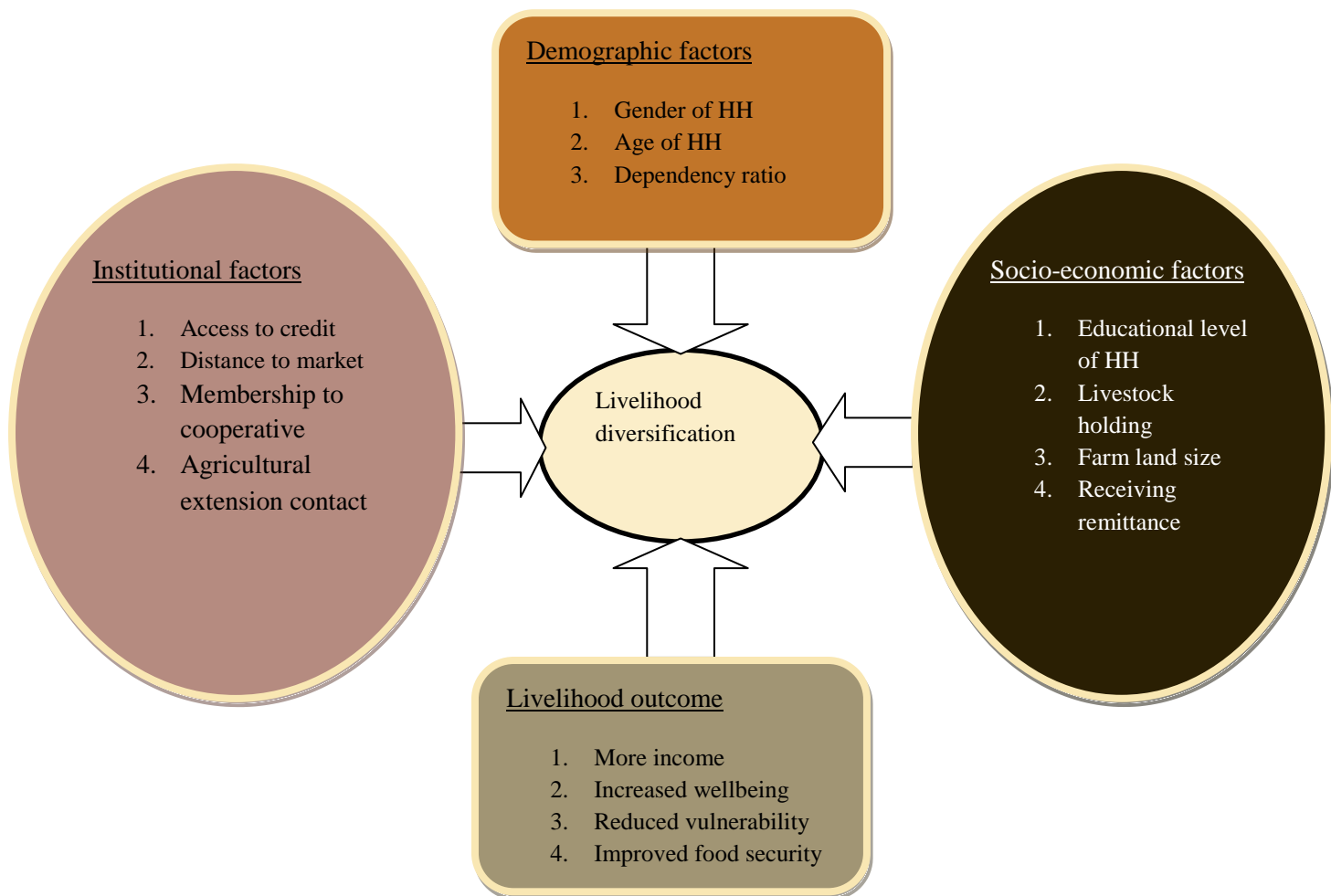
According to Anshiso and Shiferaw (2016) the studies have been done to determinants of rural livelihood diversification activities in the Lemmo District, Hadiyya Zone of Southern Ethiopia. A multinomial logit model was employed in identifying the determinants of rural livelihood diversification strategies. Accordingly, total family size, household head education, frequency of development agents' visits, access to credit service and receiving remittance have positive and significant effect on diversification livelihood activities.

Some studies emphasized the determinants of livelihood diversification strategies by using the multinomial logit model but there are gaps related with conceptualization of variable of interest and choice of covariates. So this study aimed to fill the research gaps that were not addressed by other scholars. Moreover, since explanatory variables were being varied from one local area to another, this empirical study can contribute its part for the existing literature.

2.3. Conceptual Framework of the Study

The conceptual framework in the figure illustrates the interrelationships and hypothesis about how each key factors influence the household choice of livelihood diversification.

Figure 1 Conceptual framework of the study



Source: own computation, 2022

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. Description of the Study Area

The study will be conducted in Southern Nation Nationalities and Peoples Regional State, Gurage Zone, Kebena district. Kebena district is located in Gurage Zone, SNNPRS, and is 155 km from capital city of Addis Ababa, 259 km from regional capital city of Hawassa. The administrative center of Kebena district is Wolkite. Kebena District is located in Gurage Zone, Astronomically, it roughly lies between 8° 16' 30" to 8° 19' 30" N latitude and 37° 55' 30" to 37° 58' 30" E east longitude. It is bordered District bordered by Oromia Region in North, Ezha district in South, MhurAklil district in East and Abeshge District in West. The total land area of the District is estimated to be 34000 hectare of from which 89% cultivated 1.14% grazing, 6.9% forest or bush and the remaining 2.96% unproductive and other covered (KDOFED, 2021).

The total population of Kebena district is estimated to be 149,922 and the average population density of the District has become 596 people per sq. km. The District has only one major agro-ecological zone that is sub-humid climatic zones. According to the traditional climatic classification, in all parts of the District, about 100% lies under Wayina-Dega (tropical sub-humid) and type of agro ecology. The temperature and rainfall of Kebena district range from 17.6 - 20°C and 1200-1400mm respectively. The altitude of the District varies from 1600-2300 mean sea levels (KDOFED, 2021).

The agricultural practice trend at the District is people still traditional agricultural plowing by using traditional tools. The District land covers around 89% of the cultivated area. Livestock production is an integral part of the production system of the area. Production of cattle, goat, sheep and poultry are common animal production part of the agriculture of the District (KDOFED, 2021).

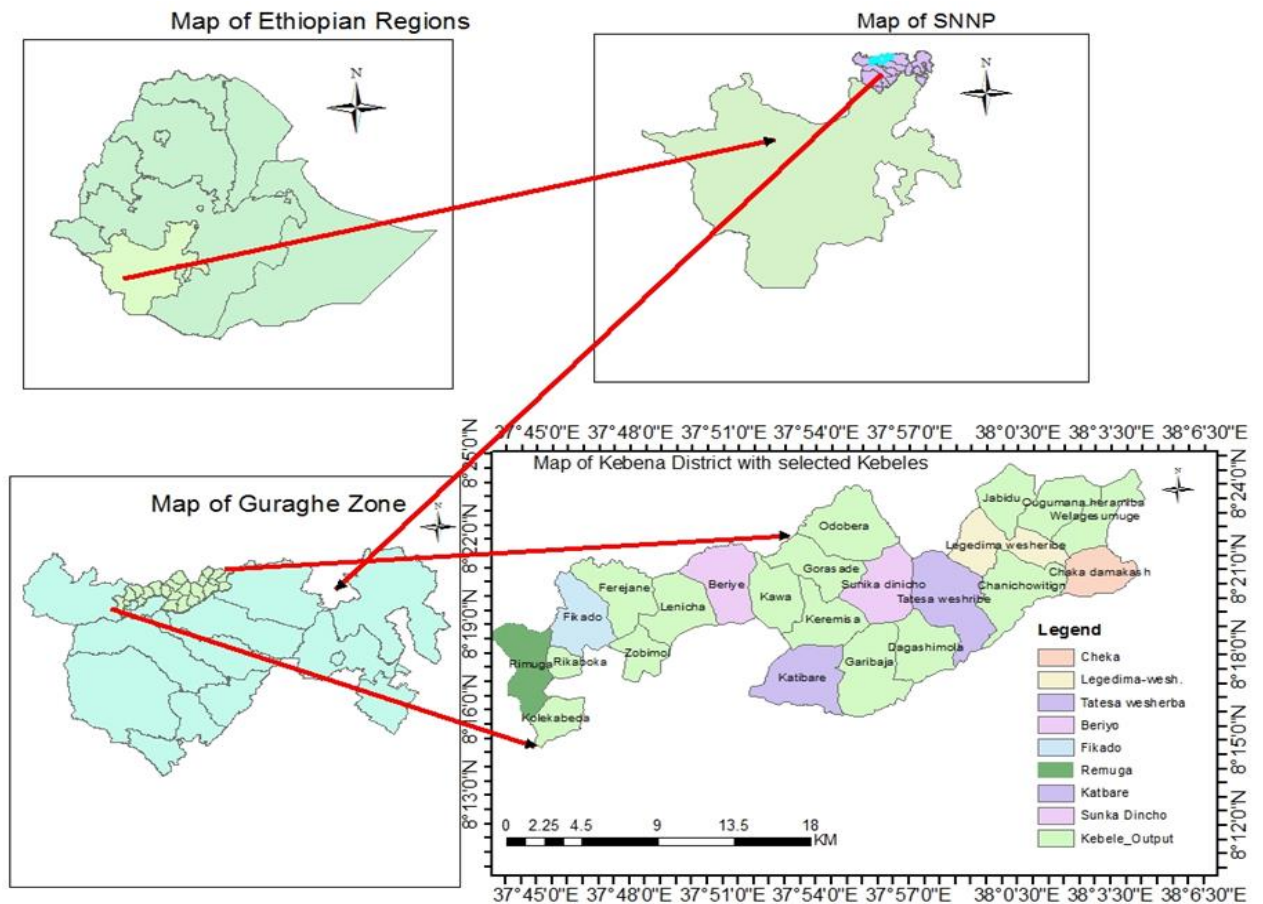
The dominant crop is Maize, Teff, Pepper, Wheat and Sorghum. Agriculture in the areas is predominantly rain-fed and the amount, reliability and distribution of rainfall are important determinants for crop yield. The climate characteristics by two rainy periods the krent rains are more important than the belg rains in this area, and are essential for the cultivation of teff, chickpeas, wheat and nug (Niger seed). Belg rainfall is also important

