

**DETERMINANTS OF INCOME DIVERSIFICATION AMONG RURAL
HOUSEHOLDS IN TULO DISTRICT, WEST HARARGHE ZONE,
OROMIA NATIONAL REGIONAL STATE
ETHIOPIA**

M.Sc. THESIS

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**December, 2018
HARAMAYA, ETHIOPIA**

**DETERMINANTS OF INCOME DIVERSIFICATION AMONG RURAL
HOUSEHOLDS IN TULO DISTRICT, WEST HARARGHE ZONE,
OROMIA NATIONAL REGIONAL STATE
ETHIOPIA**

**A Thesis Submitted to the School of Agricultural Economics and
Agribusiness, Postgraduate Program Directorate
HARAMAYA UNIVERSITY**

**In partial Fulfillment of the Requirements for the Degree of
MASTER OF SCIENCE IN AGRICULTURE (AGRICULTURAL
ECONOMICS AND RURAL DEVELOPMENT)**

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**December, 2018
HARAMAYA, ETHIOPIA**

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As thesis research advisors, we hereby certify that we have read and evaluated this thesis prepared under our guidance by Zelalem Jaleta Oljira entitled Determinants of Income Diversification Among Rural Households in Tulo District, West Hararghe Zone, Oromia National Regional State, Ethiopia. We recommend that it be submitted as fulfilling the thesis requirement for the degree of Master of Science in Agricultural Economics and Rural Development.

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Final approval and acceptance of the thesis is contingent upon the submission of final copy of the thesis to council of graduate studies (CGS) through the departmental or school graduate committee (DGC or SGC) of the candidate.

DEDICATION

I dedicate this Thesis manuscript to all my family members.

STATEMENT OF THE AUTHOR

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BIOGRAPHICAL SKETCH

Mr. Zelalem was born in March 1985, In Guduru District of Horro Guduru Wollega Zone, Ethiopia. He attended his elementary and high school education at Fincha Elementary and High school, respectively. He has also completed his University preparatory at Ambo Comprehensive Secondary School in 2004. Upon successful completion of his university preparatory school studies, he joined Ambo University of Agriculture in 2005 and graduated with B.Sc. Degree in Plant Science in 2008. After graduation he was employed as a Food Security and Agriculturalist by World Vision International Ethiopia at East Hararghe Zone Melka Bello District. After serving three years at Melka Bello District he was transferred to World Vision Ethiopia Tulo Area Development Program of West Hararghe Zone and served as Livelihood Specialist. Thereafter, he joined the School of Graduate Studies at Haramaya University in 2013 to pursue MSc in Agricultural Economics and Rural Development.

ACKNOWLEDGMENTS

I like to express my heartfelt thanks and honest appreciation to my major research advisor Dr. Lemma Zemedu for his all-round help, guidance, valuable comments and encouragement which enabled me to complete the research work and thesis write up. I am also deeply indebted to Mohammed Aman (Ass. Professor) my co-advisor, for his useful and valuable comments and kind treatment starting from the early design of the research proposal to the final write up of the thesis.

I sincerely thank Haramaya University, especially the School of Graduate Studies for their unstinted support and follow up until the completion of the research. I also owe my deepest gratitude to World Vision Ethiopia, Tulo and Habro Area Development Program (ADP) staffs, for their encouragement and support to accomplish this task within the scheduled time frame.

I would like to express my sincere appreciation and gratitude to my family for their encouragement, inspiration and help without which I could not have completed the study on time.

All participant farmers and government workers of Tulo District deserve my deepest appreciation for their unreserved collaboration and for providing a good working environment. All enumerators are also acknowledged for their efforts to get reliable information in time of interviewing framers. Also I would like to acknowledge all individuals and organizations that directly or indirectly contributed to the successful completion of this study.

Finally, I praise God for giving me strength, courage, health, wisdom and patience to finalize my study.

ACRONYMS AND ABBREVIATIONS

CC	Contingency Coefficient
CSA	Central Statistical Agency
FAO	Food and Agriculture Organization of the United Nations
Ha	Hectare
HH	Household
KA	<i>Kebele</i> Administration
mm	Millimeter
MoFED	Ministry of Finance and Economic Development
NGO	Non-Governmental Organization
OLS	Ordinary Least Squares
PSM	Propensity Score Matching
SNNP	Southern Nations, Nationalities and Peoples
VIF	Variance Inflation Factor
WVE	World Vision Ethiopia

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ABSTRACT

Rural farm households face an increasing challenge looking for alternative income sources to supplement their small scale agricultural activities. To this end, this paper examines the determinants of income diversification among rural households using cross sectional data collected from Tulo District of Western Hararghe Zone, Ethiopia. Both primary and secondary data were collected from different sources. The data were obtained from 120 sample household heads that were selected through a combination of two-stage sampling techniques. Descriptive statistics were used to identify the income diversification strategies and the households income sources. Bivariate probit model was employed to analyze the determinants of households income diversification. Result of descriptive analysis indicate that much of the rural households (67.5%) in the study area did not practice diversified income strategies due to different factors. Only 32.5% of the sampled households diversify their income form farm and off/non-farm activities. Moreover, inadequate knowledge/skill and initial capital are the major factors that influence the households diversification status. Econometric analysis demonstrated that out of the total fifteen variables included in the model only seven variables including age of household head, household family size, household land size, household yearly expenditure, access to market, urban linkage and input application were found to be the significant determinants of income diversification. The results of this study suggest that both agricultural intensification and off/non-farm diversification should be strengthened to attain smallholder households' livelihood security.

Key words: Income, off/non-farm, Bivariate probit, households, diversification

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 Sub-Saharan Africa (SSA) which offers a strong option for spurring growth, overcoming poverty, and enhancing food security (World Bank, 2008). However, farming as a primary source of income has failed to guarantee sufficient livelihood for most farming households in sub-Saharan African countries (Babatunde, 2013). This is because the agricultural sector in the sub-Saharan African countries is highly characterized by decreasing farm sizes, low levels of output per farm, and a high degree of subsistence farming (Jirstrom, 2011). In Ethiopia agriculture serves as the primary means of rural households' livelihood. It also contributes to 45% GDP, more than 80% of employment opportunities and over 90% of the foreign exchange earnings of the country (MoA, 2010).

Thus, the expectation that achieving the goal of reducing poverty only through increasing agricultural productivity and redressing the issues of access to key agricultural resources without off/non-farm livelihood diversification could not be successful in the sub-Saharan African countries (Emanuel, 2011). For these reasons there is a strong consensus that any development intervention to improve the livelihood and food security situation of the rural poor need to take agriculture along with the off/non-farm livelihood diversification, without undue preference being given to farming as the unique solution to rural poverty. Also, Reta and Ali, (2012) indicated that, in rural Ethiopia if there had not been other sources of income apart from agricultural production, the land scarcity by the farmers coupled with agricultural risks could not generate enough income to feed household members and they cannot fulfill household needs. This suggests the necessity of off/non-farm income diversification in rural Ethiopia. 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.

Farm level income diversification involves adding income generating activities at farm household level including livestock, crop and off/non-farm activities. The activities generate a set of income portfolios with different degrees of risk, expected returns, liquidity and seasonality. The process involves allocation of household productive assets among different income generating activities (Japhether, 2007). One of the most established characteristics of rural households is that they obtain their incomes from many different sources. Household income diversification is the norm in rural societies. A variety of factors identified that could explain income diversification. These factors are risk reduction strategies, responses to household shocks and asset accumulation strategies (Davis, 2010).

Households diversify because returns to their assets endowed in agricultural production decrease in relation to the returns from using them in activities outside agriculture. This implies that the ability to diversify highly depends on the access to the different types of assets, like for example physical, human, and social capital. It also explains why not all households have the same opportunities to participate in off/non-farm activities. There is a strong link between off/non-farm income share and total household income. Some 20 percent of rural income originates from off/non-farm sources. In some parts of Ethiopia, off/non-farm labor income accounts for up to 35 percent of total farm household income (Tassew and Oskam, 2001).

In general, income diversification decisions of farmer households depend on household specific characteristics, farm attributes, local labor market conditions and local and overall economic conditions of a given country. However, there is no consensus on how such factors affect off/non-farm labor supply decisions of farm households in a particular area. It is possible that a given factor can have different impact over time and across households. Some of the basic determinants of income diversification participation decisions that have been documented in the literature are risk and income shock, education, market condition, household size and asset holdings.

Therefore, one set of causes of household income diversification was a matter of necessity and survival, where diversification is born out of desperation and driven primarily by the household's poverty status. The other set of causes of household income diversification was a

matter of choice and opportunity involving proactive household strategies for improving living standards.

1.2. Statement of the Problem

In Ethiopia, the policy focus is to increase agricultural productivity and farm income so as to attain food self-sufficiency at a household, regional and national levels (Tassew, 2000). While substantial resources have been spent on agricultural research and extension to alleviate food shortage in the nation, research and extension activities have not been done adequately on the issues related to off/non-farm employment (Amare and Belaineh 2013). Hence, looking into the link between farm and off/non-farm activities and their determinants is necessary before policy measures are taken to promote off/non-farm activities. In view of these outstanding issues, various empirical studies have pinpointed the socio-economic rationale of rural livelihoods for pursuing differentiated and contextual livelihood strategies (Tassew, 2000).

Rapid population growth in Ethiopia has resulted in too small and fragmented holdings of land, reducing labor productivity and causing widespread underemployment over the nation. Over 75 percent of the households have landholdings of one and below one hectare and are cultivating only once a year due to the growing rural underemployment and unemployment that have aggravated the problem of landlessness (CSA, 2010). Scarcity of land has become a critical bottleneck in the nation in general and in the study area in particular. Farm households are endowed more with labor than with capital and land. They employ low level of capital per unit of cultivated area and operate small farms which clearly implies under-utilization of labor.

Due to the seasonal nature of agricultural production, rural labor cannot be employed throughout the year unless rural off/non-farm activities are widely developed (Tassew, 2000). For instance the socio-economic and cultural surveys conducted by World Vision Ethiopia (WVETA, 2008) observed that off/non-farm activities are not developed sufficiently enough to employ the surplus rural labor for income diversification. In order to reduce the problem of rural underemployment, focusing on farm and off/non-farm activities in rural areas is

necessary. The knowledge gap in the role of the rural off/non-farm sector is reflected in to the policies of the developing countries.

According to Ellis (2005), in practice the causes and consequences of diversification are differentiated by location, assets, income, opportunity and social relations. Social factors such as gender, social positions, networks, associations are also important. For instance, poor uneducated women who lack social ties, may not enjoy the same access to remunerative opportunities like educated males with strong social networks in the community (Barrett, et al 2001). Rapid population growth and the related pressure on the natural resource base, in particular land, have also been identified as major causes for the rise of nonfarm activities in rural of Sub Saharan Africa (Lay, 2008, Ellis, 2005). Lay *et al* (2008) found that declining farm sizes and related declines in soil fertility force land poor households to diversify into nonfarm activities to ensure survival. Other drivers include supply factors, such as technological advances and the expansion of educational attainment.

