Small Holder Farmers' Participation in Non-Farm Activities: Evidence from Humbo District, Southern Ethiopia

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Abstract

Poverty in rural areas of Ethiopia has its root, in low productivity, landlessness and erratic weather dominant areas. Small and fragmented farm size coupled with low level of technology, soil degradation and poor infrastructure, have reduced the capacity of small holder farmers to undertake long term investment on the farm. Therefore, non-farm activities provide employment opportunity in their own and also supplement agricultural incomes. This study was conducted with the objective of identifying and analyzing the factors that influence participation of farmers in non-farm activities in Humbo district. In order to achieve this objective, primary data were collected from 145 randomly selected households by using semi-structured interview. For the data analysis, descriptive statistics including mean, frequency and percentages were used to describe the farm and non-farm characteristics of the households. Moreover, t-test and chi-square analyses were employed to compare the non-farm participant and non-participant group. A Bivariate probit model was used to analyze the factors that influence participation in non-farm activities. A total of 11 explanatory variables in five groups (asset, household characteristics, individual characteristics, location and price proxy) were considered in the regression. Out of these, total land size and TLU, Age, sex and education level, family size, agro-ecology and distance from nearest market were found significantly affecting participation. Therefore, development strategies should not only emphasis in increasing agricultural production but concomitant attention should be given in promoting participation in non-farm activities in the rural areas.

Keywords: non-farm activities, small holders, participation

1.   Introduction

In most developing countries, agriculture is the back bone and the main sector for both its contribution to the GDP and generation of employment. In most African countries, agriculture is the major economic activity accounting the highest share of the GDP. For about two-thirds of the Sub-Saharan population who live in rural areas, the main income comes from agriculture (Csaki and de Haan, 2003).

        Although agriculture is the major source of income and employment in most rural areas of population in developing countries, rural households are increasingly earning their livelihoods from non-farm activities. The rural non-farm economy (RNFE) is growing in the last decades. As Haggblade et al. (2002) indicated, at the beginning of the new millennium, around 25% of rural areas full time employment and 35-40% of rural area incomes were accredited to the rural non-farm economy in the developing countries. Effective development of the RNFE can make major contributions to economic growth and poverty reduction, often by helping multiply and spread the benefits from growth in sectors such as agriculture (Wiggins and Hazell, 2011). This approach has several advantages, especially for poorer households. Their agricultural resources are often too limited to allow for efficient use of all household labour, and non-farm activities can offer an alternative remunerative allocation, especially during the lean season. Besides, income from agriculture is subjected to high risk due to climatic factors, price fluctuations, pests and diseases. Earnings from non-farm employment may help to buffer the resulting income fluctuations and improving household security (Lanjouw and Lanjouw, 1995).

        Many researchers indicated that non-agricultural activities implemented in rural areas are crucial in bringing rural economy progress. For example, over the last three decades the non-farm economy has got an acceptance in rural developmental issues because of its positive influence on poverty and food security. Participation in rural non-farm activities is one of the livelihood strategies among poor rural households in many developing countries (Mduma and Wobst, 2005). There is an argument that African economies want to be less dependent on agriculture to reduce poverty. Non-farm enterprises by small holder farmers play an important role in the early stages of diversifying beyond agriculture (Loening et al., 2008). However, very little is known about the characteristics, constraints and opportunities of non-farm enterprises (Lanjouw and Lanjouw, 2001); which makes it difficult to assess how this class of enterprises might contribute to poverty reduction. One view is that non-farm activities provide a way for out of poverty (Loening et al., 2008).

2.   Non-farm activities & the non-farm economy

According to Woldenhanna (2000), non-farm activities in which farm household participates can be categorized into wage employment and self-employment activities. Three types of wage employment can be distinguished, namely paid development work, manual non-farm work, and non-manual (skilled) non-farm work. Paid

development work involves jobs in community micro dam construction, community soil and water conservation works such as construction of terraces and afforestation, and other community works done under the food-for-work program. Manual non-farm work is an activity in which farm households work for private and public construction companies in urban and semi-urban areas. Non-manual (skilled) non-farm work involves masonry, carpentry and cementing in public and private construction sites. Non-farm self-employment comprises mainly petty trade, transporting by animals on their back, stone mining, pottery and handicrafts, selling of wood and charcoal, local brewery and selling of fruits.

