

Assessing Factors Affecting Income Diversification of Rural Households FagitaLokomaWoreda, Awi Zone, Ethiopia

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Abstract -This research was conducted on assessing factors that affect income diversification of rural households in FagitaLokoma district. Thus, the general objectives of the study was to examine factors that affect income diversification's of the rural household's and more Specifically; to analyze the factors that affect rural household's level of income diversification and to identify determinants of level of income diversification. Multistage sampling technique was used; and the samples of 50 households were interviewed. Both descriptive and econometric analysis was made so as to achieve the objectives. As far as the extent of income diversification is concerned, about 48% of the sample households were found to diversify income whereas the majority (52%) were not diversify their income. The major reason, among others, for this might be land size, fertility of land, sex of respondents, age of respondents, etc. The study has revealed that households with large land size were less in income diversification when compared with those households with small land size. Moreover, relatively old people were found to diversify their income more than young people. Similarly, male headed households have high tendency to diversify income when compared with female headed households. The result of Binary Logit Regression Model has shown that six variables have significantly affected income diversification. Thus, sex of the household heads and primary occupation has negatively affected income diversification whereas age, land fertility, land size, and market access have positively affected income diversification. As market is crucial and important criteria in order to diversify income so the government has given the special protection and control of the market activities. Government should empower women in non/off-farm activities because sex was significant variable. Rural household should improve fertility of the land by using organic and inorganic fertilizer.

Keywords: Income, Diversification, Rural household, Market, Binary logistic Regression

I. INTRODUCTION

1.1. Background of the study

Rural households in developing countries live in inherently risky environments. They suffer from various common and idiosyncratic shocks that make these households vulnerable to serious hardship. As Demmessie et al. (2001) examined risk related hardships faced by rural households in Ethiopia for the last 20 years and explained that climatic risks are the most common cause of shocks (78%). Many households also suffer from other common or idiosyncratic shocks such as policy shock (42% of households), labor problem (39%), oxen problem (35%), other livestock and land problems (17%) and other risks. These events and shocks may highly influence the actions and resource allocation decision of rural households.

Rural areas in developing countries are characterized by high price variability, poor infrastructure, low demand,

insufficient access to resource which, in turn, lead to market failure for certain products and factors of production (Dunn, 2005; Reardon, 2000; De January, 1997). For example, lack of financial resource (credit) may prevent households from expanding profitable income generating activity. Acute land constraint and absence of well operating land market may prevent households who possess particular skills or abundant labor from exploiting their comparative advantageous position. The study found out the sex (male), age of household head, family size, religion (orthodox), own account working, inset land, credit received, proximity to market and road positively affect the decision of involvement in off farm employment while getting married, education, cultivated land, coffee and chat production, fertilizer use and total cattle ownership, affect it negatively. The study indicated 58 percent of sample population involved in off farm employment and the rural

income generated from off farm sector account for 18.7 percent of the total. In Ethiopia, rural land holding of over 65 percent of farmers fell below 1 hectare and it is cultivated only once a year (Mulat and Teferi, 2004).

In such situations, households may allocate its underutilized resources to alternative accessible activity. In Ethiopia, the policy focus is to increase agricultural productivity and farm income so as to attain food self-sufficiency at national, regional and household levels. 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.

Hoozeveen (2001) and Murdoch (2006) also argue that most attractive non/off-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 labor another activities with low barriers and therefore generally poor returns.

Agriculture, the dominant sector of Ethiopian economy, is mainly characterized by rain fed, subsistence oriented, smallholder production system and traditional farming practices. The other factors related to poor agricultural performance are reduced soil fertility, unreliable climatic conditions, poor infrastructure, environmental degradation, and land scarcity have resulted in low crop yields and income variability, on the one hand and high population growth rate on the other. It is expected that the Diversification simplifies the flow of income of the households by combining activities which give returns at different time and by diversifying portfolio of economic activities that are not perfectly covariate (Barrette. al., 2000).

Households that engaged in different activities collect their income and wealth from diverse sources and assets. As income smoothening mechanism, income diversification plays an important role in smoothening consumptions when markets for full consumption insurance are absent (Murdoch, 2006).

1.2. Statement of the Problem

High-income risk is part of life in rural areas of developing countries. Seasonality of farming activity results in unemployment and underemployment for a significant proportion of the labor force during most part of the year. The level of unemployment/ underemployment in Ethiopia is estimated at 25 to 40 percent of the labor force (Mulat and Teferi, 2004).

In rural Ethiopia, where farming is the main means of livelihood, households tend to diversify their income

sources due to both push and pull factors. Rural households are usually engaged in multiple activities both within agriculture and across non-farming activities. Some households might depend exclusively on crop farming for their incomes. Some households might diversify their income source into wage employment, while others involve in mixed farming. Still others might try to exploit opportunities of rural non-farming activities in the densely populated area. A large proportion of rural dwellers have been affected from both chronic and transitory food insecurity in Ethiopia. This problem of food insecurity is more severe at local or regional level than at national level. For example, the position of Southern Nation, Nationalities and Peoples' Regional State (SNNPR) registered a poverty incidence estimate of (56%), a figure much more greater than the national average (45%) (FDRE, 2002)

Few studies attempted to examine the determinants of the level of income diversity. But these studies tried to conflate the different reasons for pursuing different income diversification strategies. In addition, to enhance the gain from rural income diversification, one has to identify the factors that smooth or hinder the capacity of rural households to undertake different activities that generate income from diverse sources. Although the motives to rural income diversification vary, one needs to consider the interaction of income diversification with rural income distribution and consumption issue.

1.3. Objectives

1.3.1. General Objectives

The main objective of the study is to examine the factors affecting rural household income diversification in study area.

1.3.2. Specific Objectives

- To assess the extent of the rural households the level of income diversification in study area and
- To identify determinants of the household's income diversification.
- 1.4. Research Question
- What are the extent of the rural households the level of income diversification?
- What are the determinants of the level of household income diversification?

