

Determinants of Rural Livelihood Diversification: The Case of Rural Households in Lemmo District, Hadiyya Zone of Southern Ethiopia

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Abstract

The purpose of this study was to explore the determinants of rural livelihood diversification activities of the rural household in the Lemmo District, Hadiyya Zone of Southern Ethiopia. Data was gathered by household survey from 131 sample households of 4 randomly selected rural kebeles of the District through structural questionnaires. The alternative livelihood strategies that were used by the study households were agriculture only, agriculture plus off-farm, agriculture plus non-farm, and agriculture plus off-farm plus non-farm activities. Multinomial Logit model was employed in identifying the determinants of rural livelihood diversification strategies. From 12 hypothesized explanatory variables, seven variables were found to have significant effect in determining diversification of household livelihood sources. Accordingly, total family size, household head education, frequency of development agents' visit, access to credit service and remittance receiving have positive and significant effect on diversification livelihood activities. However, total land holding and dependent family size have negative and significant correlation with diversification livelihood sources. Therefore, the findings of this imply that rural households' development policies should consider off-farm and non-farm livelihood activities in addition to agriculture.

Keywords: Rural Livelihood, Diversification, Determinants, Multinomial Logit Model, Southern Ethiopia

1. Introduction

Non-farm earnings account for a considerable share of farm household income in rural Africa regions. Most of the papers in this special issue confirm widespread reliance on non-farm income sources by African farm households (Reardon, 1997; Reardon *et al.*, 1998). According to Barrett *et al.*, (2001), in this regard, the logical question is that why do households diversify? Farm household diversification into non-farm activities emerges naturally from diminishing or time-varying returns to labor or land, from market failures (example for credit) or frictions, from risk management, and from coping with adverse shocks. Where returns to productive assets vary across time (land, labor or livestock across dry and wet seasons) or among individuals within a household or households within a community, data aggregated across time, individuals, or households will exhibit diverse assets, activities and incomes even if there is complete specialization according to comparative advantage. Such aggregation likely accounts for a substantial proportion of the diversification reported in empirical studies (Barrett *et al.*, 2001).

On the other hand, economies of scale tend to favor specialization. However, Barrett *et al.*, (2001), indicated that most empirical studies of African agriculture find no significant economies of scale beyond a very small farm size, attributable in large part to the absence of sophisticated water control or mechanization. In this setting, there is little pressure to concentrate production in a single crop.

Amare and Belaineh, (2013), in Ethiopia at a national, regional and household levels the focus of policy is to increase agricultural productivity and farm income so as to attain food self sufficiency. Although, 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 or non-farm employment. In spite of this fact, farmers are engaged in a variety of off and/or non-farm activities to diversify their income with a view to feed and sustain themselves during crop failures. Moreover, the contribution made by livelihood diversification to rural livelihoods is significant and has often been ignored by policy makers who have chosen to focus their activities on agriculture (Ellis, 1998).

1.1. Statement of the Problem

In 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, the available empirical evidences indicate that there is a wide difference between results concerning the share of non/off-farm income in total household income in Ethiopia. Barrett and Reardon (2000), the non/off-farm contribution in 1989/90 for rural income in Ethiopia was on averaged about 36%. In contrast, it was found that non/off-farm share of total income in rural Ethiopia was about 20% (Reardon *et al.*, 2005).

In line with this, in the field of the study there are few studies conducted at different region. Kejela *et al.*, (2005), carried out research on livelihood diversification in Borana pastoral communities of Ethiopia-prospects and challenges. However, the focus of their work was on the strategies of improving sustainable livelihoods and reducing vulnerability to disasters of the pastoral communities in Ethiopia. Demissie (2003) conducted research on the determinants and impacts of income diversification at the regional level of SNNPR, which was not at specific area and agro-ecology. On top of this, most of the available studies give emphases on the role of livelihood diversification rather than its determinants and lacks econometric investigation. Moreover, the determinants of livelihood diversification decision can vary from one local area to another and/or community to community. Also, there was no study conducted in this area concerning the question of what were the determinants of their livelihood diversification activities by study households. Therefore, the objective of this was to (1) investigate the determinants of household livelihood diversification in Lemmo District.