Despite vast potential for off/non-farm activities for income diversification in the study area, there are problems such as negative perception of the community, outdated methods of production, lack of improved technology and skill, and lack of business start- up budget. There is also lack of pertinent research to study the effect of off/non-farm activities on farm production and to identify the major problems that hamper the off/non-farm sector. Therefore this study is useful for development of projects that address local people economic, demographic, institutional and technical factors. And for this facts and reasons assessing the determinants of income diversification among rural household is vital to guide prior the policy makers and available as an input for next generation scholars

1.3. Research Questions

The study sought to answer the following questions:

- What factors determine income diversification among rural household in the study area?
- What are the types of on farm and off/non-farm activities that the rural households in the study area engage in?

1.4. Objectives of the Study

The general objective of this study is to analyze determinants of income diversification among rural households in Tulo district. The specific objectives are:

- (i). To identify income sources of households in the study area.
- (ii). To identify the factors that determine household's involvement in different income source activities in the study area.

1.5. Significance of the Study

The result of this research would contribute to better understanding of determinants of income diversification among rural households and helps in planning and implementing the improvement strategies and what will be specifically needed in the district to make a success out of the entire effort in income improvement and income source for households. Since research has not been conducted on area of determinants of income diversification within rural households of Tulo district, the study will fill this gap to some extent and will serve as reference for subsequent researchers.

1.5. Scope and Limitation of the Study

This study addressed the objectives articulated above. The study focused on factors that determine income diversification of among rural households in the study area. In addition, the study was delimited to assess income diversification at the whole household level in Tulo district and only 120 sampled households were contacted through cross-section method because of the financial and time constraints.

1.6. Organization of the Thesis

The content of this thesis has been grouped into seven main chapters. Chapter one deals with an introduction encompassing the background remarks, statement of the problem, objective

and the significance of the study. Chapter two is about literature review that covers concepts and definitions of income diversification, income diversification strategies, empirical studies, and conceptual frame work. Chapter three explains the material and methodological approach used in the study. Chapter four discusses the results of this study. In the fifth chapter, summary and conclusion and recommendation are presented. Chapters six and seven provide references and appendix sections respectively.

2. LITERATURE REVIEW

2.1. Concept and Definition of Income Diversification

Income diversification is defined simply as a process in which multiple income sources are created by a rural household (Minot *et al.*, 2009). Proxy indicator is the number of income sources of each household at given time. Although this indicator is closest to the original meaning of the word, it only reflects income-generating activities. Also income diversification is defined as a process in which rural households increase their employment and income from the non-farm activities. Regarding this, either the share of time spent on or the share of earnings from non-farm activities is used to highlight the importance of non-farm income in a household's livelihood (Davis *et al* 2011).

Diversification can be also defined as the maintenance and continuous alteration of a highly-varied range of activities and occupations to minimize household income variability, reduce the adverse impacts of seasonality, and provide employment or additional income (Haggblade, *et al* 2010). Diversification may occur either as a deliberate household strategy or as an involuntary response to a crisis. The motivation for diversification strategies therefore varies in terms of household characteristics, location, assets, income level, opportunities, institutions and social relations. Following Ellis (2000), we define off-farm diversification as temporary “wage or exchange labor on other farms within agriculture”. Moreover, as discussed by Ellis (2000), we consider local environmental resource extraction such as firewood collection, charcoal production and gathering wild fruits as an off-farm diversification strategy. Non-farm diversification refers to activities that are not directly related to agricultural production and can be wage or self-employment/ own-business based (Weldegebriel and Prowse, 2013).

In regard specifically to rural Ethiopia, households have been found to diversify their income sources due to both push and pull factors. Push factors such as rural population growth, farm fragmentation and declining agricultural productivity are commonly-cited causes for diversifying (Degefa, 2005). Previous studies suggest that the determinants of diversification

in rural Ethiopia vary according to wealth status. For example, Damite and Workneh (2004), in their study of diversification in south Ethiopia, indicated that asset ownership, especially livestock, plays a major role in influencing households' decisions to diversify into non-farm activities.

Moreover, they show that labor, both in terms of its quantity and quality, determines the choice of diversification as this overcomes entry barriers to non-farm activities. Factors such as land size, cash crop production and agricultural extension services did not encourage households to engage in non-farm diversification activities (Damite and Workneh, 2004). However, looking at the wealthier groups, rich households tended to engage more in non-farm activities that require investment and skills (such as carpentry) while the poorest households were likely to engage in less rewarding off-farm activities such as firewood collection. These findings suggest wealthier households are drawn towards non-farm diversification in an attempt to accumulate wealth. A further study by Deressa (2008), on farmers' vulnerability to climate change also shows the importance of pull factors; here, a greater degree of access to technology and proximity to infrastructure were found to be critical for engaging in non-farm diversification. More importantly, a study by Sosina (2012), finds that non-farm income positively correlates with household's consumption expenditure growth across all wealth groups in Ethiopia.

2.2.Income Diversification Strategies

Income diversification is the norm for farmers nearer to the outskirts of urban centers in semi-arid agro-ecologies of rural Africa and for smallholder rural farmers in developing economies (Davis, 2010). Given incomplete markets for labor and land, hence, sole reliance on farming is uncommon in drought prone environments. Based on the household's engagement in productive employments and unearned income sources, different major income diversification strategies are identified. It should be noted that the strategies do not necessarily exclude transfer income sources. This is because households could draw income from unearned income sources while participating in farm and nonfarm activities. The other reason is that if a farm household owns farmland, it is mandatory for the household to participate in soil and

water conservation activities with or without payment depending on the wealth status of the household (Davis, 2010).

The first diversification strategy is combining farming with skilled nonfarm employments. The rationale for combining both activities is that income earned from cash-crops (e.g. vegetables and dairy products) could be invested in high-return nonfarm activities or savings from skilled nonfarm employments could be used as inputs to improve agricultural productivity. The second strategy is for farm households reliant on farming and unskilled employment (e.g. domestic work, daily laborer, street vendor, embroidery, etc). This strategy is most likely preferred when households have access to land and labor but lack the required inputs to engage in high-paying nonfarm activities. The third strategy is when households depend on farming and transfer income sources but not on nonfarm employments. Households endowed with limited labor and non-agricultural skills are expected to utilize this strategy (Barrett et al., 2005).

The fourth and fifth strategies focus on households not engaged in farming activities likely because of limited access to inputs for farming. For instance, landless households - i.e. either fully dispossessed of their farmland due to urban expansion or do not own farmland at all - could possibly depend on non-agricultural activities, transfer income sources, or both. Households endowed with skill or labor might be engaged in nonfarm activities while others who lack the required skill or labor are likely to utilize transfer income sources to support their livelihood. The proportion of households that entirely depend on a single strategy, on average, is decreasing as income quartile increases. The rural households' diversification strategies are quite similar to rural-urban households but most households in the lower quartile mix farm with unskilled nonfarm activities (Barrett et al., 2005).

2.3.Determinants of Participation in Income Diversification

More importantly, a study by Amare and Belaineh (2013), showed that there is disparity in the effect of explanatory variables on participation decision of households in off/non-farm wage and self-employment activities. Sex, age and education of household head, number of

economically active family members, and number of children attending school significantly affected participation into wage employment activities. Whereas participation in off/non-farm self-employment was significantly influenced by sex, age, education of household head, number of economically active family members, distance to market, livestock holding and crop based diversification strategy that is, number of crops grown and harvested in a season.

Similarly, the variables: sex, age, education, number of economically active family members, distance to market and livestock holding have significantly influenced participation in multiple self-wage employment activities. This implies that supply of labor to sole and combined off/non-farm employment activities was higher for younger households than for older households. Hence, younger households rely on off/non-farm employment to support their livelihoods while the older ones concentrate on farming instead of opting for engagement in off/non-farm work (Amare and Belaineh, 2013).

A possible explanation is that households with abundant economically active and working age members could participate in non/off-farm employment activities with a view to generate more income by absorbing the available extra labor force from the farm work. Educational level of household head is found to significantly and negatively affect participation in off/non-farm wage employment (Walusimbi and Nkonya, 2004). Distance to the main market center also determine participation into off/non-farm self-employment and mixed self-wage activities significantly and negatively. Conversely, farmers residing at far distant locations from market centers are less likely to participate in off/non-farm self-employment and the mixed self-wage activities.

2.4.Determinants of Income Diversification Category

The theoretical discussion often categorizes the drivers of income diversification of rural developing countries to push/pull factors (Haggblade *et al.*, 2002)

2.4.1. Push factors of income diversification

The “push factors” terminology refers external factors that cause the fluctuation. In farm income (e.g. weather conditions, policy changes...); which lead to the increase of household’s motivation in adopting income diversification strategy to mitigate the adverse effect of these factors. The “pull factors” refers to growth opportunities in terms of household income. For instance, households have more likelihood to increase their income when favorable changes exist (e.g. education, infrastructure conditions and gender). Household income diversification strategy is affected by push factors rather than pull factors. Moreover, pull factors may play complementary roles for push factors in facilitating income diversification. Reardon *et al* (2007) point out the dynamic interactive process between pull and push factors.

2.4.2. Pull factors of income diversification

On the other hand pull factors are opportunities for diversification of income sources linked to commercial agriculture, improved infrastructure, proximity to an urban area, better market access, etc. There is widespread agreement that smallholder farmers require improved access to agricultural markets to raise their farm productivity and living standards (Chamberlin and Jayne, 2012). Some studies find that market access is a key determinant of diversification of activities (Winters *et al.* 2009). Those with access to adequate assets and infrastructure and faced with appropriate incentives engage actively in markets, while those who lack one or more of those three essential ingredients largely do not (Barrett, 2008). Proximity to markets provides opportunities to sell output, and purchase inputs, from self-employment activities as well as opportunities for non-farm wage employment (Winters *et al.*, 2009). And they argue that farmers with superior access to urban markets and those involved in contract farming schemes with processing plants or exporters are better able to overcome factor market constraints to produce for market.

Opportunities available for farm households to engage into higher nonfarm income activities that can lead to accumulation seem to be more available in areas with better endowments in

terms of agricultural potential, market access, proximity to urban centers and better infrastructure such as roads (Losch, *et al.*, 2011). Better infrastructure is linked to higher opportunities for farm and nonfarm employment and to increased agricultural production (Djurfeldt, 2008).

2.5. Determinants of Income Diversification into High-value Activities

Income diversification also defined as a process of switching low-value activities to high-value ones. This process could be hindered by lack of credit accessibility, market information, appropriate production technology, human capital, public infrastructure, social capital, and household's productive assets. In other words, the insufficiency of these meso level factors could limit the likelihood to diversify in to high-value non-farm activities (Reardon *et al.*, 2007). Thus, according to Reardon proximity to towns, access to road, electricity and water are often used as proxies for these meso -level factors.

2.6. Determinants of Income Diversification in Household Assets

The critical role of household productive assets is emphasized in the study of Reardon *et al.* (2007). Firstly, household's human capital (in term of quality as well as quantity) that is critical factor of its engagement in off/non-farm activities (Reardon *et al.*, 2007). Secondly, although landholding positively associates with farm income and a greater likelihood of credit accessibility, but its effects on income diversification is mixed. Landholding could encourage rural households to increase their income capacity by adopting new non-farm activities, but also by intensifying farm activities (Abdulai and CroleRees, 2001). Thirdly, financial capital constraints often prevent the poor household to engage in high-value non-farm activities (Ellis, 2000). Because of the ineffectiveness of formal credit market in rural areas, the value of productive assets could be employed as proxies for financial capacity of household. Lastly, social capital refers the relation networking of households, which is hard to measure. Some empirical studies categorize variables as proxies, such as membership in organizations and "connections" to local authorities (Reardon *et al.*, 2007).