for the cultivation of long - cycle crops, of which the most important is maize and Sorghum (KDOFEDO, 2021).

A root crop the so called Enset Wergasa (2006), is also a staple food for more than 140,000, Kebena people (KDOARD, 2021). The subsistence Agriculture in the district is primarily based on the root crop the so called enset together with corn [maize], Sorghum, chickpea, yams and some other cash crops include teff , niger seed , coffee and chat ; have its part in the livelihood of that area. The animal production in that area includes Cattle, goats, sheep and poultry which are the main type (KDOFED, 2021).

Livestock brings substantial cash for middle and better off wealth groups and also available dietary supplement in cow milk. The main livestock products sold are butter, cheese and eggs.

Figure 2. Map of study area



Source; -MWFEDD, 2010

3.2. Research Design

This research is a cross-sectional study. The study is aimed at collecting data at one point in time and describing the study population rather than showing the patterns of change that might be witnessed over time.

3.3. Data Types, Source and Methods of Collection

In this study the researcher employed both types of data qualitative and quantitative to analyse and investigate rural household livelihood diversification and determinants of the household in the study area. Regarding data sources, both primary data and secondary data were collect to meet the objectives of the study. Structured questionnaire was developed to collect the necessary primary and secondary data in which quantitative and qualitative data was gathered from the sample respondents. The questionnaire includes the information on household demographic characteristics, socioeconomic and institutional related information. In addition, secondary data has been collected from available reports and records of the agriculture and rural development offices of the study Districts, Ethiopian CSA, Wolkite branch and published journals from websites and unpublished literatures from different sources.

3.4. Sampling Techniques and Sample Size Determination

Two-stage sampling method was employed so as to reach at the selection of a sample household for this study. Kebena District was selected as a study area, because different household's livelihood options have being practiced, poverty and food insecurity prevalence are evident and priori study in this area is rear. At first stage, the total 24 Kebeles of the district grouped into 8 tabias based on their livelihood activities and geographical location/nearness/border (i.e.in each tabia there are 3 Kebeles)and eightrural kebeles (Rimuga, Fikado, Beriyo, Katibare, Sunka-dinicho, Tatesawesherbi, Wesherbi-leggedima and Cheka)were selected purposely from the total of 8 tabias (Kola, Zebimola, Kawa, Ambelta, Sunka, Wesherbi, Jebdu, and Wutign) of the Kabana district respectively (one kebele from each clustered tabia which represent the respective Kebeles included in the Tabias).The reason why these Kebeles were chosen is: first, there is a substantial variation in the nature and availability of off-farm activities. Second, there are variations among the 8 kebeles in their access to information, market and infrastructure facilities. A *Tabia* is the low administrative unit in the district in which some kebeles included in it in

the rural setting. At second stage, the respondent households were chosen from the list of household heads in each selected Kebele using systematic random sampling method. Total sample of 376 rural households, were chosen using probability proportional to size. The sample size of the household was determined using the sample size determination formula of (Yamane, 1997) as follow:

$n = \frac{N}{1 + N(e)^2}$, the reason for using this formula is because the formula helps to acquire manageable sample size for the researches that constitute large number of population.

Where N = population size, and e = margin error; According to the given, the population size of households =6270, confidence interval =95% and marginal error = 0.05 desired level of precision for a 95% confidence level, the reason for choosing 5% margin of error is because it is the degree of accuracy required normally set at 0.05 (5% of acceptable sampling error for social science).

$$n = \frac{6270}{1 + 6270(0.05)^2} = 376$$

Table 1 Distribution of Kebeles and Household

Agro-ecology	Kebeles	Total no of HHs	Proportion in (%)	Ways of compute	Sample
Woyina-Dega	Rimuga	802	13	$802 * 376 / 6270$	48
Woyina-Dega	Fikado	754	12	$754 * 376 / 6270$	45
Woyina-Dega	Beriyo	674	11	$674 * 376 / 6270$	40
Woyina-Dega	Katibare	895	14	$895 * 376 / 6270$	54
Woyina-Dega	Sunka	916	15	$916 * 376 / 6270$	55
Woyina-Dega	Tatesawesherbi	726	11	$726 * 376 / 6270$	44
Woyina-Dega	Wesherbi- legedima	749	12	$749 * 376 / 6270$	45
Woyina-Dega	Cheka	754	12	$754 * 376 / 6270$	45
Total		6270	100		376

Source: Own computation 2022

3.5. Method of Data Analysis

After collected the data, it is necessary to analyze them. Data analyzing is the critical study by which we extract information from collecting data. It was design to produce with strategy for investigating and specific questions. It provides us with process for investigating questions. It offers us with process for determining the structure of the data that shall do direct us towards proper inference procedure. Data has to being analyzed with

reference to the purpose objective of the study and it is possible bearing in scientific discoveries and analyze is doing with reference to the research problem at hand or the hypothesis. Data analysis involves for many steps like categorization, coding, statistically adjusting the data and tabulation. After collected the data it was edited, cleaned and summarized the appropriate data then the available data were transformed into reliable useful information. Finally the study employed descriptive, and an econometric analysis. The data was analyzed by using statistical software STATA-13 and Multinomiallogit model wasapplied to analyze the determinants of livelihood diversification strategy. Thestudy also employed descriptive statistics. Therefore, descriptive statistics includes; mean, number, percentages and standard deviations was employed to describe various aspects of sample respondents.

3.5.1. EconometricsModel Specifications

Rural household decided to be engaged in different livelihood strategies for different reasons. However, the basic assumption is that in a given period at the disposal of its asset endowment, a rational household head choose among the different mutually exclusive livelihood strategy alternatives that offer the maximum utility (Adugna and Wagayehu, 2012). Multinomial logistic regression is a classification method that generalizes logistic regression to multiclass problems i.e. with more than two possible discrete outcomes. Multinomiallogit model specifications to identify the determinants behind the household decision to livelihood diversification strategy the assumption is a rational household head choose among the different income source that offers the maximum utility which leads to livelihood diversification.

Multinomial logit model is selected not only because of the computational ease but also because multinomial logit analysis shows a superior ability to predict livelihood diversification and to pick up the differences between the livelihood diversification among households than other models. It is a simple extension of the binary logistic regression model and is the most frequently used model for nominal outcomes that are often used when a dependent variable has more than two choices Enyew and Bekele (2012).

Multinomial discrete choice model, the choice set is made up of all combinations of diversify livelihood of available alternatives. The usefulness of the multinomial logit model is limited by the property of independence and irrelevant alternative. Therefore, this

study used a Multinomial logit model in the econometric technique to overcome the shortfalls of using the other econometric models.