2. Methodology

2.1. Description of the Study Area

Lemmo District is one of the ten Districts found in Hadiya Zone of South Nations Nationality Regional (SNNPR) State. Geographically, the District is located between 7° 23'02" to 7°56'00" Latitude North and 37°50'00" to 38°07'00" Longitude East. Moreover, the District is characterized by highland feature, similar socio-economy base and agro-ecology zone among the rural Kebeles (HZFDMD, 2011). The population density is estimated to be 426 persons per square kilometer. Of these peoples only 7% of the total population of the District is urban dwellers and 93% rural dwellers (CSA, 2009).

2.2. Methods of Data Collection

Both quantitative and qualitative data was collected from primary and secondary data sources to attain the stated objectives of the study. Data from primary source was collected using structured interview questionnaires and key informant interviews.. Finally, primary data was supplemented with secondary data in order to bridge information gap from primary sources. Secondary data used for this study was collected from published and unpublished materials.

2.3. Sampling Technique and Sample Size

A multi-stage sampling technique was used to select the sampling households. Accordingly, first the District was determined purposely based on the engagement of the households on the diversified rural livelihood activities. Next, four rural kebeles were selected randomly from the total of thirty three rural kebeles of the District. At the third stage, from the selected rural kebeles sample households was determined by using the sampling techniques method of (Cochran, 1977). Following this, about 131 sample households were taken as sample for the household survey residing in four rural kebeles. Lastly, representative samples were selected randomly from sampled kebeles based on proportional to sample size.

2.4. Data Analysis

Descriptive statistics and Econometric model were used to analyze the data. Specifically Multinomial Logit model was employed in analyzing the determinants of rural livelihood diversification. **Stata 11** statically software package was used for data manipulation.

2.4.1. Specification of the Model was described as follows:

Rural household decided to be engaged in different livelihood strategies for different reasons. However, the basic assumption is that in a given period at the disposal of its asset endowment, a rational household head choose among the different mutually exclusive livelihood strategy alternatives that offers the maximum utility (Adugna and Wagayehu, 2012). Moreover, based on the work of Tassew and Oskam (2001), the maximum utility model of households from different livelihood strategies can be specified as follows:

Let U_{ij} denotes the utility that the household i gets from choosing alternative activity j and

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

Where:

- β_j = the coefficient of covariates which varies across alternatives
- X_j = the covariates which remains constant across alternatives; and
- ε_{ij} = a random disturbance term, and unobserved attributes of alternatives.

For an outcome variable with J categories, let the j^{th} livelihood strategy that the i^{th} household chooses to maximize its utility could take the value 1 if the i^{th} household choose j^{th} livelihood strategy and 0 otherwise. Therefore, J category of livelihood strategy of i^{th} household for this study is categorized as follows:

0 = Agriculture only (crop production and livestock rearing) as reference outcome

1= Agriculture + Off-farm activity (which includes agriculture plus daily labor work (wage), renting of asset (land, ox), firewood wood sale and trading of livestock)

2= Agriculture + Non-farm activity (which includes hand craft, small business trade and remittance (from abroad)

3= Agriculture + Off-farm + Non-farm (which includes all above livelihood strategy).

The probability that a household with characteristics x chooses livelihood strategy j , modeled as multinomial logit. The model is selected because that the responses of households for livelihood strategies was expected to be polytomous. Logistic regression can be extended to handle responses that are polytomous, i.e. taking response greater than two categories. Therefore, the probability, P_{ij} is modeled as: Then multinomial logit model can be written as:

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

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

Where;

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

X = Predictors of response probabilities

β_j = Covariate effects specific to j^{th} response category with the category as the reference.

Then through normalization the model, it is assumed that $\beta_1 = 0$ (this arises because probabilities sum to 1, so only J parameter vectors are needed to determine the $J + 1$ probabilities), (Galab *et al.*, 2002) so that $\exp(X_i \beta_1) = 1$, implying that the generalized equation (2) above is equivalent to:

$$P_{ij} = \frac{\exp(x_i \beta_j)}{1 + \sum_{j=1}^J \exp(x_i \beta_j)}, \text{ for } (j = 1, 2, 3,) \text{ and } P_{i1} = \frac{1}{1 + \sum_{j=1}^J \exp(x_i \beta_j)} \dots\dots\dots (3)$$

Similar to binary logit model it implies that we can compute J log-odds ratios which are specified as;

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

This type of discrete model can be estimated by using the maximum likelihood method.