2.7. Empirical Literatures on Income Diversification

There is an extensive literature that deals with the determinants of off/non-farm diversification in rural parts of the developing world (Ellis 2000 and Lemi, 2010). This literature indicates that the rural non-farm sector is gaining importance in most developing countries, even if agriculture remains the main source of income and employment. In regard specifically to rural Ethiopia, households have been found to diversify their income sources due to both push and pull factors. Push factors such as rural population growth, farm fragmentation and declining agricultural productivity are commonly cited causes for diversifying (Degefa, 2005).

Moreover, studies show that pull factors, such as urban or local demand can lead to non-farm activities that enhance the household's economic standing (Yared, 1999). Thus, rural households tend to engage in a variety of off/non-farm activities including food-for-work schemes, grain trading, petty trading, migration, liquor sales and the sale of handicrafts (Degefa, 2005). Previous studies suggest that the determinants of diversification in rural Ethiopia vary according to wealth status. For example, Demisse and Workneh (2004) in their study of diversification in south Ethiopia, indicate that asset ownership, especially livestock, plays a major role in influencing households' decisions to diversify into non-farm activities. Dercon and Krishnan (reported by Ellis 2000:35) highlight how the share of non-farm income across five regions in Ethiopia was low due to policy constraints on trade and wage labor.

The income diversification of a household is determined by wide collections of factors. Desta (2004), assessed determinants of household income diversification using multiple linear regression analysis and using a total annual household income derived from both agricultural and off/non-farm activities as a dependent variable. The study revealed that the credit received, farm size, access to irrigation, and education level had significant contributions to household income diversification. Family size was negatively related to household income diversification in this study. Similarly, another study by Walusimbi and Nkonya (2004) indicated that education level higher than primary school increased household income diversification significantly. In assessing diversification strategies of households Barrett and Reardon (2000), indicated that because of differences in initial asset endowments, rich and

poor households diversify differently. The rich typically engage in more capital intensive and more remunerative activities, while leaving the poor confined to labour intensive, highly contested niches with low barrier to entry and low returns. Wealthier households often mention “profit maximization” as their motive for entering in to rural non-farm activities, whereas lower income households emphasize “risk minimization” and “income stabilization”. Poorer households have a high incentive but a low capacity to diversify successfully, even if in some cases they rely more on non-farm activity in percentage terms.

Hoozeveen (2001), also argue that most attractive off/non-farm employment opportunities have the highest entry barriers and that the poor, who have fewer buffer stocks, less access to credit and greater interest in risk management strategies, are often not able to access the safest and most rewarding income opportunities because of entry barriers. Richer people thus have greater freedom to choose among a wider range of non-farm options than do the poor. On the other hand, the poor have little choice when diversifying out of farming: they go in to unskilled off-farm labour and other activities with low barriers and therefore generally poor returns.

Barrett and Reardon (2000), based on review of 27 case studies in Africa, showed that the average share of non-farm income in total rural household income is around 45% with non-farm wage labor income exceeding self-employment income; and non-farm earnings are substantially greater than either agricultural wage employment earnings or migration earnings.

In Latin America, Deininger and Olinto (2001), showed that in the Colombian case, non-farm income contributes between 30 to 40% of total household income. Escobar (2001), showed that about 51% of the net income of Peruvian rural households comes from off/non-farm activities while in Mexico, off/non-farm activities generate more than half of farm households’ incomes. Despite the fact that agriculture is the main source of livelihood in rural Ethiopia, farmers are engaged in a variety of off/non-farm activities to diversify their income and enable them cope with the risk of crop failures.

However, there is a wide difference between literature regarding the share of off/non-farm income in total household income in Ethiopia. Barrett and Reardon (2000) reported that the share of off/non-farm income in rural Ethiopia averaged about 36% in 1989/90. On the other hand, Reardon *et al.* (2006) found that off/non-farm share of total income in rural Ethiopia was about 20% in 1999 fiscal year. Despite the differences in the percentage of income share derived from non-farm employment, the role of non-farm income in total household income is significant. Sara (2007), found that about 75% of rural households engage in off/non-farm activities and approximately 31% of their livelihood income is generated from off/non-farm employment indicating that income from farming is not sufficient to support the household economy.

2.8. Conceptual Frame Work

Agriculture in Ethiopia is caught in a low input, low output trap, due to low levels of investment, low technology application, and low capacity (MoFED, 2005). The role of income diversification in breaking this trap is crucial. In Ethiopia since capital, infrastructure accessibility, market accessibility and credit is scarce, it is believed that access to income diversification improves the productive capital base of farmers. Insufficient capital, infrastructure accessibility, market accessibility and a lack of access to credit were critical factors influencing and limiting the growth of the smallholder particularly, in adopting basic agricultural technologies, and in engaging in other off-farm income earning activities.

Studies in rural Ethiopia indicates that the household's choice of income diversification strategy is influenced by differences in capital (i.e. human, physical and financial) endowments, location and shocks (Barrett, 2012). These studies focus on rural households' income diversification strategy where a farm household tries to allocate resources to supplement the farm income and maximize expected utility in the context of rural economy. Hence, it can be argued that income diversification strategies of rural farm households' are limited and the incentives and constraints for diversification are subject to the three mechanics on farm employment, off/non-farm employment and both (Barrett, 2012).

Therefore, the independent variables that are expected to affect diversification of livelihood strategies of rural households in the study area are age of the household head, sex of the household head, dependency ratio, education level of the household head, land size of the household, livestock holding size of the household, market distance of the household, road distance of the household, access to irrigation, credit use, membership to cooperatives, extension contact, urban linkage, access to mass media, total income and the amount of saving. In general the rural household income diversification includes on farm activities like crop and livestock production, off/nonfarm activities like daily wage labor, firewood and charcoal selling, handcraft and petty trade activities and both on farm and off/nonfarm activities like crop and livestock production, daily wage labor, firewood and charcoal selling, handcraft and petty trade activities. This is articulated on the following figure of charts.

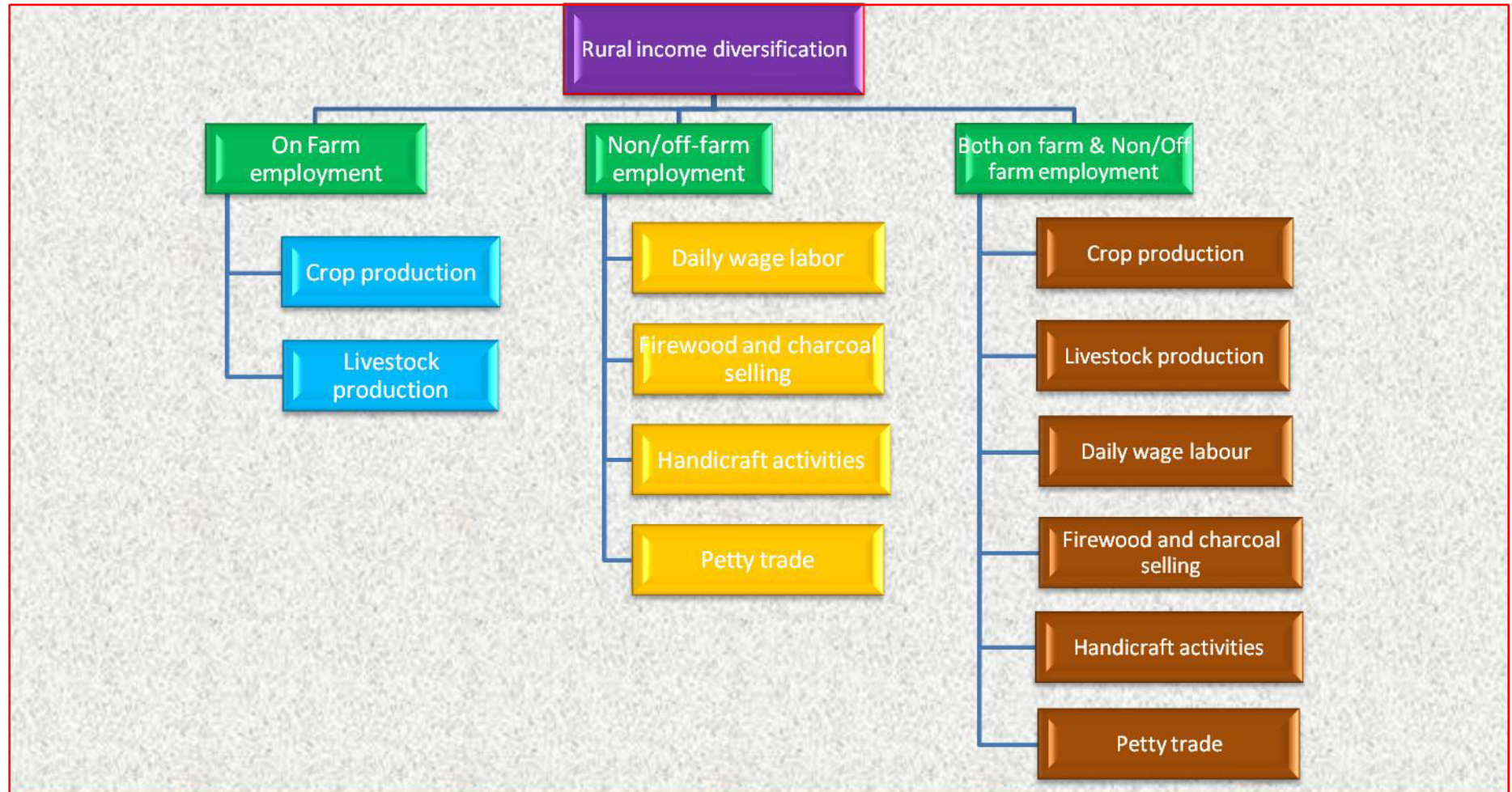


Figure 1: Conceptual framework of rural income diversification

3.RESEARCH METHODOLOGY

3.1. Description of the Study Area

Tulo District is found in the eastern part of Ethiopia of West Hararghe Zone. The District is found 368 and 40 km away respectively from the capital city of Addis Ababa and in Oromia Regional State in West Hararghe Zone to the east side of Chiro. The district has 30 rural *Kebeles* and 3 urban *Kebeles* that are located in different geographical features of Agro-Ecological Zones (TDAO, 2016).

3.1.1. Topography and climate

The study area is characterized mostly by ups and downs topographic settings and almost all midlands. It extends between 1500 and 2800m above sea level. The annual rainfall ranges from 650mm-1000mm and average temperature is 25 °c. The major soil type is loom and clay soil is one of the most complex organic and inorganic compositions. Agricultural production depends on soil type and its fertilities, loom soil is the dominant type of soil in the district (TDAO, 2016).

3.1.2. Socio- economic condition

Tulo District is known by its high population growth. The total population of the district is estimated to be 178,245 with average family size of 5. There are 90746 male and 87499 female population in the district. The average farmland holding size is 0.7 ha/hh which is far less than sufficient to feed the whole families throughout the year. In order to cope up with this contradiction farm lands are over cultivated which is going to end up with soil degradation & erosion. About 25% of soils were at least moderately degraded (TDAO, 2016).