Moreover, based on the work of Tassewu(2008), the maximum utility model of households from different livelihood strategies can be specified as follows: - Let U_{ij} denotes the utility that the household i gets from choosing alternative activity j and

$$U_{ij} = U_{ij} + \varepsilon_{ij} = X_{ij} \beta_j + \varepsilon_{ij} \dots\dots\dots(1)$$

Where: β_j = the coefficient of covariates which varies across alternatives, X_j = the covariates which remains constant across alternatives; and ε_{ij} = a random disturbance term, and unobserved attributes of alternatives. For an outcome variable with J-categories, let the j th livelihood strategy that the i th household chooses to maximize its utility could take the value 1 if the i th household choose j th livelihood strategy and 0 otherwise. Therefore, J-category of livelihood strategy of i thhousehold for this study is categorized as follows:0 = on-farm (crop production and livestock rearing) as reference outcome variable; 1= on-farm + Off-farm activity (which includes agriculture plus daily labor work(wage), renting of asset (land, ox), firewood wood sale and trading of livestock);2= On-farm + Non-farm activity (which includes hand craft, small business trade and remittance (from abroad)and 3= On-farm + Off-farm + Non-farm (which includes all above livelihood strategy).

The probability that a household with characteristics x chooses livelihood strategy j , modeled as multinomial logit. The model is selected because that the responses of households for livelihood diversification strategies will be expect to be polytomous. Logistic regression can be extended to handle responses that are polytomous, i.e. taking response greater than two categories.

Therefore, the probability, P_{ij} is modeled as: Then multinomial logit model can be written as:

$$P_{ij} = \frac{\exp(X'_i \beta_j)}{\sum_{j=0}^J \exp(X'_i \beta_j)} \quad J=0 \dots\dots\dots(2)$$

With the requirement of $\sum_{j=0}^J p_{ij} = 1$ for any i

Where; P_{ij} = probability representing the i th respondent's chance of falling into category j

X = Predictors of response probabilities, β_j = Covariate effects specific to j th response category with the category as the reference. Then through normalization the model, it is assumed that $\beta_1 = 0$ (this arises because probabilities sum to 1, so only parameter vectors are needed to determine the $J + 1$ probability), (Galabet *al.*, 2012) so that $\exp(X_i \beta_1) = 1$, implying that the generalized equation (2) above is equivalent to:

$$P_{ij} = \frac{\exp(X'_i \beta_j)}{1 + \sum_{j=0}^J \exp(X'_i \beta_j)} \text{ For } (j = 1, 2, \text{ and } 3), P_{i1} = \frac{1}{1 + \sum_{j=1}^3 \exp(X'_i \beta_j)} \dots\dots (3)$$

$$\ln\left(\frac{P_{ij}}{P_{i1}}\right) = X'_i(\beta_j - \beta_1) = X'_i \beta^j, \text{ if } J=0 \dots\dots\dots (4)$$

Empirical model

In order to test the hypothesis that household socio-economic, demographic characteristics as well as institutional factors taken singly have no effect on household choice of livelihood diversification activities in Kebena district of the study area, the following MNL was fitted into the data:

$$DIV = \beta_0 + \beta_1 GDR + \beta_2 AGE + \beta_3 EDU + \beta_4 DR + \beta_5 AC + \beta_6 RE + \beta_7 PC + \beta_8 MD + \beta_9 LSI + \beta_{10} AXC + \beta_{11} LSK + \epsilon_i \dots\dots\dots (5)$$

As indicated above, the dependent variable, Diversification (DIV), have four possible values: on-farming=0, on-farming plus off-farming=1, on-farming plus non-farming= 2 and on-farming plus off-farming plus non-farming= 3

3.6. Description of Model Variable

3.6.1 Dependent variable

The rural household's livelihood diversification strategies: its dependent and multiple decisions in each livelihood diversification strategy. The four common livelihood diversification activities employed in the study areas were

$Y=0$, if the diversification lies in On-Farm (it refers to income generated from farming activities such as the production of unprocessed crops, fruits, livestock, fish, and forestry).

Y=1, if the diversification lies in On-Farm + Off-Farm (it refers to On-Farm plus wage or exchange labor on other farms, renting of asset firewood sales and trading of livestock).

Y=2, if the diversification lies in Off-Farm (it includes income on wage or exchange labor on other farms, renting of asset firewood sales and trading of livestock).

Y=3, if the diversification lies in On-Farm + Off –Farm+ Non –Farm (it refers includes all the above activities plus agricultural activities hand craft, small business trade and remittance (from abroad) cottage industries, and mining).

3.6.2. Independent variable

The independent variables of the study are those variables that are hypostasized to have an association with rural households' decision to choose on different livelihood activities. Therefore, based on literature and data availability 11explanatory variables will be hypothesis as factors to determine rural household's decision to participate in different livelihood diversification strategy are explained as follows.

Gender of household head (GDR): it is a dummy variable that takes the value 1 formale and 0 otherwise. Men and women have different access to resources and opportunities (Ellis, 2005). Female head households had more responsibility in the house and traveling for searching non-farm and off-activity was culturally unacceptable (Melkamu M, 2020).

Age of household head (AGE): it continuous variable as the age of household head expect to increase the chance to diversify or involve in different livelihood diversification strategy choice. Thus, older household head will be expect to be less active and hence rely more on agriculture activities than off-farm and non-farm income generating activities. And, younger household head are more likely to diversify their livelihood strategies than the older household head because older household head may have better access and possession of resources accumulation (Adugna *et al.*, 2008).

Education level (EDU): It's a categorical variable that takes the value 0 Can't read and write, 1. primary level, 2. secondary level, 3.college and above that representing the number of formal education years of the household head. This variable was expected to be positively associated with household choice of livelihood diversification activities. This is expected because the more educated household heads are, the more diversified activities they would have (Yizengaw *et al.*, 2015). Formal education increases the knowledge that

one needs to become competent to choose activities that generates more income and up to date with all the modern technologies that make entrepreneurship much easier (Asfaw *et al.*, 2016). Therefore, enhancement in the educational level will escalate the probability engagement in livelihood diversification (Khatun and Roy, 2012).

Dependency ratio (DR): It is a continuous variable that the existence of a large number of children under the age of 15 and old age of 65 and above in the family could will be suppose affect the livelihood diversification of the household. Therefore, the dependency ratio was hypothesized to negatively affect household decision to participate in existing livelihood strategiesDesalegn, (2016).

Access to credit (AC): it is a dummy variable and takes the value 1, if they have access credit and 0 otherwise. Access to credit is a key determinant of livelihood diversification strategy choice. Moreover, livelihood diversification strategy choice out of the agricultural sector is positively influenced through participation in formal credit markets (Melese et al, 2019; Anshiso & Shiferaw, 2016). This study was hypothesized to have a positive effect on household decisions to participate in different livelihood diversification strategies.

Receiving remittances (RE): it is a dummy variable that takes the value 1 for receive remittance and 0 otherwise. Receiving remittance refers to relative economic support in the form of cash or kind to the household from abroad and within the country. This variable hypothesized to affect the decision to participate in different livelihood strategies positively (Anshiso and Shiferaw, 2016 and Adugna E., 2008).

Participation in consumer's cooperatives (PC): it is a dummy variable that takes the value 1 for participating in consumer cooperative and 0 otherwise. In line with this membership, it creates access to utilize the commodities and has an important impact to increase household's participation in diversified livelihood activities (Adugna, 2008).

Market distance (MD): itis a continuous variable and which refers to the amount of kilometre that the household's home away from the market center. Access to the market and other public infrastructure may create opportunities for more income by providing in diversifying livelihood strategies. Therefore, this variable was expected to positively influence the decision of a rural household to participate in a diversified livelihood strategy.

Land size (LSI): it is measured in hectares as a continuous variable indicating the total land size households owned. An increase in farm size explained by the assurance of households to invest in varying source of income and develops the land. In addition Andersson(2012) found out that bigger land sizes have largely been associated to increased involvement in agricultural activities. Therefore, farm size was expected to be positively associated with household choice of livelihood diversification activities.

Agricultural extension contact (AC): is a dummy variable that takes the value 1 for contact with agricultural extension worker and 0 otherwise. The objective of extension is to change farmers' outlook towards their difficulties which assists them to adapt better solutions to their livelihoods (Samuel, 2001). Thus, the information obtained and the knowledge and skill gained from extension organizations may influence farmers' skills and decision-making on seeking diversification. The extension contact received has increased the tendency of the household to participate in off-farm activities. This may be also explained by the factors that the message/contents that farmers gain from extension agents help them to initiate to use of risk aversion strategies that seek diversification of income within and out of agriculture. Therefore, this variable was expected positive impact on livelihood diversification (Anshiso & Shiferaw, 2016).