Table 1. Description of explanatory variables used in the Multinomial logit model Source:

Variables	Variables description	Expected sign
SEXHH	Sex of the household head; dummy (1 if male; 0= female)	+
AGEHH	Age of the household head in years	-
EDUHH	Schooling years of the household head	+
FAMSIZ	The total number of members in a family	+
ACLAB	The number of activity family members in the household between age of 15 and 64 years	+
DEPMM	Children under age 15 and old age of above 64 year in the family in number	+
TLU	Livestock holdings of the household in TLU	+ /-
LAND	Total land area of a household owned in hectare	+ /-
DAVIST	The number of days contact with DAs	+
ADVTR	The number of days obtained advice/ training	+
CRED	Dummy, 1 if HHs used credit; 0 otherwise	+ /-
DISTC	Average distance of a market from residence (in walking minutes)	+
REMIT	Dummy, 1 if HHs received remittance; 0 otherwise	+

3. Result and Discussion

3.1. Demographic and Socio-economic Characteristics of Respondents

The section shows the general relationship between the respondent's demographic and socio-economic characteristics with their engagement in different livelihood sources (agriculture only, agriculture plus off-farm, agriculture plus non-farm, and agriculture plus off-farm plus non-farm activities).

The survey result indicates that, the study sample respondents were composed of both male and female household heads. In all groups, the majority households were headed by male while only few were female headed. Relatively (on average), the more aged (47.63) households were those who used agriculture only as their main livelihood source. The age of sample households who were engaged in agriculture plus off-farm, agriculture plus non-farm, and agriculture plus off-farm plus non-farm activities were relatively low (45.54, 46.22, and 46.70), respectively.

The sample household heads' education level in "year of schooling" for those who engaged in agriculture only was 2.20, and for those who were engaged in diversified sources (agriculture plus off-farm, agriculture plus

non-farm, and agriculture plus off-farm plus non-farm) were 4.05, 3.94, and 5.11, respectively. This indicates that sample households, who have more diversified source of livelihood, were those attained more year of schooling. Therefore, the implication that one can understand from this was there was positive relation between education and livelihood diversification.

The result indicates an average number of total household size of the respondents, who were engaged only in agriculture as their major livelihood source was 6.63. The households used agriculture plus off-farm, agriculture plus non-farm, and agriculture plus off-farm plus non-farm activities as their livelihood sources have mean number of household size of 6.25, 8.46 and 7.74, respectively. This result implies that sample households, who have used a diversified source of livelihood, have relatively more size than who were not diversified.

Moreover, from the total household members, the number of dependent family member's found under age 15 and above 64 years was taken as important variable for livelihood diversification for sample respondents. This was an average number of 2.81, 2.65, 2.68 and 2.44 for the households used agriculture only, agriculture plus off-farm, agriculture plus non-farm, and agriculture plus off-farm plus non-farm livelihood sources, respectively. In addition, the result also indicates that relatively more economically active family members from the total household's size were found under those respondents participated in diversified form of livelihood. The mean number of this economically active members for the respondents used agriculture only, agriculture plus off-farm, agriculture plus non-farm, and agriculture plus off-farm plus non-farm was about 3.51, 3.54, 5.65, and 5.33, respectively.

The livestock holding in TLU for the respondents who were engaged in agriculture only was about 3.12 TLU, whereas for those used agriculture plus off-farm, agriculture plus non-farm, and agriculture plus off-farm plus non-farm was about 2.31, 3.71, and 4.09 TLU, respectively.

3.2. Econometric Model Result

3.2.1. Determinants of Livelihood Diversification

The basic question that was answered in this part was what are the factors that determine household's participation in diversified livelihood activities in the study area? Twelve variables were hypothesized to explain determinants of participation in diversified livelihood activities. For simplicity of understating the determinants each livelihood diversification options the result of each were presented separately.

Moreover, the marginal effect was conducted after multinomial logit estimation, and indicated in column 4 and symbolized as dy/dx (ME) in Table 2, 3 and 4. Therefore, the interpretation of significant variables was based on marginal effect result, since for binomial and polynomial response of dependent variable the coefficients of independent variables have no full meaning for interpretation beyond reflecting direction of relationship. Following this, the result of the significant determinants of possible livelihood diversification strategies was discussed by using marginal effect (ME) result for the three livelihood diversification options.