3.1.3. Agriculture

Agriculture is the mainstay of the population of Tulo District. About 95 percent of the population depends on agriculture for their livelihood as per the assessment of World Vision Ethiopia (2013). The agriculture sector productivity is not satisfactory as required feeding the whole family and become surplus for the other family. The way of production system is too traditional. It is performed with the aid of human labor and oxen. The crop and livestock production sector highly affected by frequent crop diseases and livestock diseases (TDAO, 2016).

In Tulo the type of the rain fall gives less opportunity for the district to produce the crops and use the same land twice a year (for ‘Meher’ and ‘Belg’). However ‘Meher’ is the main growing season accounts for more than 75% of the total land cultivated. The major annual crop grown in the districts are sorghum, maize, haricot beans, barley and wheat. The total geographical area of the district is situated in the area of 456.7 km². In terms of land use, 13063 hectare is cultivable land, 2950 is covered by forest, 5375 ha accounts for water bodies, and bushes and shrubs cover 6325 Ha of land (WVET, 2008)

3.1.4. Infrastructure and social facilities

Concerning infrastructure and social facilities, the district has an access to one commercial bank, three private bank, automatic telephone, electricity (in 8KAs including the district town) and postal services. The district has a total length of 56km long all weather roads, and 68 km long dry weather roads. Out of the total 33 KAs only 18KAs are accessible by vehicle during all weather and 13KAs are accessible during dry weather, 2 KA is accessible only by motorbike (TDAO, 2014).

3.2. Data Type and Data Sources

In this study, both primary and secondary data were collected. Primary data pertinent to the production year 2016/17, was collected from 120 sampled households. Important variables on

economic, social, and physical assets were included in the questionnaire. Secondary data was obtained through discussions with the concerned expertise and officials of line departments of the districts including Office of Agricultural and Rural Development, Office of Finance and Economic Development, Education Office and NGOs.

3.3. Methods of Data Collection

Four enumerators who are very much acquainted with data collection were recruited from the district. The enumerators were all fluent speakers of Afan Oromo. To acquaint them with the whole data collection procedures, an intensive training was conducted on data collection procedures, interviewing techniques and the detailed contents of the questionnaire. Primary data was collected using structured questionnaires. The structured questionnaire translated into Afan Oromo to allow enumerators better understand the questions and administer the interviews properly. The questionnaire pre-test conducted and adjusted accordingly. The researcher was made with close and intensive supervision of the interview process to minimize possible errors that might be occur during data collection. Personal observations of physical features, informal discussions with farmers of the select Kebeles has been conducted. The secondary data was collected by means of checklist from line government sector office.

3.4. Sampling Technique and Sample Size

Sample households were selected using a two-stage random sampling technique. In the first stage, out of the 33 farmers' associations of Tulo district four farmers' associations (*'kebeles'*) were randomly selected. In the second stage using the updated household list obtained from each sampled farmers' association(*'kebeles'*), a total of 120 farmer households were selected randomly using probability proportional to sample size sampling technique. To identify the determinant of income diversification among rural household, data was collected from 120 sampled HHs. Sample was taken to ensure representation of major land-holding categories, households that participated and those that did not participate in off/non-farm activities, as

well as isolated and well-located households as measured by the distance to the nearest market.

Table 1: The distribution of total and sampled households in the sample *kebeles*

S/N	Kebeles	Total number of smallholder households	Total number of sample households from each <i>kebele</i>
1	Kira Kufis	963	34
2	Terkanfeta	674	23
3	Ifa Bas	755	26
4	Lubu Dhakab	1054	37
	Total	3446	120

Source: Tulo district administration office (2016)

3.5. Methods of Data Analysis

Both descriptive statistics and econometric methods of data analysis have been used to analysis the data collected using different data collection methods.

3.5.1 Descriptive analysis

The study analyzed factors contributing to variations in participating households' income diversification. The characteristics of multiple off/non-farm activities in this study area were explored using the different techniques of descriptive statistics.

The explanatory variables used for the analyses are grouped into household demographic characteristics, assets and mediating factors. The demographic characteristics included age, sex, and family size and number of economically active family members. The asset variables included size of cultivated land, livestock wealth, education of household head and number of children attending school. Mediating factors included variables such as perceived quality of land, number of crops harvested per year, access to credit, proximity to market and agro-ecology in which rural households make and earn their livelihoods

Descriptive method was employed to explain the demographic and socioeconomic behavior of household characteristics. The specific methods of data analysis involved are tabulation and cross tabulation, frequency, percentages, mean, and standard deviation.

5.3.2. Econometric Methods

The logit and probit models are the most frequently used models when the dependent variable is dichotomous (Gujarati, 2004; Green, 2003). The study is interested on analyzing household income diversification by disaggregating in to income diversified from farm only and off/non-farm activities. The reason why separated is that it assumed the determinant factors are not the same across the two sets of income diversification activities. Bivariate probit model was applied to identify the determinant variables and their marginal effect on households' participation for the two sets of income diversification activities. This is because it was assumed that, households participation decision in those activities may not be independent.

Babatunde and Matin (2010) modeled a similar problem in Nigeria. They apply a multivariate estimation procedure because households in rural area often participate in several income diversification activities and the choices among those activities are not mutually exclusive. This would also be appropriate in our context for households in rural area often participate in several income diversification activities that are not mutually exclusive. Thus, separate probit or logit models may not be appropriate and may generate biased and inconsistent coefficients, as the error terms are likely to be correlated across the two income diversification equations.

Therefore, bivariate probit model is sound to estimate two participation equations with correlated disturbances. Once participation is modeled, the next task is to estimate the factors that affect the level of income from different sources. The general specification for the bivariate probit model as stated in Green (2003) presents in equations 1(a & b) and 2 below. Participation of rural households on several income diversification activities depends on the value of unobserved (latent) variable which indicates some utility difference for the rural households by participating and not participating in income diversification activities. Often

the relationship between the value of the unobserved (latent) variable Y_i^* and the observed characteristics X_j and unobserved characteristics ε_i are assumed to be linear. Y_i^* for the household diversified income, Y_1^* household not diversified income, Y_2^* can separately be stated as:

$$Y_1^* = X_1' \beta_1 + \varepsilon_1, \quad Y_1 = 1, \text{ if } Y_1^* > 0, 0 \text{ otherwise} \quad (1a)$$

$$Y_2^* = X_2' \beta_2 + \varepsilon_2, \quad Y_2 = 1, \text{ if } Y_2^* > 0, 0 \text{ otherwise} \quad (1b) \quad \text{and}$$

$$E[\varepsilon_1 | X_1', X_2'] = E[\varepsilon_2 | X_1', X_2'] = 0$$

$$\text{Var}[\varepsilon_1 | X_1', X_2'] = \text{Var}[\varepsilon_2 | X_1', X_2'] = 1$$

$$\text{Cov}[\varepsilon_1, \varepsilon_2, | X_1', X_2'] = \rho$$

Where, $i = 1, 2$ and $j = 1, 2, \dots, n$

ρ = the cross equation correlation coefficient

Individual's decision to participate or not to participate in income diversification depends on the value of Y_i^* . The observed value, $Y_i = 1$ (households participated in some income diversification) if $Y_i^* > 0$ and $Y_i = 0$ (not participated) if $Y_i^* < 0$. Where, X_1' and X_2' are the vectors of explanatory variables in equation 1a and 1b above respectively. If the vector $X_1' \cup X_2'$ and let $X_1' \beta_1 = X_1' \gamma_1$ and $X_2' \beta_2 = X_2' \gamma_2$. Thus, γ_1 contains all the non-zero elements of β_1 and possibly some zeros in the positions of variables in X that appear only in the other equation. γ_2 also defined similarly. The bivariate probit for the probability of participation in income diversification is thus defined as:

$$\text{Prob}[Y_1 = 1, Y_2 = 1 | X'] = \Phi_2[X' \gamma_1, X' \gamma_2, \rho] \quad (2)$$

Where Y_1 and Y_2 denote participation in income diversification and not income diversification activities respectively, X' indicates for the vector of independent variables.

3.5.2. Definition of variables and hypothesis

Dependent variable: Y_i : In this study dependent variables would be main income source/Income diversification/ of sampled households. It measured by defining the annual household income that they earned from different sources such as agricultural, off/non-agricultural and both activities and is a discrete variable. The dependent variable for the model represent the observed status of household's income diversification. Dependent variable's outcome is household income diversification.

The explanatory/ independent variables: Variables that tend to explain a given dependent variable are said to be explanatory or independent variables. The household income is determined by a wide variety factors. Based on theoretical relationship and findings of empirical studies, the following explanatory variables are hypothesized to explain the dependent variable. These explanatory variables are discussed as below.

Household Land size (HHLS): This refers to the total area of farmland and grazing land that a farm HH owned in hectares. In agriculture, land is one of the major factors of production. The availability of cultivable land enables the owner to earn more agricultural output and avail more forage for livestock production to earn income. Therefore, land holding and improvement in income will be expected to have direct relationship with income diversification. Therefore; land size presents both positive and negative association with diversification strategy in this study. The negative coefficients indicated that the households with large land size are participated less in off/non-farm income diversification strategies and participated more on farm only strategy.

Household Family Size (HHFS): Family size expresses the total number of living members of the farming household and it is categorized as discrete type of variable. The assumption under this concept is that the higher the total family size of household, the more likely it is to split the members in different engagements of household income generating off-farm activities. Besides, farming households having more member size in the family supposed to

develop and implement various options of diversification strategies (Hassan and Nhemachena, 2008). But, another empirical study revealed that the family size with high dependency ratio was negatively related to household income diversification (Desta, 2004). Therefore, in this study it is hypothesized that, larger numbers of family size in a farming households are likely to undertake various diversification strategies since they can use advantages of the family as a labor source to diversify household income.

Extension contact(EXTCONT): It is the number of contact that household will do in a year with agricultural agents to get agricultural extension service. It will envisage those farmers who have contact to extension rendered by development agents can get more information on market prices of input and output and technical advices which would improve the efficiency of the farmer. According to (Mandleni and Anim, 2011), access to agricultural extension services have a positive influence on the adoption of a diversification strategy. Therefore, it will hypothesized that, households having to extension contact are more efficient in income diversification than those without. The variable will be treated as a continuous variable. It takes the number of HH receive or get to extension contact and service delivered by development agent.

Market distance (MARKDIS): Closeness to market centers creates access to additional income by providing off/non-farm employment opportunities and easy access to inputs and transportation of farm outputs. It is expected that households nearer to market center have better chance to engage in household income diversification than others. Proximity to market centers is expected to have positive relationship with household income diversification. Households with poor access to markets face higher transaction cost (Minot *et al.*, 2006). The variable will be treated as a continuous variable.

Use of improved agricultural input (UAI): It is the total use of improved agricultural inputs utilized by households per year. The variable takes continuous scale of measurement. The use of improved agricultural input increase the productivity of a given land. Improvement in productivity ultimately leads to improvement in income level. Therefore, it is hypothesized

that households using improved agricultural input are expected to have higher income diversification than the non-users.

Sex of the household head (HHSEX): This is a discrete variable that takes a value of “1” if the household head is male and “0” otherwise. In this study in one hand, it is assumed that male household heads have more exposure and access to information to new interventions than female household heads, which might enable them to participate in the income diversification as early as possible (Paulos and Goodman, 2004). It might be expected that male headed households might demand more working capital than women household heads.