1.5. Scope and limitation of the study

This study was undertaken in FagitaLokomaWoreda which is located in south west AmharaRegional State. The study was conducted in this area because of: limited time, financial matters, and more generally the area is proximal to the region.

It is difficult to get the relevant data due to lack of written materials related to secondary data about extent of diversification in this Woredas and as far as our knowledge research done in Woreda in diversification is limited. Time, budget, unavailability of reliable data,

analytical skill and others are limitations to identify the real level rural livelihood diversification.

1.6. Key Technical Terms used in Ethiopia

The following terms are being used in Ethiopia colloquially. This is to help the readers to know the meanings of terms explained in this article.

Belg: Long Rainy Season starts from February to June on every year

Birr: Ethiopian Currency

Dega: High Land topography with wet climatic conditions.

Development Agent: One who is disseminating the new technology and innovations to the model farmer and fellow Village farmers. There are many number of Development Agents according to their subject background are rendering services to Agriculture, Health, Livestock and Natural Resource Management for every Keble in Ethiopia.

Household: A household in Ethiopian case is understood that a household is an economic unit of agricultural production under single management comprising all livestock kept and all land used wholly or partly for agricultural production purposes, without regard to title, legal form or size

Livelihood Diversification: In this study, livelihood diversification refers to the attempts by households to construct diverse ways to raise incomes and reduce vulnerability to different livelihood shocks. That is, livelihoods diversification is defined comprehensively as the proportion of both on-farm and non/off-farm activities in households' income generating portfolios. Livelihood diversification can take place through both agricultural diversification i.e., production of multiple crops or high-value crops, livestock; and non-agricultural livelihood diversification i.e., undertaking small enterprises, or choosing nonagricultural sources of livelihood like casual labor or migration.

Idir: It is social customary Informal Financial Institutions in the Village which is helping the people on emergency situation like death ceremony, natural catastrophe like drought, flood situations.

Iqub: It is a traditional Informal economic Institution existing in both Urban and the Village serves to save cash. Equb will help the poor people while they are unable to buy clothing, food and household equipment's etc. The small group consists of 30 to 40 members in the society used to contribute 2 to 5 Birr weekly and each member collects a maximum of 300 Birr. It is one of the popular mutual support schemes, which is often formed by people affiliated to one another.

Kebele: means "Village" in Ethiopian language. The Kebele is the basic administrative unit of the Ethiopia Government.

Kert: Small plot of land

Kolla: Low land topography with dry climatic conditions are existing.

Mahber: It refers to a support union, which is usually formed on the basis of religious, ethnic, professional etc. affiliation whereby, members contribute some amount of money on a voluntary basis, which they will latter use for individual, group, or community support programs.

Meher: Short Rainy Season starts from July to September on every year.

Non-farm Income: The typical non-farm activities that are pursued by rural households in Ethiopia: non-farm rural salaried employment; non-farm rural self-employment.

On-farm Income: Income generated from one's own farming. Income derived from crop production and rearing and selling of animals.

Off-farm Income: The income from other than farms for wages or other arrangements such as sharecropping or the exchange of labor in-kind. Off-farm income is strictly defined as income generated from working outside one's own farm through participating in sloughing, weeding or harvesting on another farmer's land.

Smallholder Farmer: In Ethiopia, smallholder farmer meets the conventional meaning of small farms less than 2 hectares per household. They are known for their resource constraints like capital, inputs and technology; their heavy dependence on household labor; their subsistence orientation; and their exposure to risk such as reduced yields, crop failure and low prices.

Timid: Small area of the land refers.

Woreda: is called as "District"

Woynedega: Mid Highland topography with semi wet condition

II. LITERATURE REVIEW

1) Theoretical Literatures

Recent literature on rural livelihood and livelihood diversification is characterized by many terms and definitions. In this study the concept of income is defined as the opportunity set afforded to an individual or household by their asset endowments and their chosen allocation of those assets across various activities to generate a stream of benefits, most commonly measured as income (Barrett and Reardon, 2000).

This definition implies that the opportunity set of a household is formulated from access to assets and activities. It also shows the importance of the link between assets, resource allocation and activities in generating benefits. Income diversification can then be defined as the process by which households construct a diverse portfolio of activities and assets in order to survive and to improve their standard of living (Ellis, 2005). In this study livelihood diversification includes both on and off farm activities that are undertaken to generate additional income to that from annual crop production.

The term income diversification has been given wide varying definitions. Ellis (2005) distinguishes income diversification from livelihood diversification by defining

the former as the composition of household incomes at a given instant in time while livelihood diversification is considered as an active social process whereby households are observed to engage increasing intricate portfolios of activities overtime. Other studies also define income diversification as prevalence of different income sources in household income at a given time (Reardon *et al.*, 2000; Dunn, 2005; Barrett *et al.*, 2000; Tassew, 2000; Escobal, 2001).

However, these studies differ in measurement of income diversity and categorization of income sources. These differences in measurements of income diversity may be the sources for some contradicting results with respect to consequences of income diversification. Like Dunn (2005) and Valdivia *et al.*, (2005). The literature offers two contrasting view on livelihood diversification. While the first view takes livelihood diversification as positive strategy of adaptation, which can lead to accumulation, the other view considers it as a residual sector that offers no more than a bargain basement for distress (Start, 2001). Start (2001) further notes that the major distinctions between these strategies are based on the kind of technologies in use, size of capital, the motive and sectoral dynamism of the strategy. Two set of factors induce rural households to diversify their activities: Push factors and Pull factors. Push factors such as “risk and seasonality” are the two common reasons for rural farm households diversifying their activities outside agriculture as a means of dealing with agricultural risks and to smooth income and consumption (Ellis 2000; Barrett, Reardon and Webb, 2000). In an agricultural environment full of uncertainty, rural households aim at lower covariate risk between different household activities to smooth consumption (Valdivia *et al.*, 2005; Reardon 2000).

Pull factors on the other hand, 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; Valdivia *et al.*, 2005). 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).