3.2.1.1. Determinants of Agriculture Plus Off-Farm Activities

From the hypothesized variables to determinants of participation in agriculture plus off-farm livelihood activities the significant variables were four. The multinomial logit model estimation result indicated that, these determinants of participation in agriculture plus off-farm activities were found to be statistically significant at 5% and 10% level for all variables, while the remaining variables were less significant in explaining the variations in the dependent variable in this study. The significant variables at 10 % include total land holding size, remittance receiving, access to credit, and at 5% the frequency of visit by development agents.

Total land holding size (LAND): Land holding size for this study was hypothesized to have either positive or negative relationship with the diversification of rural livelihood activities. The land holding size and livelihood diversification in this study area has significant and negative correlation, which was one of the expectations. The marginal effect reveals that as the land holding size increases by one unit (hectare), the probability of participation in agriculture plus off-farm activities decreases by 13.08%. This is plausible may be due to the households with more land tend to follow agricultural extensification rather than diversification. Similarly, Adugna and Wagayehu, (2012); Dilruba and Roy, (2012), has found that area of land owned by the household has a significant and negative correlation with the likelihood of choosing diversified livelihood.

Remittance receiving (REMIT): As it was expected, the survey result indicates that having opportunity of receiving remittance and participation in diversified livelihood sources has positive relationship. Specifically, households who have chance of receiving the remittance, the probability of participation in agriculture plus off-farm livelihood activities will increase by 8.9%. This is because of the fact that, receiving remittance itself is additional source of income for the farm household, and this in turn helps the farmers to expand the income activities. The result is consistent with the finding of (Adugna and Wagayehu, 2012).

Access to credit (CRED): In this study households access to credit services and diversification in agriculture plus off-farm activities has found significant and positive association. Therefore, the analysis indicates that as the households receive credit, the probability of involvement in off-farm activity in addition to agriculture will raise by 6.8 %. This might be true, if households especially those who have limited land size easily access the financial

credit can diversify their income source. Smith *et al.*, (2001) and Davies (2004), identifies that lack of access to financial services or the lack of credit as a constraint to potential diversification into apart from farm economic activities.

Development Agents Visit (DAVIST): As expected in this study, the regularity of the development agent's visits the farmers and off-farm activity participation has positive relationship. When the number of days of development agents visit the farm increases by one, the probability of farm households involvement of agriculture plus off-farm activity will raise by 7.2%. This might be reasonable because the information obtained from development agents while they visit the farmers helps them to create additional income sources other than agriculture. Demissie (2003) also found positive relationship between extension contacts and non-farm diversification.

Table 2. Multinomial logit model result on determinants of agriculture plus off-farm

Variables	Coefficients	Std. Err.	dy/dx (ME)	Z- value	P-value
SEXHH	-0.7205	1.5294	-0.0004	-0.47	0.638
AGEHH	0.0001	0.0510	0.0083	0.00	0.997
EDUHH	0.2519	0.1940	0.0164	1.30	0.194
FMSIZ	0.0154	0.2233	0.0475	0.07	0.945
DEPMM	-0.2361	1.1249	-0.0513	-0.74	0.462
LAND	-1.52	0.9042	-0.1308	-1.69*	0.091
REMIT	2.166	1.136	0.0888	1.93*	0.054
TUL	-0.2820	0.3455	-0.0804	-0.82	0.414
CRED	1.929	1.0798	0.0680	1.79*	0.074
DISTC	-0.8459	0.9899	-0.0475	-0.85	0.393
DAVIST	1.2780	0.5100	0.0722	2.51**	0.012
ADVTR	0.2519	0.2268	0.01670	1.11	0.267
CONSTANT	11.3485	5.9934		1.89	0.058

Log likelihood = -121.8147 Number of observation = 131

LR chi2(36) = 83.06 Prob > chi2 = 0.0000

Where * and **, means level of significance at 10% and 5 %, respectively

3.2.1.2. Determinants of Agriculture Plus Non-Farm Activities

Agriculture plus non-farm diversification was significantly determined by five variables, and the others were insignificant in this study. The significant and positively correlated variables were household head education at 10% level, total household size at 10 % level, number of days visited by development agents at 10%, and receiving remittance at 1% level. However, number of dependent family size and engagement in non-farm activities has significant and negative relationship in the study area. The interpretation and discussion of these significant variables is provided as follows.