Irrigation practice (IP): This variable refers to the proportion of total cultivated land under irrigation. Irrigation will be one of the important inputs that can address one of the key problems of agricultural production in the study area. Farmers in the study area may use irrigation for production of different vegetables and chat. This enables the farmers to diversify their production, practice multiple cropping and supplement moisture deficiency in caused by shortage of rain. Hence, it is hypothesized that the proportion of cultivated land under irrigation is expected to have positive relationship with household income diversification. The empirical study revealed that, among others farm size, and access to irrigation had significant contributions to household income diversification (Desta, 2004).

Age of the household head (AGE): It measures age of the respondent in years. Rural households are mostly devoting their time to farming activities. Young farmers are in a better position in education and in terms of getting information in current business operation and entrepreneur skill. Hence, it is hypothesized that as the age of household increases the efficiency of participating in income diversification decreases. According to Rees (2002), age is related with risk aversion and diversification of income sources and it is generally assumed that, other factors being the same, older farmers tend to be less prone to take risks than younger ones.

Education level of household head (ELHH): It is a continuous variable defined as the level of grades or years of schooling completed by the respondents. Education equips individuals

with the necessary knowledge of how to make living. Moreover, education enhances farmers' ability to perceive, interpret and respond to new events. Education is hypothesized to positively affect the use of modern technology and hence is expected to increase the household income diversification. The study by Walusimbi and Nkonya (2004), indicated that education level higher than primary school increased household income diversification significantly.

Annual expenditure on social and religious ceremonies (AESRC): It is a continuous variable. It refers to the portion of rural household heads income spent annually on different social and religious ceremonies. As this variable can be a proxy for use of income for non-productive purposes, it is expected to have a negative impact on household heads' participation income diversification.

Household livestock size (HHLS): It is a continuous variable measured referring to the total number of animals possessed by the household. Livestock may serve as a proxy for the capacity to bear risks of using credit for the purchase of new technology such as fertilizer and capture wealth effect. Households that own more livestock might require extra working capital for the purchase of different inputs and services such as feed, veterinary services, etc. As being an asset, livestock are readily available income for rural farming households why because in case of crop failure, farmers are able to compensate selling the livestock meaning exchanging livestock for cash income and covering the lost food crops (Wegayehu and Belaineh, 2003). Therefore, it is hypothesized that livestock ownership has positive effect on the rural household heads' decision to participate in income diversification.

Road distance (DMR): Closeness to main road creates access to additional income by providing off/non-farm employment opportunities and easy access to inputs and transportation of farm outputs. It will be expected that households nearer to main road have better chance to participate household income diversification than others. Proximity to main road will be expected to have positive relationship with household income diversification. The variable takes continuous scale of measurement and it is hypothesized that, house hold nearest to main road have positive relationship with income diversification.

Credit use (CU): It is the availability and opportunity that household can get to loan from their local micro finance institutions. Financial capital constraints often prevent the poor household to engage in income diversification activities. Because of the ineffectiveness of formal credit market in rural areas, the value of productive assets could be employed as proxies for financial capacity of household. It will be expected that households who have opportunity to get loan from his/her local financial institution have better chance to participate household income diversification than others. This a priori expectation is drawn from a study by Zeller (2001), that emphasizes the role of credit in enhancing the level of households' productive capital and the role of savings in the accumulation of assets, which provide capital for the income earning process. Thus, with the necessary capital and credit a household engage in diverse income generating activities. The variable takes dummy scale of measurements.

Urban linkage (UL): In principle in urban area the probability of practicing non/off activity is high as compared to that of a non-urban area. Urban linkage has positive relationship with rural house hold income diversification. Studies of livelihood strategies and their implications for rural-urban linkages however, are lacking. A few studies, such as the one by Haan and Ufford (2002), have revealed that rural-urban interactions are shaped to a great extent by people's livelihood strategies. Therefore, it is hypothesized that those house hold head have a chance of more linkage to urban are more opportunistic to practice income diversification.

Access to mass Medias (AMM): Access to mass media mean is access to information and information is a power. Household head those have access information has a chance to buy different knowledge, skill and technology. Thus, household those had this opportunity highly practice income diversification and it has optimistic correlation household income diversification. All the types of independent variables used in the MNL regression model with respect to their factor category and their expected signs meaning that their influence on the farmers decisions of diversification choice presented in table below.

Table 2: Description of independent variables and their effect

Variables	Nature	Value	Expected sign
Age of the hhs	Continuous	Actual age in years	+ve/-ve
Sex of the hhs	Dummy	1 if male 0 if female	+ve/-ve
Family Size	Continuous	# of hhs family	+ve/-ve
Road distance	Continuous	How long it takes to access main road (hr)	+ve/-ve
Market distance	Continuous	How long it takes to access market (hr)	+ve/-ve
Land size	Continuous	Total of land holding size(ha)	+ve/-ve
Livestock size	Continuous	Livestock holding size in TLU	+ve
Extension contact	Continuous	Total no of contact in a year	+ve
Urban linkage	Dummy	1 if yes 0 if no	+ve
Irrigation practice	Dummy	1 if yes 0 if no	+ve
Access to mass media	Dummy	1 if yes 0 if no	+ve
Education level	Categorical	Level of hhs education	+ve
Credit use	Dummy	1 if yes 0 if no	+ve
Use agricultural input	Continuous	Total input used per year (Kg)	+ve/-ve
Annual hhs expenditure	Continuous	The total expenditure of hhs(birr) on social/religious ceremonies	-ve

4. RESULTS AND DISCUSSION

4.1. Descriptive Statistics

The explanatory variables used for the analyses include household demographic characteristics, assets and other factors. The demographic characteristics include age, sex, and family size and number of economically active family members. Therefore, before get on interpretation of results from the model, it is very important to examine the nature of the data and describe the variables through descriptive statistics to come up with interlinked interpretation and conclusion in subsequent section.

Farm households in the study area are found to diversify their livelihood activities and income. Even though farm households mainly depend on agriculture which consists of crop and livestock production or both, off/non-farm activities have found to support the life of many poor farm households in the study area. To describe the livelihood activities in the study area the main sources of income and participation of the sample households in each source was presented. Moreover, the composition of the total household income by source was presented to show the importance of the different sources of income.

Table 3 shows the descriptive statistics of all the continuous variables included in the model. The overall mean age of the sampled households was 40.5 years with a standard error of 11.4 and the mean age of sampled household who diversify income and not diversify is 34 and 44 respectively. According the f-test result the age of households significantly affecting income diversification participation. This implies that, as age of household increases the participation in income diversification of household decreases. The overall mean of family size of sampled household is about 5.5 which is almost equivalent to the national estimate. Whereas, the mean of sampled household family size who diversify income and not diversify is 6 and 4 respectively. This shows that, household who have large number of family size was participate more on income diversification activities than those small number of family size.

Land holding ranges between zero (no have land) to three hectares with overall mean of 0.5 and standard deviation of 0.6. The average land holding size of sampled household who diversify income and not diversify is 0.4 and 0.53 respectively. This shows, households who have small area of land to cultivate has diversify their income more because they would be forced to get additional income to sustain their livelihoods since the productivity gained from cultivating small land is not enough. However, sampled households who have relatively large size of land holding would not enforced to diversify more since the productivity they got from the cultivable land is enough to endure the livelihood of their families. The average livestock holding was 2.9 TLU with a standard error of 2.0. Average distance from main market and main road of sampled household is 4.3 and 1.2 hours respectively.

Extension services are out of the major strategies emphasized by Ethiopian government to increase production and productivity in the rural society. Having this in mind, this study incorporates this variable as one of the factors which affect income diversification. According to the household survey conducted, the average number of extension visit was 25.5 times per year. The mean of extension visit per year for sampled household who diversify income and not diversify is 17 and 29 respectively. This implies that, those households who not diversify income other sources has visit more the extension to get service to increases their agricultural productivities. Whereas, households those diversify income less visit extension because they have been focusing on incomes from off/non-farms than agricultural production. The overall mean of input application of sampled household is 42.8kg and the mean of sampled household who diversify income and not diversify is 28.88kg and 49.52kg respectively. From the result it was concluded that, sampled households those not diversify income has more using input application to increases their productivity from agriculture.

4.2. Description of continuous variables that significantly differ among household income diversification

The f-test and chi-square test was applied in order to have a clear picture on the variables that represent household demographic characteristics, household asset, financial constraints, and location and infrastructure characteristics which significantly vary between the income

diversification participant and non-participant groups. Variables that significantly vary among those diversify and not diversify samples at 1%, 5% or 10% level of significant are presented also in table 3.

Table 3 shows that, the mean difference of continuous variables for households who diversify income and not diversify groups. On average the age of sampled household heads who were not participated on income diversification activities are found older than for participants. The corresponding figure for the participant and non-participant farmers is about 34 and 44 years respectively. The mean age difference between these groups has significant at 5% level. This indicates that older household heads are less likely to participate in income diversification work as it demands high physical and mental energy and as age increases the risk aversion of household also increases.

The average income from crop production of sampled household heads is smaller for households who diversify income than for not diversify. The corresponding figure for diversify and not diversify households is about 7926 and 9763 ETB respectively. The mean income difference from crop production between these groups has significant at 10% level. This indicates that household heads who diversify income from off/non-farm are less likely to participate in crop production activities as they will get an income from other sources which could sustain their livelihoods.

The average total annual income of sampled household who diversify and not diversify is 12478 and 10300 ETB respectively. The total mean income difference of households who diversify and not diversify is significant at 10% level of significance. This shows that, households who diversify income from different source could earn more than those not diversify. Distance from main road is significantly related to off/non-farm income diversification activities at 10% significance level. Closeness to main road creates access to additional income by providing off/non-farm employment opportunities and easy access to inputs and transportation of farm outputs. The extension visit of the sampled households who participate on the income diversification and who not participate is significant at 1% level. This shows that, households who not diversify their income from other source has more

contact the extension to apply more technical and scientific ways of production only for agriculture.

Table 3: Summary statistics of the continuous variables by the choice of income diversification strategies.

Variables	HH income diversification						F-value	P-value
	All Sample		HH diversified		HH not diversified.			
	n =120		n= 39		n=81			
	Mean	SD	Mean	SD	Mean	SD		
Age of HH	40.5	11.4	34	10	44	11	1.99	0.005**
HH family size	5.5	2.2	6	2	5	2	1.5	0.13
HH land size	0.5	0.6	0.4	0.41	0.53	0.67	1.3	0.22
HH income from crop pron.	9165.8	4349.2	7926	4695	9763	4069	1.8	0.016*
HHs livestock size	2.9	2.0	3	2	3	2	1.3	0.22
HHs income from livestock	300.0	1975.8	554	2779	178	1447	1.5	0.175
HHs yearly total income	11007.9	5978.0	12478	7353	10300	5091	1.5	0.06*
HHs yearly expenditure	6942.1	3768.3	7954	5034	6455	3889	2.3	0.012*
HHs access to main road	1.2	0.8	1.24	0.74	1.25	0.78	2.2	0.028*
HHs access to market	4.3	1.6	4.56	1.52	4.13	1.56	1.2	0.31
HHs extension contact/year	25.5	16.8	17	17	29	15	8.4	0.000***
HHs input application in Kg	42.8	27.8	28.88	29.7	49.52	24.34	2.8	0.000***

Source: Survey result (2017) Note: ***, ** & * significant at 1%, 5% & 10%.