Economic studies distinguish between several different categories of income sources in diverse income portfolios. Economic theory predicts that activities with high entry barriers offer high returns while those with low entry

constraints generate low returns. Such heterogeneity in returns surely account for some of variation in observed income diversification pattern (Barrett *et al.*, 2000).

The reasons for holding different income portfolios and livelihood diversification pattern are associated with labor market segmentation, barrier to entry, location and potential income growth (Reardon, 2000). Valdivia *et al.*, (2005) attribute these differences to existence of rural market failures (particularly in land and finance), differential market access, quality difference in factors of production, and differences in property rights and endowments of assets. Valdivia *et al.*, (2002) identify four distinct rural livelihood strategies offering different returns. Similarly, Dercon and Krishnan (2005) categorize several different rural household activities in to five different income portfolios based on level of entry barriers. This is the approach taken in this study. In this study, rural is any locality that exists primarily to serve agricultural hinterland. Data for this study is collected from farmers association, the lowest administrative unit of settled rural area. A rural household is then a household that lives in the countryside and involves both in farm and non-farm activities.

The term off farm business income refers to net income derived from non-farm self-employment while wage income is net income earned from both farm and non-farm wage employment. Farm income include income from crop production after deducting expenses on purchased inputs, imputed value of home in-kind consumption from own production and income from land rent and share cropping. Livestock income represents the sum of net income from livestock transaction, income from animal rent, sale of animal products and imputed value of home consumption from livestock products. Transfer (gift) includes pensions, remittance, food aid, other government and nongovernmental gift.

2) Empirical Literature on Determinants of Income Diversification

Chaplin *et al.*, (2012) examined non-agricultural diversification of farm households and corporate farms in Eastern and central European countries. To examine the effect of different factors on diversification decision, the finding of study showed that general education level and availability of public transport have positive and significant effect on diversification, while agricultural education, use of agricultural advice and extension, non-labor income, distance to public transport have a significant negative effect on off farm employment. With respect to impediments to enterprise diversifications, the study indicated that the major reasons were a desire to focus on farming, lack of capital or credit, insufficient knowledge and skills, and location characteristics.

The study recommended that improvement of education and providing vocational training may help to overcome the impediments, and provision of financial resources with loan guarantees and interest rate subsidies to enterprise start up. The study concluded that there is little

evidence that farmers will serve as driver of rural structural change due to small size of household farms, low level of farmers' education, and that diversification might be a feasible way out of vicious circle of fragmented farms, low productivity and poor profitability by improving the asset base and education of poorest farms.

In their review of broad theoretical and case studies in livelihood diversification, Hussein and Nelson (undated) pointed out that poor people have to diversify sources of livelihood in order to survive in risk prone and uncertain world and hence build up a wide portfolio of activities to provide flexibility among sources of income. They argued that different income portfolio held by households can be explained not by their behaviors toward risk but by the ability of household's access to the means required to pursue such activities such as skills, location, livestock ownership, access to capital and credit.

Classification of activities: Agriculture such as crop income, livestock income, forest products, fishing, etc. and Non-agriculture sector (Enterprise profits, Rents). These include diversifying income source, migrating, stocking up on various supplies, mortgaging or selling assets, sharecropping, borrowing and lending, drawing up on the various forms of social and family relationship, and participating in relief work. The study also summarized the constraints of livelihood diversification as: a low population, no urban center in proximity, market access, restriction on trade and movement, government policy that extract surplus, availability of infrastructure, labor availability, terms of trade, limited availability of education and skill training, shortage of time, norms and religions, lack of credit. Escobar(2001) showed that the pattern of income diversification between farm and non-farm activities is clearly linked to the assets or endowments of rural household. The study also noted that under the situation of imperfect or missing market, personal and institutional constraints can play an important role in determining participation in non-farm activities. The study further noted the critical role of household's wealth, private and public asset endowments, and regional characteristics in enhancing or hindering the profitability of household asset base.

Based on review of literature, Escobar(forthcoming) pointed out that the changes in composition of rural incomes varies with wealth when analyzed at the individual, household, or regional level, which is conditioned by credit constraints as well as access to infrastructure. Evidence also shows that rural households in developing countries earn more from own farming than other income sources. It is only in a few countries that the importance of nonfarm incomes is greater than own farm income. Escobar, 2001 indicated, from the survey of literature, that poverty can be explained by the differences in allocation of physical, financial, human and organizational assets, and the endowment of public goods

as well as the combination of public and private assets, which may enhance the chance of rural poor to diversify incomes. The income diversification in rural are constrained by different income related problems like insufficient land, cattle, farm capital, education and skills, credit, access to road and electricity.

Review of studies on non-farm income diversification and livelihood strategies in rural Africa by Reardon(2000) identified that skills and educational attainment, greater physical access to market, public services, ex ante endowment of financial capital and other assets (livestock, cash cropping, migration), family size and structure as key determinants of household participation in off farm business and non-farm earnings.

Winters (2009) analyzed household's assets, activities and income generation in Mexico. Ejido sector showed that a household's asset position has a significant effect on its participation in specific activities as well as on the level of income earned from those activities. This supports the argument that assets are important in determining the capacity of households to undertake certain activities.

3) Empirical Literature on Ethiopia

Adujna (2002) investigated the determinants of household diversification in rural Ethiopia. The results of the study show that for a representative household most demographic factors, except number of male adults and working adults, lower the number of family members engaged in farming. Similarly, for domestic work, except number of female adults and family size, most demographic factors lower number of household members participating in this activity. The results of the study also indicate that number of family members who can read and write, and agricultural risk factors promote households to engage in skilled professional activities and to send more kids to school. Empirical evidences also show that agricultural activities compete for family labor in trading, schooling and skilled professional activities and unobserved regional factors are the major determinants of schooling, trading, and skilled professional activities.