Household head education (EDUHH): Educational attainment has been identified as one of the most important determinants of non-farm earnings. As the schooling year of household heads for education increases by one unit, the probability of participation in agriculture plus non-farm income source will increases by 6.5 %. This implies that the highly educated persons diversify their livelihood options through acquiring salaried jobs and self-employment activities. The result was consistent with the former studies conducted by (Adugna and Wagayehu, 2012; Dilruba and Roy, 2012; Owusu *et al.*, (2011); Niehof, (2004).

Total family size (FMSIZ): In line with the researchers' expectation, the relationship between total family size and livelihood diversification in this study was positive and significant. The marginal effect result in Table 13 reveals that, as the number of total family size increase by one, the probability of engagement in non-farm increases by 6.2%. This might be due to the correlation between larger family size and availability of an extra labour force that can be engaged in non-farm activity (Adugna and Wagayehu, 2012).

Dependent family size (DEPMM): In this study as it was expected, number of dependent family size and agriculture plus non-farm livelihood diversification has negative and significant correlation. An addition of one more dependent family number will decrease the probability of household participation in agriculture plus non-farm activities by 1.9%. The rationale behind this might be that an increase in dependency ratio, leads to shortage of working hands to earn from diversified activities to fulfill the household needs. This means an increase in the number of household members below 15 and above 64 years, who are unable to engage themselves in some activities, affects livelihood diversification negatively. Dilruba and Roy (2012), has also found negative relationship between number of dependent family size and livelihood diversification activities.

Remittance receiving (REMIT): Like agriculture plus off-farm activities, again the remittance receiving and agriculture plus non-farm diversification has found positive and significant relationship at 1 % probability level. If households have a chance of receiving remittance, the probability of engagement on agriculture plus non-farm activities will increases by 17.32%. The justification of this was similar with the scenario of agriculture plus off-farm activities.

Development agents' visit (DAVIST): Here also, the frequencies of development agents visit of the farmers and involvement on agriculture plus non-farm income has positive and significant correlation at 10 % level. The marginal effect predication indicates that, an increase in the frequency of developments agents contact by one day, will lead to raise the probability of agriculture plus non-farm diversification by 4.33%. The possible justification for this situation is also similar with that of agriculture plus off-farm activities (that means the information obtained from the extension agents helps rural households to create new income earning mechanism so as to have better living standard).

Table 3. Multinomial logit model result on determinants of agriculture plus non-farm

Variables	Coefficients	Std. Err.	dy/dx (ME)	Z- value	P-value
SEXHH	-0.5951	1.4880	-0.0686	-0.40	0.689
AGEHH	-0.0623	0.0496	-0.0119	-1.26	0.209
EDUHH	0.3188	0.1884	0.0650	1.69*	0.091
FMSIZ	0.3604	0.2170	0.0627	1.66*	0.097
DEPMM	-0.5189	0.3084	-0.0194	-1.68*	0.092
LAND	-0.73708	0.8196	-0.0879	-0.90	0.368
REMIT	2.915	1.0859	0.1732	2.68***	0.007
TUL	0.1432	0.3107	0.0209	0.46	0.645
CRED	-1.4810	1.0471	-0.0657	-1.41	0.157
DISTC	-1.3065	0.9611	-0.1251	-1.36	0.174
DAVIST	0.8505	0.4999	0.0433	1.70*	0.089
ADVTR	0.1309	0.2071	0.0218	0.63	0.527
CONSTANT	12.7164	5.7824		2.20	0.028

Log likelihood = -121.8147 Number of observation = 131

LR chi2(36) = 83.06 Prob > chi2 = 0.0000

Where *, and *** means level of significance at 10% and 1%, respectively

3.2.1.3. Determinants of Agriculture Plus Off-Farm plus Non-Farm Activities

Tables below indicates that the determinants of respondents involvement agriculture plus off-farm plus non-farm activities in the study area. Accordingly, alike to above findings household education level, dependent family number, remittance receiving opportunity and frequency of the households visited by development agents were found to have significant correlation with the involvement in agriculture plus off-farm plus non-farm activities. Therefore, only the interpretation of marginal result effect of this variable is given below, since rational justification and discussion were similar to that specified in the above under 3.2.1.1 and 3.2.1.2.