4.3. Description of categorical variables that significantly differ among household income diversification

For categorical variables more details about households who diversified income or not are presented in subsequent tables. The sample is dominated by male headed households which is actually true in any part of Ethiopia. The data comprises 84.2% of male headed households and 15.8% is female headed. Being female headed or male headed is a crucial factor for income diversification in such a way that women can easily involve in nonfarm activities because such activities require less effort compare to agricultural activities. Moreover, it is quite obvious in countries where farming is primitive like Ethiopia; agricultural activities are laborious and time taking. This is also a probable reason for women to involve in off-farm activities.

Table 4 depicts the above fact, which means out of 19 households who are female headed in the sample only 8 of them did not diversify their income. In other words about 57.8% of female headed households was diversified their income by more than 5% of their total income. Whereas, out of 101 households who are male headed in the sample 73 of them did not diversify their income. In other words only 27.7% of male headed households was diversified their income by more than 5% of their total income. The percentage of male and female headed households who did not diversify income is 72.3% and 42.2%, respectively. But the percentage share of female headed households in the diversified group is higher as compared to the share of male headed families in the same group. Gender difference between the diversified and non-diversified groups is significant at 10% level.

There is exists also difference in credit use (loan demand) between the household diversified and non-diversified groups for income diversification activities. During the survey period 58.9% of the diversified group and 16.8% of the non-diversified group access to credit. The difference is significant at 1% level. The diversified group are likely to use credit because credit helps to start own business like local brewery, selling tea/coffee and livestock and grain trade.

Table 4: Summary of statistics for the categorical variables by choice of income diversification strategies

Variables			HH income diversification						
			All Sample n=120	%	diversified		not diversified		P-value
					(n=39)	%	(n=81)	%	
HH sex	Male	101	84.2	28	23.3	73	60.8	0.012*	
	Female	19	15.8	11	9.2	8	6.7		
Did HH own land	Yes	119	99.2	39	32.5	80	66.7	0.675	
	No	1	0.8	0	0.0	1	0.8		
HH urban linkage	Yes	63	52.5	21	17.5	42	35.0	0.497	
	No	57	47.5	18	15.0	39	32.5		
HH access to media	Yes	82	68.3	24	20.0	58	48.3	0.183	
	No	38	31.7	15	12.5	23	19.2		
HHs received credit	Yes	37	30.8	23	19.2	14	11.7	0.000***	
	No	83	69.2	16	13.3	67	55.8		
HH irrigation pract.	Yes	23	19.2	2	1.7	21	17.5	0.004**	
	No	97	80.8	37	30.8	60	50.0		

Source: Survey result (2017) Note: ***, ** & * significant at 1%, 5% & 10%.

According to this study, income was categorized as income from farming (agricultural) activities and income from off/non-farm activities. Farming activities include crop production and livestock rearing while off/non-farm activities refers to handicraft, petty works, trade, employment, fire woods and daily laborer. Farm households in the study area are found to diversify their livelihood activities and income. Even though farm households mainly depend on agriculture which consists of crop and livestock production or both, off/non-farm activities have found to support the life of many poor farm households. Table 5 shows the participation rate and composition of household's total income. About 98% of the sample households derive their income from farming which accounts 85% (81% crop income and 4% livestock income) of the total annual household income. The remaining 15% of household income is obtained from different off/non-farm sources which includes off-farm self-employment and off/non-farm petty trade income.

Table 5. Household participation in different types of farm and off/non-farm activities and composition of total household income

Income by source	Participation rate(%)	Mean share of total income (%)
Total farm income	98	85
Crop income	98	81
Livestock income	19	4
Total off/non-farm income	33	15
Income from petty trade	18	9
Self-employed income	14	6

Source: Computed from own survey data, (2017)

The table 6 depicts that, within the age 18-35 years range, as age increases the number of households who diversify their income increased and the same is true to those who did not diversify. From this table, we can clearly see that as age increases the tendency of diversification decreases. Generally, age group between 18 to 35 is the leading group for income diversification and it is significant at 1% of significance level.

Table 6: Households heads age group of income diversification status

Age category	All sample n=120	HH income diversification				P-value
		diversify	%	not diversify	%	
18-25	15	12	10	3	3	0.000***
26-35	32	16	13	16	13	
36-45	41	8	7	33	28	
46-55	15	2	2	13	11	
>55	17	1	1	16	13	
Total	120	39	32.5	81	67.5	

Source: Survey result (2017) Note: ***, ** & * significant at 1%, 5% & 10%.

As household head level of education increase the number of household who diversify their income is increasing. This implies that, education level of household have significant role on

households to participate on the income diversification or not. Generally, above secondary school level of education was found the significant level of education for income diversification.

Table 7: Level of education and income diversification of respondents

Education Level	All sample n=120	HH income diversification				P-value
		diversify	%	not diversify	%	
Illiterate	39	10	8	29	24	0.20
Reading & writing	15	3	3	12	10	
Grade 1-4	30	13	11	17	14	
Grade 5-8	26	9	8	17	14	
Grade 9-10	8	3	3	5	4	
Grade 11-12	1	1	1	0	0	
Above grade 12	1	0	0	1	1	
Total	120	39	33	81	68	

Source: Survey result (2017) Note: ***, ** & * significant at 1%, 5% & 10%.

According to this study, inadequate awareness, market inaccessibility and shortage of capital are the major factors that influence households income diversification (Appendices Table 4). From the total sampled household 18% of them participated in trade. Whereas 14% of households are engaged in hired work/employment activities and the remaining 67% sampled households did not diversify their income due to inadequate awareness and thinking as it has no profit by 37.5% and 38.3% respectively(Appendices Table 5). Table 9 depicts, generally the major factors of income divarication of the study area is shortage of capital which 56% sampled households responded.

Table 9: Households major factors affecting income diversification

Factors	Frequency	Percent	P-value
HH diversified	29	24.2	
Inadequate awareness	22	18.3	
Shortage of capital	56	46.7	
Lack of information	11	9.2	0.000***
Shortage of cultivable land	1	0.8	
Market inaccessibility	1	0.8	
Total	120	100.0	

Source: Survey result (2017)

4.4. Econometric Model Results on the Determinants of Income Diversification

Before running the bivariate probit model it is necessary to conduct a multicollinearity test. Thus, variance inflation factor was used to test the multicollinearity problem among continuous variables and contingency coefficient was computed to see the degree of association among dummy/categorical variables. The larger value of Variance Inflation Factor (VIF), usually values exceeds 10 indicates a serious multicollinearity problem (Gujjirati, 2003). The multicollinearity test results have shown no serious problems among the continuous and categorical independent variables (Appendix Tables 1 and 2).

The STATA version 11 was used to generate the parameter estimates. The parameter estimates of the bivariate probit 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 model (Green, 2003).

Table 10: Bivariate probit model estimates of households' choice of income diversification

Variables	HH who diversify				HH who not diversify			
	coef.	Z	P> Z	M.effect	coef.	Z	P> Z	M.effect
EDUCAT_LEVEL	-0.875	-0.68	0.494	-0.034	0.067	0.5	0.614	0.015
HH_SEX	0.707	1.6	0.108	0.274	-0.392	-0.74	0.458	-0.091
HH_AGE	-0.027	-1.78	0.075*	-0.01	0.024	1.45	0.148	0.005
HH_FSIZE	0.256	2.8	0.005**	0.099	-0.184	-1.64	0.101	-0.043
HH_LANDSIZE	-0.842	-1.87	0.061*	-0.327	0.607	1.18	0.237	0.141
LIVESTOCKSIZE	-0.157	-1.39	0.164	-0.061	0.121	0.89	0.372	0.028
HH_YEARLYEXPEN	0.0001	2.71	0.007**	0.00005	-0.0001	-1.93	0.054*	-0.00004
ACCESS_ROAD	-0.0791	-0.32	0.746	-0.03	0.053	0.19	0.847	0.012
ACCESS_MARKET	0.414	3.89	0.000***	-0.16	0.013	0.11	0.914	0.003
URBAN_LINKAGE	0.019	0.06	0.955	0.007	0.912	1.73	0.084*	0.213
ACCESS_MEDIA	0.098	0.31	0.757	0.038	-0.553	-1.51	0.13	-0.129
CREDIT_RECIVED	0.093	0.21	0.837	0.036	0.368	0.81	0.417	0.085
IRIGATION_PRACT	0.288	0.63	0.529	0.112	0.344	-0.61	0.54	-0.08
EXTEN_CONTACT	-0.003	-0.27	0.785	-0.001	0.003	0.29	0.772	0.0008
INPUT_APPLICATION	-0.024	0.4	0.005**	-0.009	0.019	2.06	0.039*	0.004

Number of obs = 120, Log likelihood = -80.25, Wald chi2(30) = 53.81, prob > chi2 = 0.0048,

Likelihood-ratio test of rho=0: chi2(1)=44.6824, prob>chi2=0.0000 and * ** *** is shows level of significance at 10, 5 & 1% respectively.

Age of household heads: Age of the household head has negative and significant influence on off/non-farm income diversification at 10% significance level. As the farmers' age increases their risk aversion also increases. As a result older farmers hesitate to invest their money in a new business to diversify their income. The older the farmer is the higher will be his/her vulnerability to various limiting factors of income diversification. Another probable reason for this inverse relationship could be, as age of the farmer increases, s/he cannot be able to travel long distance to find employment opportunities thereby unable to participate in laborious petty trading works which is one of the major sources of off farm income in the locality. Generally, the econometric analysis reveals that, as the age of the household head

increases the income from off/non-farm activities for that particular household tend to decrease significantly.

Household family size: This refers to the total number of household families working on the income diversification. The larger the number of household workers the more labour force available for income diversification. Family size was hypothesized to have a positive/negative impact on income diversification. In this study household family size has positive and significant influence on off/non-farm income diversification at 5% significance level. According to Hassan and Nhemachena (2008) farming households having more member size in the family supposed to develop and implement various options of diversification strategies. While another empirical study revealed that the family size with high dependency ratio was negatively related to household income diversification (Desta, 2004). Therefore, having larger numbers of productive family size in a farming households are likely to undertake various diversification strategies since they can use advantages of the family as a labor source to diversify household income.

Household land size: As of the hypothesized, land size is significantly and negatively related to off/non-farm income diversification strategies at 10% level of significance. The negative coefficient indicate that the households with large land size participated less in off/non-farm income diversification strategies compared to those using on farm only strategy. The possible reason can be a small cultivable land might be not enough for households to produce a sufficient productivity from farm alone, which forces them to look for supplementary from off/non-farm income generating activities. Similarly, Fikru and Adugna (2008) stated that farmers with smaller land size are involved in off/non-farm diversification activities because of shortage of land to support their livelihood. On the contrary to this result, Kebede et al (2014) found that the total cultivated land size has positive and significant influence on off-farm participation perhaps households with better holding opted for additional income in casual laborer works to smoothen their farm operations.

Household yearly expenditure: In contrary of the hypothesized having annual household expenditure has a positive and significant influence on off/non-farm income diversification

strategies at 5% level of significance for household who diversify. However, it has negative and significant at 10% level of significance for households who not diversify income.