Table 2 Description of Variable, Measurement and their expected sign

Independent variable	Variable description	Nature	Measurement	Expected sign
Gender	Gender of household head	Dummy	Male=1 Female=0	+ve
AGE	Age of the household head	Continues	Number of years	-ve
EDU	Education level of household head	Categorical	0=illtreat 1=primary level (1-8) 2=secondary level (9-12) 3=collage and above (university)	+ve
DR	Dependency ratio of the household	Continues	Number of dependent	-ve
AC	Access to credit by the HH (1= Yes, 0= No)	Dummy	Yes=1 No=0	+ve
RM	Remittances to the household (1= Yes, 0= No)	Dummy	Yes=1 No=0	+ve
PC	Participation in cooperatives (1=Yes, 0= No)	Dummy	Yes=1 No=0	+ve
MD	Market distance in km	Continues	In km	+ve
LS	Farm land size(in the year 2020)	Continues	Hectare	+ve
TLU	Total Livestock holding	Continues	Number of livestock	+ve
AXC	Agricultural extension contact(1=yes, 0=no)	Dummy	Yes=1 No=0	+ve

Source, own computation, 2022

3.7. Post estimation tests/or Diagnostic tests

3.7.1. Checking Multicollinearity

Before proceeding to estimate the data using multinomial logit regression, different tests will be undertaken. One of the tests is checking the existence of multicollinearity between explanatory variables. The presence of multicollinearity among the variables seriously affects the parameter estimates of any regression model. The Variance Inflation Factor (VIF) technique will be employ to detect the problem of multicollinearity for the variables

(Gujarati, 2004). VIF can be defined as;
$$Vif_{xi} = \frac{1}{1 - R_i^2}$$
 the larger the value

of VIF, the more troublesome it is. As a rule of thumb if a VIF of a variable exceeds 10, the variable is said to be highly collinear.

3.7.2. Checking Heteroskedasticity

Heteroscedasticity exists when the variances of all observations are not the same, leading to consistent but inefficient parameter estimates. More importantly, the biases in estimated

standard error may lead to invalid inferences (Whitten, 1980). Heteroscedasticity will be detecting by using Breusch-Pagen test.

3.7.3. Model Specification test/Omitted variable test

Under this section will bereached through examination of the specification tests for the MNL that were developed by (Hausman and McFadden, 1984) with the intention to examine the validity of IIA. I show that these tests lose all their power if an MNL with a full set of alternative-specific constants is estimated. Since these constants absorb all elements of the deterministic parts of the utilities, failure to pass the test indicates specification error in the deterministic parts of the utilities. However, the tests tell us nothing about the specification of the random parts of the utilities.

CHAPTER FOUR

4. RESULT AND DISCUSSION

This chapter presents the results and discussion part of the study. While the descriptive analysis has been applied to explain the demographic, the socioeconomic part and institutional characteristics of the sample respondents, an econometric model is used to explain the factors influencing the likelihood of occupational livelihood diversification among the rural households. The results are discussed as follows.

4.1 Demographic, Socio-economic part and Institutional Characteristics of Respondents

The demographic, socioeconomic and institutional part of the study is presented with the help of descriptive method of analysis- mean, percentages, and frequencies to reveal their effect on the occupational livelihood of a society. It is expected that demographic and socioeconomic factors determine livelihood diversification in rural settings. Previous literatures (Khatun and Roy, 2016; Bedru and Beyene, 2017; Adewunmi, *et al*, 2018), support this argument. Thus, the descriptive analyses of the demographic, the socioeconomic part and institutional factors are displayed as follows:

Gender of Household Heads: -When we look to the gender composition of the respondents it seems like the following. Of the 376 household respondents' 79.5% of them are males headed and the remaining 20.5% of households are females headed. In other words, most of the respondents from the sample taken are male household heads. This could have its own side effects on the probability of occupational livelihood diversification. The descriptive analysis implies that there was significant difference in the gender of households in study area at 5% significance level. Where empirical literatures indicate that the probability of livelihood diversification relatively increases more if the household is headed by male than by female on the premise that male household heads are stronger than the female household heads emanated from the difference in biological nature (Khatun and Roy, 2014). *Table 3 Descriptive statistics of gender of household*

Gender of household	Freq.	Percent	χ^2
0= Female	77	20.48	13.9511
1= Male	299	79.52	
Total	376	100	

Source own computation

Education Status of Household Heads (EDU): - As it is portrayed on table 4.2 from the total sample respondents 34 (9%) of household heads are can't read and write whereas 116 (31%) of them are primary (1-8), 167 (44%) respondents are secondary school (8-12), and 59 (16%) respondents are collage and above. The chi-square value indicates that, the education levels of the community are difference. Hence, from the assumption of previous literatures it is possible to anticipate that the education level of household has its own positive relation to the increasing of livelihood diversifications (Eneyew, 2016). Since a great number households are educated in the study area; due to the educational status their probabilities to livelihood diversification may increase.

Table 4 Descriptive statistics of Education level

Education Level of household	Freq	Percent	χ^2
0=can't read and write	34	9.04	0.3972
1=Primary	116	30.85	
2=Secondary	167	44.41	
3=College and Above	59	15.69	
Total	376	100	

Source own computation, 2022

Receiving Remittance: -The proportion of households that have receive 59(16%) are relative economic support in the form of cash or kind to the household from abroad and within the country. whereas 317 (84%) household are cannot support any remittance as whole. This implies that the household of those area have receive remittance are minimum. The Chi-square value revealed significant difference on household's income from abroad and relative within the country and cannot get any income from abroad and relatives.

Table 5 Descriptive statistics receiving remittance

REM-HH	Freq.	Percent	χ^2
0=No	317	84.13	17.3426
1=Yes	59	15.69	
Total	376	100	

Source own computation, 2022

Access to Extension Contact (AXT-CON):-The proportion of households there is not contact to extension service was about 25% for the total sampled households. Where about 75% the rural household in study area are entirely accessed agricultural extension contact. This indicates that the household in the area are good indication of agricultural extension contact. The Chi-square value shows that highly significant difference access to extension and not access to extension community at 1% significance level.

Table 6 Descriptive statistics of access to agricultural extension contact

AXT-CON	Freq.	Percent	χ^2
0=No	92	24.47	11.6787
1=Yes	284	75.53	
Total	376	100	

Source own computation, 2022

Access to Credit Service (ACC-CRED):- The proportion of households that have access to credit use (loan demand) 84% of the community and 16% of the community are not access to credit service. The accessed group are likely to use credit because credit helps to start own business like local brewery, selling tea/coffee and livestock and grain trade. The Chi-square value shows that highly significant difference access to credit service and not access to credit service in study area at 1% significance level.

Table 7 Descriptive statistics of access to credit

ACC-CRED	Freq.	Prevent	χ^2
0= No	317	84.31	13.4323
1=Yes	59	15.69	
Total	376	100	

Source own computation, 2022

Age of Household Head: -Age is one factor for rural livelihood diversification. The household heads in the study area have an average age of about 45 years with the minimum and maximum year 26 and 60, respectively. For general information it is indicated in table 4.3. This may indicate the sample household head have a greater farming experience and composed of sample respondents of different ages. This may also imply that, the rural households have a potential to diversify their livelihoods

Farm Land Size of Households: -The result revealed that land distribution among the rural household too vary from household to household. Consequently, in the study area majority of the sample respondents owned about 3-6 hectare. On the opposite of this, there are also few rural households who are landless. Furthermore, the mean, minimum, and maximum land size of the respondents is 6.82, 3. and 12 hectare, respectively. This idea is clearly stated in table 4.3 below. In general, it is found that the size difference of land holding is large; among the sample respondents of the study area.

From this, we can observe in the study area that, the chance of landless farmers to diversify their livelihood income is very low. This is may depend on the amount of arable land they plough based on the rent. If the possibility of getting rented arable land is zero, those

farmers have no choice to stay in agriculture and may exist for searching non-farmincome. Here, there is same relating to the previous research of (Mohammed, 2015).

Market Distance: - The data are gathered from households resided in eight kebeles in kebena district. The town is far about 27Kmt to the Southwestern part from Wolkite the capital city of Gurage Zone. The household heads in the study area have an average market Distance of about 20km with the minimum and maximum distance of 4 and 41 km, respectively. This indicates that the market distance are positive effect in some case and also negative effect on other to the livelihood diversification received in study area.