Cars well (2001) presents evidence from southern Ethiopia that non-farm and off farm activities are carried out by significant proportion of adults and makes an important contribution to livelihoods, showing high involvement of women, high cash income contribution to poorer household and high importance of laboring for others next to trading in highland where livelihood diversification have long history. Tassew (2000) carried out a survey of random sample of rural household to analyze on farm and off farm employment, the impact of income diversification on farm production and rural income distribution in Oromia region of Ethiopia. The study showed that a substantial proportion of farm household (81%) diversifies their income into off farm activities, which increases farm output directly by increasing their managerial skill and indirectly through purchase of farm inputs. Applying the survey data for

relevant variables to estimated results showed that 10% increase in off farm income lead to a 1.4% increase of net farm household income and to a 1.2% increase in farm output. And it also leads to a 10.2% and 1.3% increase in purchase of farm labor and variable capital farm inputs respectively. Carswell (2001) analyzed factors that influence the probability of involvement in off farm employment at household level and the impact of off farm employment on rural poverty alleviation in Amhara region. Further, it revealed that farm households who diversified their productive activities to off farm economy are found to be better off as compared to those who confined their operation to farm sector, implying the significant impact of off farm employment and income on poverty alleviation and full time off farm operators are the members of the worst poverty ridden groups.

Dercon and Krishnan (2005) analyzed the determinants of occupation diversification of households using survey data from rural Ethiopia and Tanzania. They argued that different income portfolio held by households cannot be explained by their behaviors towards risk rather better explained by differences in ability of household to adopt more profitable diversification strategies which depend on access to the means required to pursue such activities such as skill, location, livestock ownership, access to capital and credit. The regression result of multinomial logit for five categories of occupations showed that, after controlling for the effects of location, entering into high return activities is determined by investment in particular skills or access to capital. The study also found that the availability of higher male labor and larger farm size allow households to take up high return activity such as cattle rearing. The study identified demographic and economic factors as the major determinants of occupation diversification.

Mulat and Teferi (2004) investigated the role, scope, and link between farm and non-farm activities in North Shoa of Ethiopia. Based on primary sample survey data from three districts from North Shoa the study found that farmers are engaged in various off farm economic activities in order to maintain their subsistence income levels. The study pointed out that even if the non-farm activities viewed as the survival strategies rather than as remunerative sources of livelihood, it accounted for 59.5 percent of total annual cash income of the farm household. After pinpointing the nature and characteristics of both crop production, resource use, livestock sector and non-farm activities in detail in the study area, the study identified that the major determinants of involvement in non-farm activities and non-farm income include low demand for food & services of these activities, primitive technology, shortage of raw materials, lack of skills and training and lack of access to credit, and low and declining levels of rural income. Furthermore, they forwarded recommendation to overcome the problems constraining non-farm

employment in the area, emphasizing on macroeconomic policies that favors the growth of rural income, on promotional effort to remove demand constraints on livestock production such as dairy and wool production, and on conservation and forestry program.

They attribute the probability of participation in the nonfarm activities to our broad groups: personal attributes, farm income, food balance and land endowment. The ratio of non-farm income to income (cash) is defined as explanatory (dependent) variable. The regression results show that livestock revenue, yield, land-holding size, food balance (food sale less purchase) and age showed significant role while the effect of sex, crop revenue, family size, education, have become insignificant on generating off farm income.

Kindness (2003) examined proportions of cash income from different sources, constraints to income generation and its geographic, time and household variation in Wolaita, South Ethiopia. Analyzing the survey data from three different agro-climatic sites and wealth based household groups, the study showed that small land holdings, high population density, and small number of livestock forced a large number of farmers to diversify their income sources and non-farm income sources (petty trading, trading activities, and craft activities) contribute a large proportion of annual cash income for households in all wealth categories and particularly during bad cropping year. Tassew (2000) found that, by decomposing total rural household income in Ethiopia into various sources, livestock and off farm wage incomes reduce rural inequality. However, further decomposition of wage income into various categories arrived at mixed results. The further decomposition results reveal that while non-farm wage, self-employment income and non-labor incomes have non-equalizing effects, incomes from food for work reduces income inequality. The study noted that the marginal effect on income in equality is higher for non-labor income than for non-farm wage and self-employment income. He attributes the reasons for dis-equalizing effect of non-farm income to existence of an entry barrier (capital and skill requirement) for the poor and availability of transaction cost of searching jobs and rationing in the labor markets. In contrast to Adams (2004) findings in rural Pakistan, unskilled nonfarm wage work increases income inequality, due to very high transaction costs in searching for jobs.

III. METHODOLOGY

1. Description of the study area

Geographically the study area was located at Chigoli, and Aykelta Kebeles in Fageta Lokoma Woreda in Awi Zone of Amhara Regional state. Fageta Lokoma Woreda is located at 11°04'30"-11°05' latitude and 36°52'-36°54' longitudes. Its capital town Addis Kedam is one of 8 Woredas in Awi zone located approximately 101KM southwest of Bahir Dar, the capital city of Amhara National Regional state

and about 446km northwest of Addis Ababa. The woreda is bordered by Dangila Woreda on the North, Sekela Woreda on the south, and Guanga Woreda on the west.

Climatic conditions in the highlands of Ethiopia are generally a result of differences in altitude. Climatic conditions in Fageta Lokoma Woreda, Awi zone are divided into three agro-climatic zones: Dega (16%), Weynedega (84%), and Kolla. Altitude ranges from 2000-3200 masl. Average Annual rainfall is 2379mm with a unimodal rainy season. The rainy season for the area is from June- end of September. Temperature varies between the mean annual maximum of 25 degree centigrade and mean annual minimum of 11 degree centigrade across the elevation gradient. Fageta Lokoma Woreda has 25 Kebeles and a population is mainly rural (95.4%). Economic activity of the area: is mixed farming system (animal husbandry and crop production activity) that can grow different crops but largely the farmers adopt cereal crops like; maize, sorghum, teff and wheat.

2. Research Design

The selected design to conduct this research was cross sectional research design. The researcher did not use longitudinal method due to shortage of time that means longitudinal method take more time and need many sample size but cross sectional method take less time and we are also ask and pass system of data collection method. This research depends on identifying determinants of income diversification of rural household through interviewing purposefully.