Access to market: Market distance is positively and significantly related to off/non-farm income diversification activities at 1% significance level. Closeness to market centers creates access to additional income by providing non-farm employment opportunities and easy access to inputs and transportation of farm outputs. It is be expected that households nearer to market center have better chance to participate in household income diversification than others. Similar to this result, Amare and Belayneh (2013) 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 non-farm activities (like petty trading and shop keeping).

Urban Linkage: As hypothesized having link/connection with the urban area peoples (urban linkage) has a positive and significant influence on off/non-farm income diversification strategies at 10%level of significance. The positive coefficient indicates that, other factors remaining constant, the probability of income diversification into off/non-farm activities of households who have linkage with urban linkage increased by 21%. This could be that having friends/relatives in the urban area improves the farm households' information on non/off-farm income diversification opportunities.

Input application: Use of improved agricultural input is significantly related to off/non-farm income diversification activities at 5% and 10% significance level to household who diversify income and who not diversify respectively. The use of improved agricultural input increase the productivity of a given land. Improvement in productivity ultimately leads to improvement in income level.

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary

Agriculture is found to be the dominant economic activity and contributes 85% of the smallholder farm households' total annual household income in the study area. Thus, to improve the smallholder farm households income due attention should be given to agricultural intensification and commercialization of agricultural crops. The survey result shows that low level of rural farming households' participate in off/non-farm activities and the contribution of non/off-farm income to total household income is small compared to farm income. This reflects that rural farm households in the study area are engaged in low profitable, low return and non-rewarding off/non-farm activities. In the study area only 32.5% of the sample households are participated in off/non-farm income diversification strategies to follow their livelihood income. This indicates that, inadequate awareness, market inaccessibility, shortage of capital and no interest for off/non-farm activities are the major factors influencing households not to diversify their income. The econometric analysis demonstrated that the smallholder farm households income diversification strategies are shaped by age of household heads, household family size, household land size, household yearly expenditure, access to market, urban linkage and input application.

5.2. Conclusion

Based on the research questions and the objectives, it was seen that the dominant socio-economic variables affecting income diversification and the pattern of diversification among smallholder households in rural Ethiopia, "Tulo" district. According to the researchers' observation and econometric analysis of survey, income diversification is not well developed among farmers. In spite of the fact that off/non-farm activities essentially supplement farm household income and, therefore, are subsidiary to the farming component that only 15% of total income is generated from off/non-farm activities while there is a huge potential for diversification into the locality. Most of the farmers earn their off/non-farm income from

employment, business, petty works and fire wood which contribute very little in the income of farmers. The estimation results show that different socio-economic factors may influence the household's access to alternative income sources. The most significant general conclusion of this research is that, age of household heads and land size of household have negative significant influence on the household's decision towards income diversification, while urban linkage, household family size, household yearly expenditure, access to market and input application of the household head are variables which boost income diversification among small scale farmers.

5.3. Recommendations

Based on the research findings the following recommendations are put forward. Though households need to be involved in off/non-farm activities, financial constraint is one of the obstacles to do so. This is because; there is no well-developed and evenly distributed provision of credit in the study area. Infrastructure development is a back bone for any development. To the contrary, the infrastructure development of the study area is below average. For instance, it is difficult to reach market place due to poor road network. This can negatively affects the tendency of diversification among small scale farmers. Therefore, road construction, electricity and telephone services should be developed in order to facilitate income diversification both through farm and off-farm activities.

Though, education level is of the significant variables affecting income diversification. Education coverage in the study area is very low. For example, about 27% of the sampled households are unable to read and write, 21% attend only primary school and only 14% proceeded to secondary school. As witnessed by the econometric result of this study, educated farmers are in a better position to diversify their income thereby increase their livelihood. Therefore, expansion of education coverage will enhance income diversification of households. Generally the concerned body has to work more to increase the access to education in the study area in order to explore the existing opportunity of income diversification via off/non-farm activities.

Women's dominate many of the off/non-farm activities in the study sites such as household-based food processing, local drink sales, and petty trading. Therefore, giving financial

assistance to women by the governmental and non-governmental agencies could accelerate rural livelihood transformation from mere agricultural production to income diversification into off/non-farm activities. Thus, the concerned bodies should give due attention to the positively and negatively significant variables.

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7. APPENDICES

7.1. Appendix

1. The variance inflation factors of continuous independent variables.

Variable	VIF	1/VIF
INPUT_APP	1.46	0.68
EXTEN_CON	1.41	0.71
LIVESTOCK_SIZE	1.32	0.75
HH_YEARLYEXPN	1.30	0.76
ACCESS_MARKET	1.29	0.77
HH_FSIZE	1.24	0.80
ACCESS_ROAD	1.19	0.84
HH_AGE	1.13	0.88
HH_LANDSIZE	1.07	0.93
Mean VIF	1.27	

Source: Survey result (2017)

2. Contingency coefficients for categorical independent variables

HH_SEX	EDUCA	URBAN	ACCESS_MED	CREDIT	IRRIGA	
HH_SEX	1					
EDUCA_LEV	-0.1163	1				
URBAN_LINK	-0.1577	-0.2738	1			
ACCESS_MEDIA	0.0328	-0.0523	0.1592	1		
CREDIT_REC	0.0813	-0.1228	0.0993	0.0046	1	
IRRIGATION	-0.072	0.0236	0.0392	0.1431	-0.0157	1

Source: Survey result (2017)

3. Percentage of households engaged in trade activities.

Response	Frequency	Percent
Yes	28	23.3
No	92	76.7
Total	120	100

Source: Survey result (2017)

4. Percentage of factor that determines households not engaged in trade activities.

Factors	Frequency	Percent
HH diversified	23	19.2
Inadequate awareness	35	29.2
It has no profit	2	1.7
Market inaccessibility	4	3.3
No interest	1	0.8
Shortage of capital	55	45.8
Total	120	100

Source: Survey result (2017)

5. Challenges to engage in hired or employment activities.

Factors	Frequency	Percent
HH diversified	5	4.2
Inadequate awareness	45	37.5
It has no profit	46	38.3
Market inaccessibility	9	7.5
No interest	9	7.5
Shortage of capital	6	5
Total	120	100

Source: Survey result (2017)

6. Percentage of households engaged in in any hired or employment activities.

Response	Frequency	Percent
Yes	5	4.2
No	115	95.8
Total	120	100

Source: Survey result (2017)

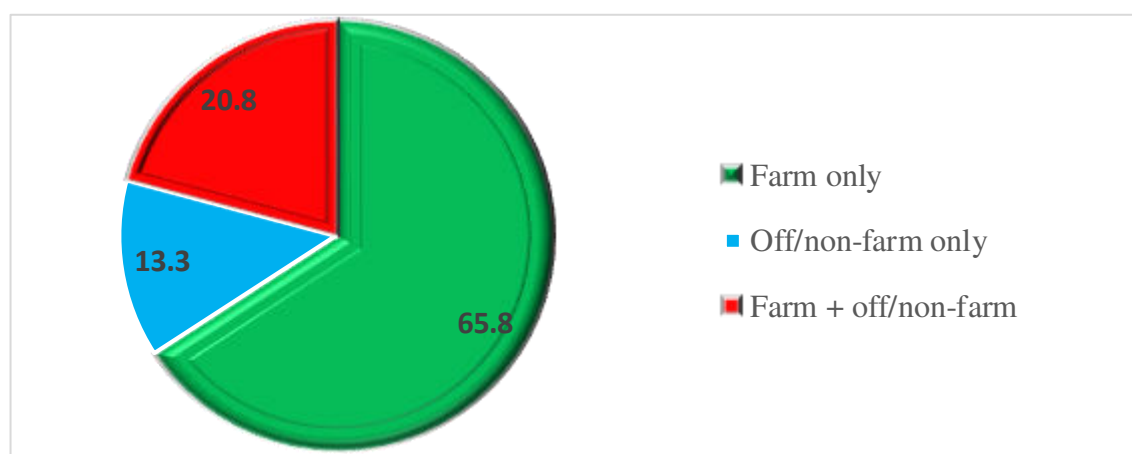


Figure 2. Income diversification strategies and the contribution of livelihood activities to the household income. source: own survey result, 2017.

7.2. Appendix

Survey Questioners

A. Background Information

A1. Name and Code of Interviewee (Preferably HH Head) _____ Code _____

A2. Name and Code of Enumerator (Code) _____ Code _____

A3. Name and Code of PA _____ Code _____

A4. Agro-ecology of the PA _____

1= Lowland 2= Midland 3= Highland

B. Household Characteristic

B1. Sex of HH Head 1= Male 2= Female

B2. Age of HH Head _____

B3. How many household members do you have? _____

B4. Marital Status of the HH Head

1= Single 2= Married 3= widow 4= Divorced

B5. Religion of the HH Head

1= Orthodox 2= Muslim 3= Protestant 4= Catholic 5= Others (Specify)

B6. Highest Level of School Completed for the HH Head

1= No Education 2= Read & Write 3= Grade 1 – 4 4= Grade 5 – 8

5= Grade 9 – 10 6= Grade 11-12 7= Above Grade 12

B7. Major Occupations of the Household

0= Farming 1= Weaving 2= Carpentry 3= Black Smith 4= Carpet Making

5= Petty Trading 6 = Daily Labor 7= Cattle Tending 8= Pottery 9. Bamboo Making 10. Others

B8. Economic Class to which the household belong

1= Rich 2= Medium 3= Poor 4= Poor of the poorest

B9. Do you or any member of your family engage in any Non-farm activity

1= Yes 2 = No

B10. If Yes, The amount of income earned From non- farm activities? _____

B11. What is yours and/or your family income source?

1=Farm only 2= off/non-farm only 3= Farm + off/non-farm

B12. What is the major factor that makes you not to diversify your income from farm, non/off farm and from both?

1=Lack of knowledge 2=Lack of capital 3=Lack information 4=Absence of land

5=Lack of market 6=high dependent family size 7=Absence of Livestock's

8=Lack of irrigable land 9=Road accessibility 10=Transportation problem

11=Lack of credit access

C. Crop Production

C1. Do you own Land? 1= Yes 2= No

C2. If Yes to Question C1, what type of land access do you have?

1= Private 2= Rented/Borrowed 3= Share Cropping 4= Common

C3. What total size of land do you own in any form (Ha)? _____

C4. How do you compare your present land size with the need of your family?

1= More than Enough 2= Just Enough 3= Less than enough

C5. How do you plough your land?

1= Using Family Labor 2= Using hired Labor 3= Using owned oxen

4= Using rented oxen 5= Using borrowed oxen 6= others

C6. Is there extra land in your peasant association that could be meant for Redistribution?

1= Yes 2= No

C7. If No to QC6, are you willing to move to other areas comprehended in Resettlement programme?

1= Yes 2= No

C8. How do you compare existing production with that of 10 years ago?

1= Increasing 2= Decreasing 3= No change

C9. If Production has decreased what are the reasons?

1= Paste and disease 2= Shortage of land 3= Lack of rainfall

4= Shortage of input 5=Shortage of labor 6= Poor soil fertility 7= others

C10. What is the annual food requirement of your family (Qt)? _____

C11. Fertility of the land 1=Fertile 2= Moderate 3=Not fertile

C12. Topography of the land 1= Plain 2= Steep 3= Hilly

Use of Agricultural Inputs

C13. Is there potential for irrigation cultivation in your PA? 1=Yes 2= No

C14. If yes to Q C13, do you produce using irrigation? 1=Yes 2= No

C15. If Yes to C14, what is the area of your irrigation land (in Hectare)? _____

C16 . Do you get any technical support from development agent 1=Yes 2=No

C17. If yes, how regularly do extension agents visit you or you visit them for extension services? (in month) _____

C18. Did you participate in the new extension program in this year? 1=Yes 2= No

C19. If Yes to C18, did you apply agricultural inputs in this year? 1=Yes 2= No

C20. If Yes C19, what inputs did you apply?