Dependency Ratio: -the result in table 4.3 indicates that the sample households who have the average inactive workers are 1.73 and the minimum and maximum inactive workers in each household are 0, and 7 respectively. In general the household with large number of dependency are less likely to diversify livelihood strategy activity.

Table 8 Descriptive statistics of continuous explanatory variables

Variable	Mean	Std. Dev.	Min	Max
Age of household	45.01596	7.910483	26	60
Dependency ratio	1.736702	1.518713	0	7
Land size	.9773138	0.9323052	0.25	7
Market distance	20.13032	13.2043	4	41
FARM Size	6.821809	2.143555	3	12
LSTKNO	4.518617	2.20416	0	12

Source own computation, 2022

4.1.2. Descriptive statistics for dependent variable

In rural areas households can diversify their livelihood strategies by involving in different sources of income generating activities to fulfill their basic needs including their usual business of farming. The rural households in the kebena District are not an exception to this. Therefore, the main sources of livelihoods in this study area are categorized into four; livelihood sources based on farming activities, off-farm, and on-farm plus off-farm plus non-farm activities. In rural development research, income distribution is a major issue when livelihood diversification is talked about. It raises question about how equally are the income distributed from various activities and owing to it does it have a favorable impact on households? As income inequality has been a serious issue throughout the world and especially when livelihoods are diversified, knowing the extent of income inequality is an important issue to be researched. When the income sources are diverse, knowing the income source of inequality is equally desirable. The result in table 4.4. Revealed that ON-

farm, On-Farm plus Off-Farm, OFF-Farm and On-Farm plus Off-Farm plus Non-Farm are 40.4%, 31.4%, 21.5%% and 6.6% respectively which means that On-Farm activity of household in study area are dominantly practiced.

Table 9 *Descriptive statistics of livelihood diversification*

DIV	Freq	Percent
ON-Farm	152	40.43
ON-Farm + Off-Farm	118	31.38
Off-Farm	81	21.54
On-Farm Off-Farm+Non-Farm	25	6.65
Total	376	100

Source own computation, 2022

4.2. The contribution of livelihood diversification to household income.

The rural economy especially in kebena district is not based solely on agriculture but rather on a diverse array of activities and enterprises. Whilst farming remains important, rural households are looking for diverse opportunities to increase their incomes. Respondents alluded to the fact that the extent to which households are able to feed themselves often depends on off-farm, and non-farm income as well as their own agricultural production. Non-farm income is used by many households to purchase grain which ensures their income. Whatever diversification strategies that are pursued, it was revealed that households are careful not to disrupt household food supply (Mutenje G., 2010).

In the study area it was noted that diversification activities become popular for a few months outside the agriculture seasons which limits the amount of effort and investment in harnessing the potential of non-farm livelihoods. This seasonal attention to non-farm livelihoods was prevalent in the district consequently implying a marginal contribution to the overall income.

Furthermore, the bias towards crop production further meant that community members are entrenched in crop production as the only means of ensuring greater food availability. The situation was further compounded erratic weather patterns which continued to affect food availability, evidenced by the scale of food aid activities taking place in the district. For poorer households, casual wage labour on other farms and community work programs continue to be popular as they require no specialized skills or input costs. This is inconsistent with Reardon *et al.*, (2016) who suggest that “contrary to conventional

wisdom, wage income is often more important than rural nonfarm self-employment earnings.

Though several household studies indicate that rural nonfarm income exceeds agricultural wage earnings in kebena district agriculture wage labour remains popular. This type of diversification can include work on others' farms or non-farm activities which often results in a decline in the management of the home farm if the necessary labour is no longer available when needed the most (Reardon, 2001; Reardon *et al.*, 2008).

Though it is generally believed that income surpluses generated off-farm can provide farmers with income for on-farm innovation, interviews with key informants revealed that it is not clear to what extent income generated by nonfarm activities is reinvested in agricultural production. Households are only able to reinvest in agriculture when off-farm work is only short term and the home farm has not been neglected. Where households successfully participate in on-farm work, priority is placed in ensuring increasing income of household level.

This means income from diversification is more often used for food purchases first. Diversification among wealthier households with more land and/or education is different from the poorer households who are limited to low-productivity farming and low-pay farm labour due to limited education and land holding. In kebena district, an increase in diversification amongst low income group is seen more as a survival strategy rather than progress out of poverty. This has also been observed to be the case in rural kebena district where although increased diversification corresponds with greater income, those poor in land and capital are less able to invest in diversification activities than higher income groups (KDOARD, 2021).

In light of the aforementioned, the contribution of diversification on income has several compounding factors. Whilst diversification usually means increased income for a household, but that depends on the extent to which it has disrupted household farming and whether the income derived is sufficient for food purchases and farm investments. It would be important for agricultural extension workers to also consider strengthening linkages between diversification activities and investment in agriculture (Chapman and Tripp, 2014).

As shown in Table 9 the household survey witnessed that almost 73%,and of the household's average net annual income were obtained from agricultural crop production and animal husbandry sources; and only 17%,of the household's average annual income are obtained from a of off farm activities and 10% of average annual income are contribution of Non-Farm activities. This is approximately consistent with national estimate of the country, where more than 80% of the rural peoples' livelihood income gained from agriculture activities (CSA, 2014).According to the survey result the contribution of non/off-farm activities to the total household income was less likely to on-farm livelihood activity. In line with less percentage contribution of non/off-farm activities compare to On-Farm activities, key informants stated that most of the area income gain from agricultural activities and non/off-farm activities in the study area are less paying and non-ruminative activities. Moreover, they stated that rural farm households in the study area are engaged in non/off farm activities as part time activities.

Table 9 the contribution of each income sources to the total household net annual income.

Variable	Mean	Percentage contribution	Std. Dev.	Min	Max
ON-Farm Income	22311	72.52	9517.369	2000	68000
OFF-Farm Income	6890	17.19	9423.233	0	35000
ON-Farm + OFF-Farm Income	27352.66	89.71	16232.09	2000	103000
Non-Farm	5898	10.29	24034.28	0	420000
On-Farm +OFF-Farm +Non-Farm Income	32667.55	100	23703.92	3000	173000
Total Income	32667.55	100	23703.92	3000	173000

Source own computation, 2021

4.3. The Determinates of Livelihood Diversification.

Before directly estimating the empirical findings of this study, it is always advisable to check the relative fitness of the model. In this regard, that the quality of the model is also tested against its goodness of fit using PseudoR². The results depict that about 73 percent of the variation in the dependent variable is explained by the explanatory variables included in the model of interest. This may seem low; however, goodness-of-fit for discrete choice models like the logit case is usually low (Verbeek *et al.*, 2004). Even though long iterations (4 in this case) show a symptom of the multicollinearity problem,

this suspicion was checked using the correlation estimates technique and we found that it is not a serious problem in the model (see in appendix-)

Checking multicollinearity problem

Estimation Variance Inflation Factor (VIF) was applied to test for the presence of multicollinearity problem among the explanatory variables are greater than critical value. There was no explanatory variable dropped from the estimated model since no serious problem of multicollinearity was detected from the result of VIF shows less than cut off point equals to 10 (see in Appendix).

Similarly, heteroscedasticity was tested by using Breusch-Pagen test. This test resulted in rejection of the existence of heteroscedasticity hypothesis as and there was no need to make the standard error robust (see in Appendix).

Checking Existence of omitting variable

Ramsey reset test using powers the fitted value of DIV	
Ho: model has no omitted variable	
F(3,359)	Prob>F
0.42	0.7413

The result revealed that the probability of overall test is insignificant which means the models are correctly specified

4.3.1. Econometric result

Here, the researcher tries to estimate and present findings on the factors that determine choices of different livelihood diversification. Multinomial logit model regression shows the determinant variables for each category versus the base category. Accordingly, the base category is the household who choose on-farm only as a livelihood strategy. This strategy is used as a reference category. The STATA version 13 was used to generate the parameter estimates. The parameter estimates of the multinomial logit model give only the direction of the effect of explanatory variables on the dependent variable, but the estimates neither stand for the actual size of change nor the probabilities (Chilot, 2007). However, the marginal effect measures the expected change in the probability of a given choice that has been made in relation to the unit change in the explanatory variable.

Thus, the predicted probabilities are better interpreted using the marginal effects of the multinomial model (Greene *et al.*, 2013). Cameron and Trivedi (2012) argued that the

marginal effects are more informative than coefficients and hence, the results in this thesis are interpreted according to their marginal effect values.