3. Types and source of data

The researcher was used both qualitative (to appraise the believe and perception of the income diversification participants of rural household regard to the importance of participation in diversification, and the improvement it brought in their livelihood) and Quantitative data to measure the relationship between dependent variable (income diversification) and each explanatory variable (market access, farm size, distance from house-road, age, sex, education, credit, family size and household size) that were considered in the study. For this study, both primary and secondary source of data were used. The primary data were collected from the sample of rural household that participate in income diversification (sample respondent). Secondary source of data were collected from the rural household office Woreda, documents, previous reports, and desk research.

3.4. Sampling technique and sample size

Multistage sampling technique was used for this study. In the first stage, Awi zone and Fageta Lokoma Woreda were selected purposively based on prior knowledge of the researcher about the area regarding income diversification. In the second stage two kebeles were randomly selected from Fageta Lokoma Woreda, out of the 25 Kebeles because a population was homogeneous. In the third stage 50 households were

selected out of 1580 households in the two Kebele by using Probability Proportional to Sample size (PPS) sampling techniques. So proportionally from Aykalta Kebele 26 out of 830 and from Chigoli Kebele 24 out of 750 household was selected.

Table: 1. Sample size Determination

Selected Kebeles	Target Population	Sample size
Chigoli	750	24
Aykalta	830	26
Total	1580	50

The sample size was determined using the simplified formula developed by Yemane (1967) at 90% confidence level.

$$n = N / 1 + N(e)^2$$

$$n = 1580 / 1 + 1580(0.1)^2 = 94$$

Where; N = target population

e = significance level

5. Method of data collection

Primary data

Informal survey was conducted first to understand the general situation of the area; which turn facilitates the further formal survey. Then formal survey was conducted to gather data formally through interview schedule method that would be filled out through face to face of respondents. The formal helps to gather qualitative data through contacting participants of the study area, through group discussion, types of activities of the people in the study area, their behavior etc.

Secondary data were gathered through reviewing, examining of documents, reports and records of published and unpublished documents.

6. Methods of Data Analysis

For this study both descriptive and econometric analysis were employed.

6.1. Descriptive Analysis

The descriptive parts of the data analysis were explaining and describing of the determinants of rural household income diversifications in terms of: percentages, mean, standard deviation, cross tabulation, chi-square, one sample t-test, minimum, maximum and using of other different testing methods.

6.2. Econometric Analysis

The Dependent Variable in this study is income diversification, which is dichotomous taking on two values, one if the household head is participate in off/non-farming activities and zero otherwise. Estimation of this type of relationship requires the use of qualitative response models.

In this regard, the non-linear probability models, Logit and Probit are the possible alternatives. The ordinary least square regression, when the dependent variable is binary, produces parameter estimates that are inefficient. Consequently, hypothesis testing and construction of confidence interval become inaccurate and misleading. To alleviate these problems and produce relevant empirical

outcomes, the most widely used qualitative response models are the Logit and Probit models. Hence, binary logit model was employed to identify determinants of household income diversification and different socio-economic and demographic factors were considered as independent variable.

6.2.1. Specification of the Logit Model

This study was intended to identify the determinants of households' participation into non/off-farm activities by using Binary Logistic Regression Model with a particular interest to explore factors influencing households' participation between varying income diversifying activities. This study was analyzing factors contributing variations in participating households' income. To this effect, Logit model was used to understand why some households are able to derive better/lower income from specific non/off-farm activities than others.

The characteristics of Binary non/off-farm activities in this study area were explored by using the Logit model can be specified as follows:

$$y = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8 + \dots + \beta_{13} x_{13} + \varepsilon_i$$

Where; Y = Income Diversification, [Dependent Variable]

Y=1, if farmers Diversify Income in non/off farm activities,

Y=0, if farmers Not diversify Income

X1=Sex of household,

X2=Age,

X3=Family Size,

X4=Education,

X5= Primary Occupation,

X6= Access to formal Credit,

X7= Distance from main road,

X8= Land size,

X9= Fertility of the Land,

X10=Total Livestock,

X11= Irrigation use,

X12= Extension Contact,

X13= Market Access.

β =is a parameter vector to be estimated

ε =is the random disturbance terms

α =constant

7. Definition and working hypothesis of Variables

Dependent Variable

The dependent variable for this study is income diversification. It is hypothesized to consist of the following component.

Independent Variables

Income diversification is a function of the following independent variable (access to market information, age, sex, education level, land size, irrigation use, fertility of the land, access to formal credit, family size, and distance from house road, etc.

- **Age:** is a Continuous variable and one determinant factor for income diversification since old age individuals did not participate in farm and non-farm income generating activities. In the contrary those individuals who are young and adult can participate in income generating and have an opportunity to diversify their income. Which is positive effect and insignificant.
- **Sex:** is a Dummy variable (0, if respondent is female, 1 if male) that determine the income diversification level of rural households and most of the female households not participate in on farm activities. This is negative effect and significant effect on income diversification in Northern Ethiopia.
- **Distance from house-road (DNMR):** it is one of the Continuous variables and the farness or nearness of distance that the home of the household takes from the road in terms of Kilometer that it takes to reach. Farmers nearest to main road diversify income more than long distance, which is negative effect and a better physical access to roads increases non-farm earnings. Thus, we include the distance from the homestead to the next tarmac road in our econometric models.
- **Market access (MKTA):** It is a Dummy variable linked to transport accessibility, and ability to sell farm products in the market were positive and significant determinants of income diversification. Farmers that wearable to sell their farm products had significantly more diversified income sources implying that they were better able to access market opportunities and to engage in non-farm activities.
- **Land size (LANS):** is one of the Continuous variables and measured in hectare. Households with larger farm sizes were more likely to have diversified sources of income. As an indicator of wealth, the larger farm size suggests that wealthier households were more likely to have higher income sources of diversification. Barrett, Reardon and Webb (2000) indicate that there is a positive relationship between the share of rural household income obtained from non-farm sources and the size of land holdings, indicating the presence of entry barriers into high income nonfarm activities for those households that lack such assets, which is significant.
- **Education (EDUSTU):** it is one of the Categorical variables and measured in years of schooling. Education of household highly affects the ability of individuals to diversify their income. This is positive effect on income diversification.
- **Access to formal credit (ATFCR):** it is one of the Dummy variable and positive impacts on the share of non-agricultural income. Households that received a formal loan may diversify their income more out of the agricultural sector. Credit enables households to change their physical capital stock within a short time to take advantage of income opportunities outside agriculture. The basic constraint in deriving income from non-agricultural sources is the stock in physical capital and

the ability to borrow money.(Dimova *et al.*, 2010) in Tanzania.