Household head education (EDUHH): Education level of household head and motivation to participate in agriculture plus off-farm plus non-farm activities were found to have positive and significant relation at 5 % probability level. As the education level of households schooling raises by one, the probability of households search for off-farm plus non-farm activities in addition to agriculture will increase by 2.97%.

Dependent family size (DEPMM): The model estimation result for dependent family size and involvement in agriculture plus off-farm plus non-farm activities shows that there was negative and significant correlation at 5 % level. When one number of the dependent family member added to the household member, the probability of participation in agriculture plus off-farm plus non-farm activities will decline by 4.17%.

Remittance receiving (REMIT): The result also reveals that, as households gate a chance of obtaining remittance, the probability for participation on agriculture plus off-farm plus non-farm livelihood activities will increase by 3.14%. In other words, the result portrays that there was a positive and significant relation between obtaining remittance and participation on agriculture plus off-farm plus non-farm livelihood activities at 5 % level.

Development agent's visit (DAVIST): As of the pervious sections yet again, there was a positive and significant relationship between the repeated development agent's visit and participation on agriculture plus off-farm plus non-farm livelihood activities at 10 % level. As the farm households visited by the development agents repeatedly, the probability of participation on agriculture plus off-farm plus non-farm livelihood activities will increase by 9.08%.

Table 4. Multinomial logit result on determinants of agriculture plus off-farm plus non-farm

Variables	Coefficients	Std. Err.	dy/dx (ME)	Z- value	P-value
SEXHH	-1.0828	1.5982	-0.0838	-0.68	0.498
AGEHH	-0.0282	0.0516	-0.0027	-0.55	0.583
EDUHH	0.4585	0.1960	0.0297	2.34**	0.019
FMSIZ	0.1997	0.1960	0.0102	0.89	0.375
DEPMM	-0.6619	0.2254	-0.0417	-2.05**	0.040
LAND	-0.7947	0.3229	-0.0245	-0.91	0.362
REMIT	2.4582	0.8726	0.0314	2.15**	0.031
TUL	0.36871	1.1426	0.0615	1.13	0.259
CRED	-1.7343	0.3264	-0.030	-1.59	0.111
DISTC	-0.8347	1.0100	-0.0557	-0.83	0.409
DAVIST	0.8886	0.5150	0.0908	1.73*	0.084
ADVTR	0.2084	1.0874	0.0086	0.95	0.342
CONSTANT	9.9372	6.0284		1.65	0.099
Log likelihood = -121.8147		Number of observation = 131			
LR chi2(36) = 83.06		Prob > chi2 = 0.0000			

Where *, and** means level of significance at 10% and 5%, respectively

4. Conclusion and Recommendation

4.1. Conclusion

The central interest of the study was to answer the question, “What are the determinants of diversifications of rural livelihood activities in the study area? Since the determinants of rural livelihood activities can vary from area to area, across time and individuals. To come up with the final result and implication of the study, multinomial logit model was employed for analyzing the cross sectional data that was collected from a total of 131 randomly selected rural households.

In the study area the types livelihood sources that were used by rural households were agriculture, agriculture plus off- farm, agriculture plus non-farm, and the combination of the three previous activities.

The multinomial logit model result shows that from out of 12 hypothesized variables about seven variables were found as significant determinants of different livelihood diversification activities in the study area. As the result, remittance receiving, access to credit services and regularity of development agents to visit the farmers have significant and positive relationship with participation in agriculture plus off-farm livelihood activities, while total land holding has negative and significant relationship. Education, total household size, receiving remittance and frequency of development agents’ visit have positive relationship with households’ diversification their livelihood in non-farm activities in addition to agriculture. However, the number of dependent family size and agriculture plus non-farm activities were correlated negatively.

On top of this, household education, remittance receiving and development agents’ visit have significant and positive relationship with involvement of rural households’ in agriculture plus off-farm plus non-farm activities. Similar to agriculture plus non-farm scenario, agriculture plus off-farm plus non-farm and dependent family size number have significant and negative association.

Generally, according to this study, the determinants of household participation in diversified livelihood activities in the study area were: total land holding, education level of household, remittance receiving, and regularity of development agents’ contact, total households size, dependent family size and access to credit.