Table 9 Econometric result of determinant of livelihood diversification.

Variables	On-farm + off-farm		Off-farm		On-farm + off-farm + non-farm	
	Marg.effct	P> z	Marg.effct	P> z	Marg.effct	P> z
Gender	0.0317551	0.577	0.0513216	0.414	0.0075737	0.023**
AGEOHH	0.0000829	0.678	0.00445	0.032	-0.0009795	0.034**
EDUHH	0.0438225	0.084	0.0301	0.369	0.0042433	0.001*
DEPRATIO	-0.014191	0.034	0.01704	0.037	-0.0102076	0.025**
REMH	-0.069096	0.204	0.07083	0.834	0.0056214	0.872
MCCOOP	-0.029279	0.494	0.06976	0.056	0.0043913	0.691
MKTDS	0.0002318	0.019**	0.00217	0.007*	0.0016707	0.012**
AXTCON	-0.10842	0.021**	0.05987	0.067	-0.0097733	0.733
ACREDS	0.0512387	0.036	0.05027	0.815	0.025508	0.031**
FARM Size	-0.00822	0.525	0.01551	0.707	0.0045227	0.044
LSTKNO	-0.025455	0.013**	0.01202	0.225	-0.011275	0.011**

Source own computation, 2022

Gender of the household head:-

This variable opposed the pre-assumed expectations, gender has a positive and significant relationship to on-farm plus off-farm plus non-farm livelihood diversification strategy choice at 5% level of significance. The positive coefficient indicates that male headed households are more probably engaged on livelihood strategy. If the other factors remain constant, the likelihood of adopting the on-farm plus off-farm plus non-farm strategy in favor of male households' increases by 0.8% and the opposite is true for female headed households with reference to the on-farm only strategy. The possible reason could be in the study area due to the gender division of labor male headed households are mostly depends on on-farm activities than female headed households.

According to key informants, in the study area farming activities like plough are male roles and thus male headed households are usually involved in farming only. On the other hand, female headed households do not plough their land by themselves unless they hired male labor. Thus, they arranged their land for sharecropping and involved in non-farm activities other than their sharecropping income. Moreover, the common non-farm activities like preparing and selling local drinks, mat making, spinning and poetry work, petty trading

like grain and fruits trading, and selling firewood are women roles and thereby, women engaged in these activities.

On the contrary to this result, according to Amare and Belaineh (2013) gender of a household head found to have a significant and positive relation with non/off-farm wage, self and mixed self-wage employment activities participation at 1, 5 and 10% levels of significance, respectively revealing that the male headed households were able to participate in all non/off-farm employment activities compared to female headed households because women are busy by domestic activities.

Age of household head (Age):-

As expected, this was found significantly and positively influence households 'choice of Off-Farm, and negatively on On-Farm+Off-Farm+Non-Farm livelihood strategies at 5% significance level, respectively. Given all other variables in the model held constant, a one year increase in age of the household will decrease household's choices of Off-Farm, and On-Farm Off-Farm + Non-Farm livelihood strategies by 0.5%, and 0.9% respectively. This implies that farmers, whose age is relatively younger, could be pushed to engage more in off-farm and non-farm activities than agriculture alone. The possible reason could be younger households cannot get enough land to support their livelihood compared to the older farm households. This resonates with the previous findings from other studies (Eneyew and Bekele, 2012; Gebru and Bekele 2014; Khatun and Roy, 2016). This is expected because the desire and ability of older household heads to participate in non-farm activities may be adversely affected by abnormal health status, weak physical fitness and cultural thoughts associated with older ages.

Education status of household (EDU):-

As expected, the variable education positively and significantly related with the households livelihood diversification into on farm + off farm + non-farm activities at 1% probability level. This indicated that those farmers with high educational level are more likely diversify livelihood strategies into on farm + off farm + non-farm activities. This is due to most probably educated person gain better skill, experience, knowledge and this again help them to engage in diversified livelihood strategies. The marginal effect revealed the likelihood of a household diversifying into on farm + off farm + non-farm farm activities increase by 4.2%, for those farmers with more level of education. In other words, additional

one year education can increase the chance of choosing on farm+ off farm + non-farm farm activities. This is in line with study by Birhanu and Getachew (2016) that education is very important variable that can help farmers to diversify the rural economy.

Dependency ratio of the household:-

As expected, this variable has a significant and negative association with choice decision of the household to diversify in On-Farm+Off-Farm, On-Farm+Off-Farm+Non-Farm livelihood strategy at 5% level. Keeping all other variables in the model held constant, when one number of the dependent family member added to the household member, chance of diversifying livelihood in On-Farm+Off-Farm, Off-Farm, On-Farm+Off-Farm+Non-Farm livelihood strategy will decrease by 1.4%, 1.7%, and 1% respectively. This result is in tandem with findings by Babatunde R.O (2013) in that the probability of dependency ratio of household is negatively related to family labor use and hence larger number of dependency in a given households are less likely to use family labor than smaller number of dependency households and useless hired labor, other things being equal.

Livestock holding:-

Livestock holding is negatively and significantly related to on-farm plus off-farm plus non-farm livelihood diversification strategy at 1% level of significance. Moreover, as the livestock numbers increases by one unit, the likelihood of smallholder rural farm households' choice of combining off-farm, and non-farm livelihood diversification strategies decreases by 1.1%, provided that the other factors remain constant. On the other side, a unit increase in livestock increases the rural farm households adoption of on-farm only livelihood strategy. When the livestock size increase by one unit the probability of households' choice of on-farm plus off-farm, and on-farm plus off-farm plus non-farm livelihood strategies decrease by 2.54% and 1.2% respectively, provided that the other factors remain constant.

In the study area, livestock are the source of cash income. Thus, the large livestock holding creates better opportunity to earn more income from livestock production. Therefore, households who obtained the required amount of cash from livestock may not need to involve in non/off-farm activities for additional income whereas farmers with lower

livestock holding may be obliged to diversify livelihoods into off-farm and non-farm activities to fulfill household needs.

Similarly, Adugna (2008) and Yisehak *et al.* (2014) found livestock holding has negative and significant relation with non/off-farm livelihood diversification strategies. On the contrary to this result, Amare and Belaineh (2012) found that livestock holding significantly and positively influence participation in wage activities at 5% level of significance. Households with more livestock holding do have the capacity to participate in lucrative non/off-farm employment activities than those households with no or small size livestock holding.

Market distance (MD):-

As expected, market distance is positively and significantly related to On-farm + Off-farm, Off-farm, and On-farm + Off-farm + Non-farm livelihood diversification strategies equally at 1% probability level. According to the study, keeping all other variables in the model held constant, As the market distance approached (near) by 1 km, the likelihood of diversifying the livelihoods into On-farm + Off-farm, Off-farm, and On-farm + Off-farm + Non-farm activities increase by 0.023%, 0.2%, and 0.2%, respectively. The possible reason for the result could be that households less far from market places have easy and quick physical access to the market, to transport output and input from and to their residence and the chance of wage labor, and small business (petty trade) and other off-farm and non-farm activities are encouraging as the result diversification is increasing. This is in line with the study by Lorato (2019); households who are living around market areas can diversify their sources of income than those households living far from market areas. However, it contradicts the result of Gebru *et al.* (2018) as the distance from the household's home to the market center increases by 1 km. The more households are distant from the market center, the more disadvantaged from diversifying their livelihood income into off/non-farm options.

Furthermore, the study by Amare and Belayneh (2012), Kelil and Feleke (2016) stated that market distance and non/off-farm diversification had positive and significant relationship because residing nearer to the market enables farm households to engage in off/non-farm activities (like livestock trading, sharecropping, petty trading, shop keeping and etc.).

Access to Extension contact (AXTCON):-

This variable has a positive and significant effect on livelihood diversification into On-Farm plus Off-Farm livelihood strategies at 5% probability level. This shows households who get training and extension service are more likely to engage into different combination of livelihood diversification strategies. The marginal effect results of the model showed that, factors are constant, the likelihood of diversifying into On-Farm plus Off-Farm livelihood activities increased by 10.8% for those who gained training and extension service than the contrary.

It is in line with the study by Asfaw *et al.*, (2015);the extension service provides the necessary information so that farmers are able to acquire new skills and knowledge that helps to improve production and participate in different livelihood diversification to improve their life but contradicts with the study by Yishak(2014), found households' participation in agricultural training most likely decreases the likelihood of livelihood diversification into combining non-farm with off-farm activities because training enhances agricultural production skills, knowledge and experiences of farmers.