1= Fertilizer 2= Herbicides 3= Pesticides 4= Improved seed 5 = Others (Specify)

C21. What quantities of inputs have you applied in this production season?

C21	
Input type	Quantity in Kg
DAP	
Urea	
Pesticide	
Manure	
Others	
Total	

Labor Use

C22. Have you encountered labor shortage in this production season? 1=Yes 2 = No

C23. If Yes to QC20, mainly for what specific activities have you encountered labor Shortage?

1= Cultivation of Land 2= Crop Harvest 3= Weeding 4= Threshing 5= Others (Specify)

C24. If Yes to C20, how did you overcome problems posed by labor shortage?

1= Hiring labor 2= Assistance from relatives 3= Social assistance 4= Was not able to overcome the problem

5= Others (Specify)

C25. If you hired labor to overcome problems of labor shortage at what wage rate have you deployed (Man day)? _____

Use of Draft Power

C26. How many oxen of your own do you use for farming? _____

C27. Do you face oxen shortage for during your farming activities? 1= Yes 2= No

C28. If Yes to Q27, how did you cope up with such shortage?

1= Pairing with others 2= Exchanging labor for pair of oxen 3= Using oxen of relatives 4= Hiring Oxen 5= Others (Please specify)

C29. Production and Income (This Year)

Grain Type	Amount of production		Income Obtained
	Land(ha)	Prod. (qty)	
Barely			
Wheat			
Sorghum			
Teff			
Maize			
Fruits			
Legumes			
Vegetables			
Coffee			
Chat			
Others			
Total			

D. Livestock Production

D1. How many livestock have you owned?_____

1= No Livestock 2= oxen 3= Cows 4= Claves 5= Heifer 6= Sheep 7=Goat 8=Chicken
9=Horse 10= Mule 11=Donkey 12= Camel 13= Other

D2. What income have you earned from sale of livestock (Birr)?_____

D3. What income have you earned from sale of Livestock product's (Birr)?_____

D4. What specific problems do you have in raising livestock?

1= Grazing 2= Diseases 3= Lack of Water 4= Wild Animals 5=Theft 6= Poor breed 7= Others (Please Specify)

E. Handicrafts/Any hand skill

E1. Do you or any member of your family ever engaged in handicraft activity?

1= Yes 2= No

E2. If Yes to E1, how many of them do participate in the job?_____.

E3. If no to E1 why?

1. Lack of knowledge/skill 2. Thinking as it has no profit 3. There is no place where to sell my products 4. I have no interest 5. Lack of initial capital

E4. What is the form of participation of your family members in the handicraft work?

1= Fully engaged on the work 2=Integrate the work with other activities 3= Others (Specify)

E5. Why did you engage in those handicraft activities?

1= To supplement farm income 2= As a major mode of livelihood 3= Inherited from family 4= Others (Specify)

E6. How did you obtain the knowledge to work on such handicraft works?

1= From family 2= From neighbors 3= From friends 4= Received training 5= Others (Specify)

E7. What types of instruments do you use to undertake the handicraft works?

1= Traditional 2= Modern/Improved 3= Others (Specify)

E8. How did you obtain these instruments?

1= Purchased 2= Homemade 3= Inherited from families

E9. What are the potential sources of raw materials for your work?

1= Local market 2= Local environment 3= Outside markets 4= Others (Specify)

E10. Where do you sell your home made handicraft produces?

1= Village market 2= Markets of other PAs in same woreda 3= In the neighboring woredas 4= Others (Specify)

E11. How do you transport your produces to market places?

1= Pack animals 2= Hired labor 3= Carried by family members 4= Car transport 5= Others
(Specify)

E12. Who are your potential customers for your produces?

1= Local Farmers 2= Local Merchants 3= Merchants from other areas 4= Others (Specify)

E13. How do you compare handicraft and agriculture on the following parameters?

1= Handicraft preferable 2= Agriculture Preferable 3= Both are equally preferable

E14. Do you get any support from government and non-government institutions or any other agency specific to handicraft? 1= Yes 2= No

E15. If Yes, what specific supports have you received?

1= Credit 2= Training 3= Material Provisions 4= Financial Provisions 5= Others (Specify)

E16. What is the major problems of handicraft activities?

1= Negative perception of the community 2= Lack of capital 3= Lack of market 4= Lack of raw materials 5= Lack of skill

6= Lack of cooperatives 7= Others

F. Trade and Business Engagements

F1. Do you or any member of your family engaged in trade activities? 1= Yes 0= No

F2. If you say yes To Q F1, how many of your family members are engaged in market based economic ventures? _____

F3. If no to QF1 why?

1= Lack of knowledge/skill 2= Thinking as it has no profit 3= Lack of market 4= I have no interest 5= Lack of initial capital

F4. If Yes to Q F1, on what specific activities are you engaged and what income does you obtain?

F3	
Trade Engagement	Income

	Obtained This Year
Grain	
Cash crop	
Livestock	
Livestock products	
Vegetables/fruits	
Others	
Total	

F5. What type of engagement do you have in any of the above activities?

1= retailer 2= wholesaler 3= others

F6. What are the potential problems you usually face in trading?

1= Lack of initial capital 2= Poor transport facility 3= Shortage/lack of pack animals 4= lack of skill 5= Market shortage 6= Others (Specify)

F7. Where do you obtain your trading items from?

1= Home produced/made 2= Locally made/produced 3= Other woredas/areas 4= Others (Specify)

F8. Where do you usually sell your trade items?

1= PA market 2= Markets of other PAs in same woreda 3= Markets of other woredas 4= Others (Specify)

F9. What transport facilities do you use to transact the traded goods/items?

1= Pack animals 2= Hired labor 3= Family labor 4= Cars 5= Others (Specify)

F10. Who are your potential customers for your produces?

1= Local Farmers 2= Local Merchants 3= Merchants from other areas 4= Others (Specify)

F11. How do you rate the performance of the trading business?

1= Outstanding profit 2= Satisfactory profit 3= little profit 4= No profit 5= Loss

F12. How do you compare trade and agriculture on the following parameters?

1= Trade preferable 2= Agriculture Preferable 3= Both are equally preferable

F13. Do you get any support from government and non-government institutions or any other agency specific to trade? 1=Yes 2=No

F14. If Yes, for Q F13, what specific supports have you received?

1= Credit 2= Training 3= Material Provisions 4= Financial Provisions 5= Others
(Specify)

G. Hired Work/Employment

G1. Do you or any member of your family engaged in any hired or employment activity? 1= Yes 2= No

G2. If yes for Q G1, How many of your family members are engaged in such income generating activities? _____.

G3. If no QG1 why?

1. Lack of knowledge/skill 2. Thinking as it has no profit 3. Lack of market 4. I have no interest 5. Lack of initial capital

G4. If Yes to G1, on what specific activities are you engaged and what income do you obtain?

G3	
Hired works	Income Obtained
	This Year
Daily laborer	
Guarding	
Cattle tending	
Farming	
Others	
Total	

G5. What are the potential problems you usually face in this occupation?

1= Low payment 2= Job insecurity 3= Unavailability of work 4= Others (Specify)

G6. Why did you get employed?

1= To supplement other HH income sources 2= Sole agent of livelihood 3= Others

(Specify)

H. Petty Works

H1. Do you or any member of your family engaged in selling of food, drinks, and fuel wood?

1= Yes 2= No

H2. If Yes to Q H1, How many of your family members are engaged in such income generating activities? _____

H3. If no to QH1 why?

1. Lack of knowledge/skill 2. Thinking as it has no profit 3. Lack of market 4. I have no interest 5. Lack of initial capital

H4. If Yes to H1, on what specific activities are you engaged and what income do you obtain?

H3	
Petty works	Income Obtained
	This Year
Food selling	
Drinks Selling	
Fuel selling	
Others	
Total	

H5. What are the potential problems you usually face in these works?

1= Lack of market 2= Lack of initial Capital 3= Lack of raw materials 4= Others (Specify)

H6. Why did you get involved in these activities?

1= To supplement farming 2= Sole agent of livelihood 3= Others (Specify)

I. Rent and Other Non- farm activities

I1. Does anyone in the family get income from rent or other non- farm activities? 1= Yes 0=

No

I2. If Yes to QI1, how many of your family members are engaged in such activities? _____

I3. If Yes to Q I1, please give the following details?

I3	
Income Source	Income Obtained
	This Year
Oxen renting	
Pack animal renting	
House renting	
Remittance	
Coal & Wood sell	
Grass & Hay sell	
Farm implements sell	
Tradition medicine sell	
Funeral service	
Church's	
Carpenter	
Traditional service 'equip'	
Edir	
Credit	
Other	
Total	

J. Production and Utilization of Income

J1. Have you sold or bought grain this year? 1= Yes 0= No

J2. If Yes, To Q J1 please indicate the amount and money streamed into the transaction?

J2				
Grain Type	Bought		Sold	
	Qty(Kg)	Exp(Birr)	Qty(Kg)	Exp(Birr)
Barely				
Wheat				
Teff				
Sorghum				
Maize				
Legumes				
Cash crops				
Vegetable/fruit				
Others				

Total				
--------------	--	--	--	--

J3. Please indicate your this year income from the following sources?

J3	
Income Source	Income Obtained
	This Year
Handcraft	
Trade/business employment	
Hired Laborer	
Renting	
Other non/off farm activities	
Petty works	
Agriculture	
Other	
Total	

J4. How did you spent your income from non- farm activities?

1= Food purchase 2= Business Expansion 3= Cloth & HH items 4= Social Affairs 5= Debt repayment 6= saving 7= Agricultural input purchase 8= others

J5. Out of the yearly total income the highest proportion comes from

1= Farm 2= Non/off farm 3= both the activities have equal income 4 =I don't know which is greater

J6. Please give details of your expenditure as per listed below!

J6	
Expenditure Items	Expenditure (Birr)
	This Year
Fertilizer	
Improved seed	
Pesticides	
Oxen	
Tax	
Church/Mosque	
Cloth & shoes	
Traditional welfare (edir)	
Traditional saving (equip)	
School fee	
Health	
Transport	
Coffee	
Kerosene	

Oil	
Soap	
Salt	
Spices	
Milling	
Relative assistance	
Recreation(drinks, chat etc)	
Others	
Total	

K. Accessibility

K1. How long does it take you access the main road from home? (Minute)_____

K2. How long does it take you to access to your district town?(Minute)_____

K3. Do you have a linkage or relation with your district town? 1=Yes 2=No

K4. Do you have access to multimedia to have an information? 1=Yes 2=No

K5. If yes to K4 what an instrument you are using to be connected to multimedia's?

1= Mobil 2=Radio 3=Television 4= others

L. Credit

L1. Do you borrow Money (Credit) this Year? 1= Yes 0 = No

L2. If Yes ,what is the amount in Birr?

Thank You Very Much for Your Cooperation!