4.2. Recommendation

Based on the finding of this study, the following policy recommendations were provided to concerned parties (government and non-government agents):

- Education level of households has a positive relationship with diversification of livelihood options, so as to improve life of farm households. Therefore, efforts need to be continued in more aggressive manner on training of farmers to improve their knowledge and traditional experiences.
- Credit service is essential to improve both agricultural and non-agricultural production. In addition, improving production is a center of the current development strategy. Hence, increasing credit access and strengthening the credit institutional arrangement is much advisable to make this development possible and improve livelihoods of rural households.
- Frequency of contact of extension agents for training and advice of farm households should also be emphasized, since it has significant effect for farmers on creating different livelihood activities.
- Agricultural sector contribution is the major livelihood options for all rural households, since they are using it as households’ permanent food consumption and income source. Besides, the provision essential farm inputs and technologies for increasing productivity of the agriculture yield, policies should also give emphases for

non –farm and off-farm livelihood activities.

References

- Adugna Eneyew and Wagayehu Bekele, (2012). Determinants of livelihood strategies in Wolaita, Southern Ethiopia: *Agricultural Research and Reviews* Vol. 1(5), pp. 153 -161.
- Amare Demissie and Belaineh Legesse, (2013). Determinants of income diversification among rural households: The case of smallholder farmers in Fedis district, Eastern Hararghe zone, Ethiopia: *Journal of Development and Agricultural Economics* Vol. 5(3), pp. 120-128.
- Barrett, C.B., Reardon, T. and Webb, P. (2001). Nonfarm income diversification and household livelihood strategies in rural Africa: Concepts, dynamics and policy implications. *Food Policy*, 26(4),315-331.
- Barrett CB, Reardon T. (2000). Asset, Activity and Income Diversification among African Agriculturalists, Some Practical Issues. Project report to the USAID BASIS CRSP, March 2000.
- CSA (Central Statistical Authority). (2011). *population and housing census of Ethiopia, Result from SNNPRS: Analytical Report, vo. II*. Addis Ababa.
- Cochran, W. G. (1977). *Sampling Techniques*, 2nd Ed., New York: John Wiley and Sons, Inc.
- Davis, J. (2004). *The Rural Non-farm Economy, Livelihoods and their Diversification: Issues and Options*. Natural Resource Institute, Chatham, UK.
- Demissie Damite, (2003). *The Determinants and Impacts of Income Diversification in Rural Ethiopia: The Case of Communities in Southern Nations, Nationalities, And Peoples Regional State: A Master Degree Thesis Submitted to the School Of Graduate Studies of Addis Ababa University department of Economics*.
- Dilruba k. and Roy B.C.(2012). Rural Livelihood Diversification in West Bengal: Determinants and Constraints: *Agricultural Economics Research Review: Vol. 25(No.1)*; pp 115-124.
- Ellis, F. (1998). Household strategies and rural livelihood diversification; *Journal of Development Studies*.
- Galab S, Fenn B, Jones N, Raju D, Wilson I, Reddy MG. (2002). Livelihood diversification in Rural Andhra Pradesh: Household asset portfolios and implications for poverty reduction working paper no. 34.
- HZFDMD (Hadiya Zone Finance and Development main Department).(2011). *Annual report on of Socio-Economic profile*. Hossana.
- Kejela Gemtessa, Bezabih Emanu and Waktole Tiki, (2005). Livelihood Diversification in Borana Pastoral Communities of Ethiopia- Prospects and Challenges.
- Niehof A. (2004). The significance of diversification for rural livelihood systems. *Food Policy* 29 (2004) 321–338.
- Reardon, T. (1997). Using evidence of household of income diversification to inform study of rural non-farm labour market in African : *World Development*, vol 25, No: 735-47.
- Reardon, T., Delgado, C. and Malton, P. (1998). Determinants and Effects of Income Diversification amongst Farm Households in Burkina Faso. *Journal of Development Studies, Vol. 28 (2)*,
- Smith, D.R., Gordon ., A, Meadows ., K, Zwick .,K. (2001). Livelihood diversification in Uganda: patterns and determinants of change across Mtwo rural districts, *Food Policy* 26
- Tassew W. and Oskam A. (2001). Income diversification and entry barriers: evidence from the Tigray Region of Northern Ethiopia. *Food Policy* 26(4):351–365.
- Owusu.V., Abdulai. A. And Abdul-Rahman. S. (2011). Non-farm work and food security among farm households in Northern Ghana, *Food Policy* 36 (2011) 108–118.