Access to credit service (ACRDS):-

As expected, access to credit has a significant and positive association with the likelihood of choosing On-Farm+Off-Farm and On+Off+Non-Farm livelihood diversification strategy at 5% probability level. Keeping all other variables in the model held constant, the likelihood of the choice of On-Farm+Off-Farm and On+Off+Non-Farm livelihood diversification strategy for those households who have access to credit service increase by 5.1% and 2.6% respectively. This is due to the reason that households who have limited land size can diversify their livelihood if they have easy access to credit service.

Farm size (FS):-

The farm size is significantly and positively related to livelihood diversification at 5% significance level. The positive coefficient indicated that the households with large farm size are more diversified in to On-Farm plus Off-Farm plus Non-Farm activities and rely more on agriculture livelihood strategy. The livelihood diversification of large farm households into On-Farm plus Off-Farm plus Non-Farm activities increases by 0.5% as the farm size increases by one hectare. The possible reason to this is due to the farm productivity the farm households hire other farm land also diversify into off/non-farm

activities. This finding is contradict with that of Fikru (2008) and Yenesew, *et al.* (2015) argued that farm size is negative and significant effect to livelihood diversification.

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDATION

5.1. CONCLUSION

In this study the determinant of livelihood diversification activities in case of Gurage Zone Kebena District has been assessed using cross sectional data. The primary data for this study were collected from 376 households of Kebena district using a structured questionnaire and key informant discussion. Data analysis was made using descriptive statistics, and econometric analysis. Since the determinants of rural households livelihood diversification can vary from one geographical area to another geographical area, across time and individuals to come up with the final result and implication of the study, multinomial logit model was employed for analysing the data.

From the descriptive statistics, the existing livelihood diversification strategies that were pursued by rural households in the study area are On-farm only (40.5%), On-farm plus Off-farm (31.4%), Off-farm (21.5%) and On-farm plus Off-farm plus Non-Farm (6.6%). This indicates that in the study area, the agricultural crop production and livestock rearing alone without Non-Farm and Off-Farm livelihood diversification is not enough to provide smallholder households income. The econometric analysis demonstrated that the smallholder farming households in the study area are likely to have diversified livelihood when they have access to mass media, creating relationship with urban peoples, more expansion and recognition of female non-farm roles.

The multinomial logistic regression result states that household size, age, gender, farm size, access to credit, livestock holding, education and dependency ratio were the factors that influence livelihood diversification in Kebena district. It was also revealed that Agriculture is found to be the dominant economic activity and contributes 61.5% see appendix... of the smallholder farm households' total annual income in the study area; the high level of smallholder rural farming households' participation in Non-Farm and Off-farm activities, the contribution of Non-Farm and Off-farm income to total household income is small compared to On-Farm income. This reflects that the smallholder rural farming households in the study area are engaged in low profitable, low return and non-rewarding non/off-farm activities.

Women dominate many of the non-farm activities in the study sites such as household-based food processing, local drink sales, local crafts (pottery and sewing) and petty trading. Therefore, giving financial and vocational assistance to women by the governmental and nongovernmental agencies could accelerate rural livelihood transformation from mere agricultural production to livelihood diversification into non/off farm activities.

5.2. RECOMMENDATION

Based on the finding of this study, policies as well as actions directed towards improving the livelihood of the rural households in the study area should focus on:

1. Credit access should be increased and credit institutions should be strengthened to make this development possible and improve the livelihoods of rural households.
2. Expand infrastructure and input and output market in the rural area and fill the market information gaps.
3. Expand and strengthening the agricultural extension service for rural households so as to create a diversified livelihood activities and improve the livelihood of the farmers household
4. Solve financial problem through increasing and strengthening financial institution and promoting better income-generating options.
5. The government and other related organizations give attention and motivation to rural credit and saving programs in order to be function according to the plan of credit tacking.
6. Improve the smallholder farm households income due attention should be given to agricultural intensification and commercialization of agricultural crops.

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Appendix;-

Appendix-1descriptive statistics of explanatory variable

. ttest AGEHH == 0

One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
AGEHH	376	45.01596	.407952	7.910483	44.2138	45.81812

mean = mean(AGEHH) t = 110.3462
 Ho: mean = 0 degrees of freedom = 375

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

. ttest DEPRATIO == 0

One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
DEPRATIO	376	1.736702	.0783216	1.518713	1.582697	1.890707

mean = mean(DEPRATIO) t = 22.1740
 Ho: mean = 0 degrees of freedom = 375

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

. ttest MKTDS == 0

One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
MKTDS	376	20.13032	.68096	13.2043	18.79134	21.4693

mean = mean(MKTDS) t = 29.5617
 Ho: mean = 0 degrees of freedom = 375

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

. ttest LANSI == 0

One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
LANSI	376	.9773138	.04808	.9323052	.8827737	1.071854

mean = mean(LANSI) t = 20.3268
 Ho: mean = 0 degrees of freedom = 375

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

Source own computation, 2022

Appendix-2 Marginal effect of (On-farm + off-farm= 1)

mfx, predict (pr outcome(1))				
Marginal effects after mlogit				
y = Pr(DIV==1) (predict,				
0.31556372				
variable	dy/dx	P>z	X	Std. Err.
Gender	0.0317551	0.577	2.31245	0.06143
AGEOHH	0.0000829	0.678	0.794667	0.00484
EDUHH	0.0438225	0.084	4.9813	0.03222
DEPRATIO	-0.0141909	0.034	2.032	0.01709
REMHH	-0.0690962	0.204	1.76	0.07374
MCCOOP	-0.029279	0.494	0.125333	0.06716
MKTDS	0.0002318	0.019**	0.248	0.00212
AXTCON	-0.1084203	0.021**	20.144	0.01519
ACREDS	0.0512387	0.036	6.82133	0.00357
FARM Size	-0.0082195	0.525	20.144	0.00213
LSTKNO	-0.0254553	0.013**	6.82133	0.00484

Source own computation, 2022

Appendix-3 Marginal effect of (Off-farm = 2) category

mfx, predict (pr outcome(2))				
Marginal effects after mlogit				
y = Pr(DIV==2) (predict, pr outcome(2))				
0.21046148				
variable	dy/dx	P>z	X	Std. Err.
Gender	0.0513216	0.414	0.794667	0.05744
AGEOHH	0.00445	0.032	44.9813	0.00423
EDUHH	0.0301	0.369	2.032	0.02762
DEPRATIO	0.01704	0.037	1.76	0.01564
REMH	0.07083	0.834	0.125333	0.05415
MCCOOP	0.06976	0.056	0.248	0.05346
MKTDS	0.00217	0.007*	20.144	0.00186
AXTCON	0.05987	0.067	6.82133	0.01317
ACREDS	0.05027	0.815	4.47733	0.0099
FARM Size	0.01551	0.707	20	0.02762
LSTKNO	0.01202	0.225	6.82133	0.01564

Source own computation, 2022

Appendix-4 Marginal effect of (On-farm + off-farm + non-farm =3)

Mfxpredict (pr outcome(3))				
Marginal effects after mlogit				
y = Pr(DIV==3) (predict,				
0.05782913				
variable	dy/dx	P>z	X	Std. Err.
Gender	0.0075737	0.023**	0.794667	0.03001
AGEOHH	-0.0009795	0.034**	44.9813	0.00234
EDUHH	0.0042433	0.001*	2.032	0.01516
DEPRATIO	-0.0102076	0.025**	1.76	0.00893
REMHH	0.0056214	0.872	0.125333	0.03631
MCCOOP	0.0043913	0.691	0.248	0.03728
MKTDS	0.0016707	0.012**	20.144	0.00108
AXTCON	-0.0097733	0.733	6.82133	0.00755
ACREDS	0.025508	0.031**	4.47733	0.00566
FARM Size	0.0045227	0.044	20.144	0.05415
LSTKNO	-0.011275	0.011**	6.82133	0.05346

Source own computation, 2022

Appendix-5 Checking multicollinearity problem

Variable	VIF	1/VIF
TOIN	2.81	0.356028
LANSI	2.61	0.382847
AGEHH	2.41	0.414226
MKTDS	1.45	0.691606
EDUHH	1.42	0.704545
PHHCCOOP	1.3	0.770166
DEPRATIO	1.14	0.879931
LSTKNO	1.13	0.882235
SEXHH	1.11	0.897287
REMH	1.07	0.932979
AXTCOON	1.04	0.96004
ACREDS	1.02	0.977529
Mean VIF	1.54	