- Family size (FSIZE): is the number of one house hold members that determine income diversification. Poor family with large number of individuals is more vulnerable to poverty and less participates to diversify their income. This is negative effect and insignificant on income diversification.
- Availability of irrigated land (AIRL): the result of the regression result shows that households with irrigated land diversify their income less than those households does not have any irrigated land. The coefficient of availability of irrigated land also insignificant and negative effect.
- Fertility of the land (FERTL): Qualities of land were found significant and positive influence on the level of income diversification but the coefficient is not statistically different from zero. Farm households having fertile of land, farm can produce more and increase their total income which will be invested in different income generating activities.
- Livestock holding (LIVH):this is Continuous variable and a number of livestock owned by the household. In line with our expectation, livestock holding were found positive impact on the level household income diversification. For one unit increase in the value of livestock, between individual and overtime, level of income diversification of households increased by 0.25 unit which not strong enough.
- Primary occupation of the household head (POCCH):this is Categorical variable and has negative effect on income diversification. we found farm households mainly engaged in primary occupation or where agricultural sector is their livelihood less likely diversify the income their income compared to other occupation.
- Extension contact (EXTENC): This is a Dummy variable which measures visiting of rural household by extension agents. This is important and positive effect on income diversification.

IV. RESULT AND DISCUSSION

This chapter deals with the findings, descriptive statistics and econometric models, on level of income diversification in Fagita Lokoma Woreda.

1. The extent of Household Income Diversification

1.1. Demographic Characteristics

This section discusses the demographic characteristics of the sample households in the study area such as sex, age, education level and family size. As we conducted our research work, the rural households of the Kebele, engage in different economic activities to diversify their income due to small land holdings and the fundamental requirements needed at household levels. Most of them are peoples who get their income from diverse source which include; self-employment, wage employment,

share cropping, land renting, production of cash crops to invest on livestock rearing and production. On the other hand, different factors influence the income diversification of the rural households in study area.

Table:2 Demographic Factors.

NB: **=significant at 5% level of significance, numbers in parenthesis indicate percentage out of total.

Source: "Own survey, 2011E.C"

Factors		Income Diversification		X ² /T-value
		Diversify(N=24)	Do not Diversify(N=26)	
Sex(Num ber)	Male	21(42%)	25(50%)	
	Female	3(6%)	1(2%)	0.053*
Age(Years)	[25-42]	9(18%)	15(30%)	
	[43-54]	15(30%)	11(22%)	46.69*
	Mean=42.14		Min=25Maxi=54	
Family size	[2-5]	20(40%)	19(38%)	
	[6-10]	4(8%)	7(14%)	0.418
Education	Mean= 4.84Min=2		Max=10\	
	Illiterate	1(2%)	3(6%)	
	Read and write	14(28%)	13(26%)	
	Primary school	6(12%)	3(6%)	
	Secondary	3(6%)	7(14%)	0.10

1.1.1. Sex and age of household

Normally the head of the household is responsible for the co-ordination of the household activities. As such it is pertinent to include some attributes such as sex and age of the head in the specification of participation in income diversification. About 92% (out of total) were male headed and the remaining 8%(out of total) were female headed. As shown in (Table 4.1) 42% of household male headed diversify income and 6%(out of total) of female headed households. Moreover, 75% of the total female populations were found to diversify their income. However, it is difficult to conclude that female headed households have higher tendency to diversify income than male headed households since the former population is relatively fewer in the study than the latter population. Hence, in the study area males diversify their income more than female headed. It is significant and important at 5% significance level with chi-square value 0.053. This implies the probability of the female headed more diversify their income than male headed.

The age of the household is considered a crucial factor, since it determines whether the household benefits from the experience of older person, or has to base its decisions on the risk-taking attitude of a younger farmer. As shown in (Table 4.1), the age of respondent ranges from 25 to 54 with mean of 42.14 and standard deviation of 6.382. When the age increases the probability of income diversification also increases. The household with age group (25-42) less diversify their income than the age group (43-54), which is 18% and 30% respectively. Age was significant with t value 46.69 at 5% significance level.

1.1.2. Family size and Education level of household

From 50 sampled households the average family size was 4.84 with a minimum of 2 and maximum of 10. It is one of the continuous variables that affect household income diversification. The household with family number between (2-5) diversify their income more than the family group (6-10). It has chi-square value 0.1 as shown in (Table-4.1).

Another attribute of importance is the level of education attained by the heads of the household, who normally are the decision-makers. Education also enables the person with ability to do basic communications for business purpose. From all household heads 8% were found to be illiterate, 54% can read and write, 18% attained primary school and the rest 20% was found to be in secondary school. The household that can be read and write and primary education level diversify more than illiterate, which is 28% and 12% respectively with chi-square value 0.33.

1.2. Socioeconomic characteristics

The farm characteristics of household like primary occupation, land size, total livestock population, irrigation use, and fertility of the land affect income source of household.

Table-3 Socioeconomic Characteristics of households.