Source own computation, 2022

Appendix-6 Checking Heteroskedasticity

Breusch Pagan/ Cook-Wisherg test for heteroscedasticity	
Ho: constant variance	
Variables: fitted values of DIV	
chi2(1)	prob>chi2
1.17	0.2785

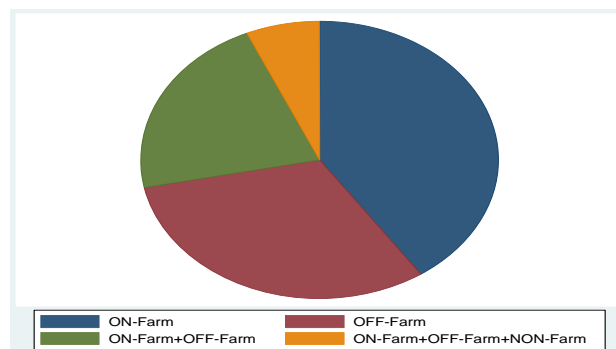
Source own computation, 2022

Appendix-7 Checking Existence of omitting variable

Ramsey reset test using powers the fitted value of DIV	
Ho: model has no omitted variable	
F(3,359)	Prob>F
0.42	0.7413

Source own computation, 2022

Appendix-5 Descriptive statistics of livelihood diversification



Appendix-8. QUESTIONNAIRE

I am a student at the University of Wolkite Ethiopia conducting research on the “**Determinants of Rural Households’ Livelihood Diversification: In The Case of Kebena District, Gurage Zone, Ethiopia**” by collected the information about them. Your responses are valuable for the improvement of the existing/college system. Please be free and provide genius response. All your response is secured from consequences. All information will be used only for academic purposes but also may be used by other relevant stakeholders within and outside of the university for the purposes of developmental intervention.

Instruction: - Please do not write your name and response to your question by making a tick

(x) In the blank space and write in the space provided for appropriate choice and continues answer.

Part one: -Demographic characteristics of the household

Instruction: Put the code number of responses in the given corresponding blank spaces for close ended questions and provide detail information for the open ended questions

1. Sex: A. Male=1 B. Female=0
2. Age _____
3. How many members of your household are in the working age category and able to work?
4. Please answer by using age between 15 – 64 years as reference. A. Male ____ B. Female _____
5. Number of dependent HH member (<15, >64 ages) A. Male... B. Female...Total....
6. The education level of the head of the household?
A. can’t read and write=0 B. primary level =1
C. Secondary level=2 D. College and Above =3

Part two question on assess the livelihood diversification strategy choices of the rural household

7. Please indicate on which of the following livelihood strategies you depend on

No	Types of activities	1=yes	0=no
1	On-farm activities		
	Crop production		
	Crop and livestock production		
	Others		
2	Off-farm activities		
	Daily wage labourer		
	Contract farming		
	Others		
3	Non-farm activities		
	Petty trade		
	Thatching		
	Carpentry		
	House mudding		
	Pottery		
	Blacksmith		
	Selling of local drink		
	Trading of small ruminant		

8. If you pursue diversified livelihood strategies, please identify your livelihood diversification strategy?

A. On-farm=1 B. On-farm plus Off-farm=2 C. On-farm plus Non-farm=3 D. on-farm plus off-farm plus Non-farm=4

9. If the answer is if any which of the following item does the household produce mainly?

10. If you have diversified your livelihood strategies, what is your reason to do so?

A. To accumulate wealth or increase the level of income = 1, B. to respond to crisis = 2, C. to insure sustenance = 3, D. others (specify _____ = 4)

Part three:- question on identify determinant of livelihood diversification strategy choices of rural households

3.1 Main source of income

11. Please list your means of earning incomes according to their importance whether you diversified livelihood activities or not.

A. On-farm=1 B. On-farm plus Off-farm=2 C. On-farm plus Non-farm=3 D. on-farm plus off-farm plus Non-farm=4

12. How much annual average income you earn from on-farm activities?

No	On-farm activities	Incomes in birr	
		Annual	
1	Crop production		
2	Livestock production		
3	Crop and livestock production		
4	Others		

13. How much annual average income you earn from off-farm activities

No	Off-farm activities	Incomes in birr	
		Annual	
1	Daily wage laborer		
2	Contract farming		
3	Others		

14. How much annual average income you earn from non-farm activities

No	Non-farm activities	Annual income in birr	
		Annual	
1	Petty trade		
2	Thatching		
3	Carpentry		
4	House mudding		
5	Poet making		
6	Blacksmith		
7	Selling of local drink		
8	Trading of small ruminant		

3.2. Access to credit service

15. Is there any micro finance institutions/Banks which gives you saving and credit services in your area? A. No=0, B. Yes=1

16. Do you borrow from micro finance institutions/banks?

Yes B. No

17. If you used borrow from micro finance institution what was the Purpose of your credit?

1. To start own business 3. Purchase of farming inputs
 2. To improve business 4. Purchase of house 5.Others.....

18. If you do not use credit, why? (A. No credit service in the area=1, B. high interest rate =2, C. Fear of indebtedness=3, D. lack of collateral=4, E. lack of awareness =5, F. I don't need it =6, G. Other (specify) _____=7)

3.3. Data related to agriculture

19. How many size of your farm land _____hectare
 20. What kinds of benefit you are acquiring from the use of these natural capitals? (A. Gaining income = 1, B. Others (specify) _____
 21. Is there agriculture extension development agent contact with you? (A. No = 0, B. Yes = 1).
 22. How many distance of your area from farm land _____km?

3.4 Participation in cooperatives

23. Do you have membership in cooperatives? (A. No=0, B. Yes=1)
 24. If yes, list the names of institutions?
 25. If your answer to question number 23 is “yes”, what is the benefit you acquired from your membership (please describe it!).....
 26. Do you have membership in productive safety net programs? (A. No=0, B. Yes=1)
 27. If your answer to question number 26 is “yes”, does it have an impact on your livelihood improvement? Please mention it!

3.5 The effect of livestock holding

28. Do you have any livestock your own? (A. No=0, B. Yes=1)
 28.1. If your answer for question No 28 is ‘Yes’ how many livestock you have? 0=No Livestock, 1=oxen, 2=cows, 3=calves, 4=sheep, 5=chicken, 6=donkey, 7=other
 28.2. Do you have sold livestock in the past one year? 1=Yes, 2=No
 28.3. If your answer for question No 28.2.Is ‘Yes ‘how many income have you earned from sale of livestock (Birr)?

28.4. If your answer for question No 28.2. Is 'Yes' in what purpose you sell? 1=to purchase agricultural input, 2=to purchase food consumption 3= to purchase cloths, 4= to purchase ox, 5 to pay tax, 6=other specify) _____

3.6 Agricultural extension visits

29. Did you participate in the new extension program in this year? 1=Yes, 0=No

30. If your answer for question No 29 is yes in what agricultural technology did you

Participate? 1=in fertilizer, 2=pesticides, 3=improve seed, 4=if others specify _____

3.7 Market distance

31. Where is market place for your farm product? 1=mini market in kebeles, 2=district

Towns market, 3=Zonal market 4=others specify _____

31.1. What is the distance (km) to sale the product in a nearby market?

31.2. Did the market distance affect to you diversify in off/non-farm activity? 1=Yes, 2=No

31.3. If your answer for question No 31.2. Is yes for which product? 1=for farm product,

2=livestock product, 3=non-farm product, 4=other specify _____

3.8. Received remittance

32. Have you ever received any remittance? 1=Yes, 2= No

33. If your answer for question No 32 is 'Yes', where you received it? 1= from outside the country, 2= within the country 3=if others specifies _____

34. If your answer for question No 33 is 'Yes', on which livelihood strategy? 1=farm

Activities

35. Who provided you it? 1=government, 2=NGOs, 3=relatives &4=If others

specify _____

36. For what purpose do you use it?

0= for Farm activities, 1= for on-farm plus off-farm activities 2=for off-farm activities 3= on both farm and off/non-farm activities

Checklist for Key Informant Interview

37. What are the constraints to agricultural productivity?

38. What are the opportunities to household diversify their income? Please specify.

39. Do you think that livelihood strategies in your area are open to all households residing in your areas? What do you think? What are the entry barriers for households not to involve in better livelihood combinations? _____

40. What is the role of proximity to market and credit service in improving livelihoods?

41. Is there any policies, legislations, regulations, local norms, traditions, etc. that encourage or discourage certain kinds of livelihood activities?

42. What are the contributions of livelihood diversification to household income?

43. Please briefly describe the impacts of population, technological advancements and conflict trends on your livelihood strategies?

44. What are the main constraints of off/non-farm activities in your area?