Factors		Income Diversification		X ² /T-value
		Diversify (N=24)	Do not Diversify (N=26)	
Primary occupation	Farming activity	21(42)	23(46)	
	Non farming	3(6)	3(6)	0.001***
Land size	[0.25-1.5]	16(32)	13(26)	
	[1.6-3]	8(16)	13(26)	13.32***
	Fertile	2(4)	3(6)	
Use of Irrigation	Moderate	4(8)	10(20)	
	Not fertile	18(36)	13(26)	1.197
	Yes	11(22)	16(32)	0.021
Number of livestock	No	13(26)	10(20)	
	[0-18]	11(22)	13(26)	
	[19-50]	13(26)	13(26)	10.113

NB: *** and **=significant at 1% and 5% level of significance, numbers in parenthesis indicate percentage out of total.

Source; Owen their survey result, 2019

1.2.1. Primary Occupations of household

The household with primary occupation farming were less probable to diversify their income which is 46% were not diversify than 6% of non/off farming activities.

1.2.2. Land holding and total Livestock Production

On this study, the average land sizes for households were 1.375 hectare. About 60% of farmers from sample had land that ranges between 1 to 2 hectare and 6% of the households have an area above 2 hectare of land. In this study area farmers try to get access to land for production of crop and livestock through renting. The household having the low land(0.25-1.5) diversify their income more than large hectare of land. The household having many livestock diversify their income more than those having low livestock number. From the survey result the minimum livestock holding was 0 and maximum 50 livestock with standard deviation 13.368 and mean 17.76. It is significant with t value

Source: survey result 2019

1.2.3. Availability of Irrigated land and fertility of the land

From 50 selected households, 46% of people's are use irrigation for farming activities and remaining 54% of people's were not use irrigation for cultivation. Irrigation users get income two times per year and were not participate in off-farm activities. In the table 6 below the household that uses irrigation were less diversifies their income than that does not use irrigation. It is significant at 5% significance level. Another the most important factor that affect the income of the household is fertility of the land. In study area 10% of the households land is fertile, 22% moderate and 68% were not fertile. The household who owned fertile land was get high income and were not participate in off-farming activity. But the household who owned not-fertile land was diversify income from off-farming activity.

1.3. Access to Service

Table-4 Access to Service.

Factors		Income Diversification		X ² /T-value
		Diversify(N=24)	Do not Diversify(N=26)	
Distance to the market	[1-8]	12(24)	11(22)	0.417
	[9-15]	12(24)	15(30)	
Extension contact	Yes	20(40)	24(48)	0.76
	No	4(8)	2(4)	
Access to formal Credit	Yes	7(14)	10(20)	0.36
	No	17(34)	16(32)	
Access to market information	Yes	19(38)	21(42)	0.092*
	No	5(10)	5(10)	

NB: **=significant at 5% level of significance, numbers in parenthesis indicate percentage out of total.

Source: "Owen survey, 2019

1.3.1. Distance nearest to main road and Extension contact

In the study area, households travel a maximum of 15km and a minimum of 1km to reach the nearest market center (Woreda capital Addiskidam). The average distance needed for farmer to travel to the market was about 8.42km per trip with standard deviation 4.408. The distance to the local extension office (developmental center) is an important factor since the interaction of the farmers with the extension office is crucial in making information available.

In this survey, the result 88% of the household head contact with extension service. The extension contact is important to get advice from extension agents to apply improved technologies. The household that get extension contact and diversify income from off-farm income were 40%. The household that get extension contact less diversify than other.

1.3.2. Credit availability and Market Information

The survey result indicated that about 34% of sampled household need credit but the majority of them did not take credit both on-cash and in-kind to purchase inputs like, fertilizer (Dap and Urea), seed, chemicals and sprayer. This is because fearing of interest rate and defaulters (to make grouping as means of collateral). The access to credit could be one of the causes of the changes due to the probability of the income diversification increase.

The distribution of market information refers to the availability of relevant market information to the farmers, about demand, supply and price of the crops. The survey result indicates that 80% of the households had market information before they sale their produce to the nearby market but 20% of the interviewed farmers do not have access to any information.

1.4. Level of Income Diversification in study area

As we have ensured in our research activity farmers in study area was diversify their income both in off farm/nonfarm activities. 48% of the farmers were diversified their income in off farm/nonfarm activities. Those who diversify their income by off farm activities; they diversify their income by doing farm activities plus off farm activities including livestock, chicken rearing, and other off farm activities selling of their products. Other farmers diversify their income by doing nonfarm activities including small trading activities, like weaving, in construction working, sewing cloth or tailor work and tell selling. The households who are engaged only one activity either off farm/nonfarm activity or on farm activity were almost 52%.

2. Determinants of income diversification

2.1. Econometric analysis

Income diversification is affected by different variables weather positively or negatively in significance or insignificance econometric analysis. Based on the following econometric equation we can select those factors that affect the income diversification of households significantly. The result of binary logit model was presented in (Table4.4), and discussed accordingly.

Table: 5 Binary Logistic Regression Model result of variables.

Factors	B	S.E.	Wal d	D f	Sig.	Exp (B)
Sex	1.55 7	1.88 7	.681	1	.053	.211 **
Age	.138	.083	2.75 5	1	.097	.871 **
Education	2.91 1	1.77 1	2.70 2	1	.100	.054
Family size	.285	.352	.657	1	.418	1.33 0
Primary occupation	-.513	1.43 8	.127	1	.001	.599 ***
Access to Formal Credit	.870	.951	.837	1	.360	2.38 7
Distance from Main Road	-.102	.125	.659	1	.417	.903
Land size	-.089	.793	.013	1	.008	1.09 3** *
Fertility of the land	2.55 7	1.37 2	3.47 1	1	.062	12.8 95*
Total Livestock hold	.031	.050	.372	1	.542	.970
Irrigation use	.071	1.38 8	.003	1	.959	1.07 4
Extension contact	.476	1.56 9	.092	1	.762	1.61 0
Market access	2.90 4	1.72 2	2.84 5	1	.092	.055 *
Constant	10.9 11	7.31 5	2.22 5	1	.136	547 49.0 17

NB: ***, **, *, represent significant at 1%, 5%, 10% level of significance respectively, on income diversification.

Source; survey result 2019

Binary logistic model interpretation

- **Education:**When education level changes from illiterate to other the probability of income diversification would be increased by 0.054 percent. Education of household highly affects the ability of individuals to diversify their income. Households those having primary education, secondary education, and other education diversify their income greater than as compared to household head those households without any level of education..

- **Availability of irrigated land (AIRL):**The use of irrigation changes the probability of the income diversification would be increased by 1.074 percent. The result of the regression result shows that household with irrigated land diversifies their income more than those households do not have any irrigated land.
- **Livestock holding (LH):**As livestock holding increases, the probability of income diversification increased by 0.97 percent.
- **Extension contact (EXTENS):** The household that get extension contact diversify their income at 1.16 percent than that does not get extension service.This is a dummy variable which measures visiting of rural household by extension agents.
- **Family size (FAS):** The number of family increases by one unit the income diversification was increased by 1.33 percent. It is the number of one household member that determines income diversification.
- **Access to formal credit (ACFC):**The household that had access to credit were diversifying their income at 2.387 units than that does not get formal credit.
- **Distance from main road (DFMR):** as distance from main road increases by one kilometer the probability of the households income diversification was decreased by 0.903 percent. This implies distance nearest to market centre diversify more.

2.2 The Most Significant Factors Which Affect Household income diversification

In order to identify the most determinant variables in this study, an attempt had been made by using Binary logistic model. Then, the most significant variables were as follows:

- **Sex:** When sex changes from male to female the probability of the income diversification were decreased by 0.211 percent. This implies that male headed more diversify than female. And, the reason might be gender inequality with in society. Thus, sex has a significant effect up on income diversification since it is significant at 5% level of significance.
- **Age:** when the age of household increases by one year the probability of the income diversification was increased by 0.87 percent. This implies that young aged less diversify than old aged. And the reason might be as age increases experience increases. Thus, age has significant up on income diversification since it is significant at 5% level of significance.
- **Fertility of the land:**when the fertility of the land changes from fertile to not-fertile the probability of the household income diversification was increased by 12.895 percent. This implies the household having fertile land less diversify than not fertile land. And the reason might be household with fertile land depend only one farming activity (crop production).Thus, fertility of the land has a significant effect up on

income diversification since it is significant at 10% level of significance.

- **Primary occupation of the household head:** when primary occupation changes from off/non-farm activity the probability of the income diversification were decreased by 0.599 percent. This implies household with primary occupation farming were less diversify than other. And the reason might be off/non-farm activity requires skill and knowledge. Thus, primary occupation has a significant effect up on income diversification since it is significant at 1% level of significance.
- **Land size:** As land size increased by one hectare the probability of the income diversification was decreased by 1.093 percent. This implies that the larger farm size less diversify their income. And, the reason might be the household having large land size depend only one activity which is crop production in study area. Thus, land size has a significant effect up on income diversification since it is significant at 1% level of significance.
- **Market access:** As market access increases the probability of household income diversification was increased by 0.055 percent. This implies that access to market increases income diversification. And the reason might be the household that get market information timely were know price of commodity and supply. Thus, market access has a significant effect up on income diversification since it is significant at 10% level of significance.

V. CONCLUSION AND RECOMMENDATIONS

Conclusion

From the survey result as we have discussed in chapter four, we conclude that the income diversification is the first and foremost important activity that brings change in income. Market access, fertility of the land, and age play dominant role on the income diversification which was significant and positive effect in study area. Others such as Sex, land size and primary occupation were significant and negative effect on Income diversification.

Life is a full of competition which brings people start to diversify their income and go far away from on farm activities. Both push (risk and seasonality) and pull (opportunities) factors are forced the peoples to diversify their income. Due to these factors the peoples involved or start to choose the other alternatives. Nonfarm activities play the dominant role which may be self-employment or wage employment in the income of the respondents.

Land size is one of the continuous and significant variables at 10% significance level that determine

income diversification. As we have seen, the probability of the household with large hectares can less participate in different activities.

The presence of nearest regular local market access has significant positive effect on level of income diversification for farm-easy off farm strategy. This implies that frequent local market facilitates transaction between supplier and demanders through development of petty trade.

Sex of household was negative and significant at 5% level of significance this implies that male were less in income diversification when compared with females.

Age was positive and significant at 1% significance level. This implies that Young aged household was less diversifies their income than old aged households. When age increases the probability of the income diversification was increased by 0.871 percent.

Fertility of the land was significant and positive effect on income diversification. This implies the fertility of the land changes from fertile to not-fertile the probability of the income diversification increases at 12.895 percent.

Primary occupation of household was significant and negative effect on income diversification. This implies if the primary occupation were farming the probability of the income diversification were less.

Recommendations

- According the findings of the research, the study suggests that rural households should be given access to market and main infrastructures such as roads, transport access, storage facilities and communication.
- Access to market has a positive and significant relationship with the probability of income diversification. The study suggests that market facilities and active market actors should be available in the market. As market is crucial and important criteria in order to diversify income so the government should be given the special protection and control of the market activities.
- Although the evidence suggests that aged individuals have more probability to diversify their income. Young and adults should be promoted and motivated in order to develop their potentials and the ability to diversify their income by giving them access to resources, credit, education, training, etc. so the government should have to provide them financial, economic and material supports to diversify their income and create diverse income sources in the Kebele.
- The study also suggests that the land size have a significant and negative effect on the income diversification so the households should be diversify

their income on small sizes of land by using improved inputs, and adoption of modern technology.

- Household should be improving the fertility of the land by using organic and inorganic fertilizer.
- Sex was significant and negative effect on income diversification, so Government should be empowerment of women's participation in off/non-farm activities.
- **Access to infrastructure:** the government and other non-governmental organizations should fulfil the basic infrastructure like; road, electricity; water access of households and extending of saving and credit institution in order to improve their income and majorly to motivate their saving patterns.
- **Improve the educational status of the households:** governmental agencies should provide maximum level educational awareness, based on how to overcome the attitudinal change of households. And the government should also extend the educational facilities among the communities in the study area.
- **Improving Income:** in order to improve income capacity the government should subsidize the price of input and support the price of output.

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