Defined in another way, non-farm activities include all secondary and tertiary sector employment of both permanent and casual nature. Broadly speaking, non-farm activities in the rural areas can be divided into the following categories (Meyer, R. L, 1991):

- Small-scale industrial activities such as food processing (flour milling, oil processing, soap making and food processing)
- Cottage industries (handicrafts, spinning of cotton or wool, cloth weaving and dying, pottery, leather tanning and distilling local brews)
- Artisan activities (blacksmiths, masonry, wood work/carpentry, house construction, repair services and fabrication of farm tools)
- Commercial activities (trade and transportation)
- Infrastructure development activities (special public works, feeder roads and irrigation works, and food-for-work programs) and
- Formal employment including professional and administrative jobs.

The rural development thinking has passed through several shifts, from the dual economy view of the modernization paradigm to that of the agricultural-led growth paradigm (Ellis and Biggs, 2001). In the dual economy view, the contribution of the agricultural sector to growth is to transfer resources, particularly labor, to the manufacturing sector (Fei and Ranis, 1964) while the agricultural-led growth paradigm sees agriculture playing an active role in driving growth through production and consumption linkages (Johnston and kilby, 1975). In the different version of debates in these two major paradigms the central point of discussion was the role of agriculture in rural development. The non-farm economy came into the discussion in reference to its relation with agriculture. With the sustainable livelihood approach, the non-farm economy comes more explicitly and frequently in to rural development thinking .The livelihood approach recognizes and emphasizes the diversified nature of rural household assets and livelihood strategy (Ellis, 2000).

Several cross-sectional studies in Africa and Latin America show a positive correlation between non-farm participation and total income (Reardon *et al.*, 2001). Some studies also found non-farm employment contributing to increase in agricultural investment (Ruben and Van den Berg, 2001; Bezu and holden, 2008).These findings suggest that, expansion of non-farm economy may play a positive role in reducing poverty. Non-farm expansion can play a significant role in reducing poverty if most of the poor have access to employment in the sector. But it is not always the case that the non-farm sectors are more inclusive of poor. In East Africa household members from low-agricultural potential are found to be more likely to be engaged in the non-farm sector than those in high-agricultural potential (Matsumoto *et al.,* 2006). While there is evidence of positive correlation between non-farm participation and total income across several countries, the relationship between the share of non-farm income and total income or wealth is not so uniform. In some cases the poor get a higher share of their income from non-farm activities thereby expansion of the non-farm sector contributes to greater equality while in others, as shown for most of African studies (Rearden, 1997), the rich and wealthy get a higher share of their income from non-farm activities implying an inequality increasing non-farm economy.

3.   Determinants of participation in Rural Non-farm Employment in Ethiopia

The studies that examine the factors that influencing participation in non-farm employment used different methodologies and different units of analysis, due to this condition comparison of results difficult. Still some common features arise such as negative effect of agricultural production or income and positive effect of family size and being male (or male headed household).

Tefera et al., (2005) using logit model, analysed non-farm participation decision of households. They found that non-farm participation to be negatively correlated with agricultural income and self-sufficiency positively correlated with adult male labor.

In their participation analysis, Matsumoto et al., (2006) set out to estimate multinomial probit model of occupational choice for individuals in farm, local non-farm, and migration activities in Ethiopia, Uganda and Kenya. However, because of the number of migrants in the Ethiopia sample was very low (only 15 individuals in the members of 420 household), they combine local non-farm and migration activities in the Ethiopia data which effectively makes the regression a binary model. The result shows that men are more likely to participate in non-farm employment. Participation increases with age and the number of local language the respondents can speak and decreases with years of schooling.

Woldenhanna and Oskam (2001) estimated tobit model for household labor supply to non-farm employment, separately for wage and self-employment. They found upward sloping labor supply curve for both types of activities. Moreover, they found that labor is negatively correlated with agricultural land, livestock and non-labor income. They also estimated a multinomial logit model to analyse the choice between the two types of non-farm employment. They found that non-farm wage employment increase with family size and decreases with agricultural production and the number of dependents. On the other hand, self-employment increases with agricultural production and is not affected by demographic factors. They argue that the results imply that households engage in self-employment to gain attractive returns while they engage in wage employment because of push factors. Their study does not find significant effect of education.

Van den Berg and Kumbi (2006) estimated tobit models for income from handicraft, food/drink and trade separately. They found that own cultivated land is positively correlated. This is similar to the result from woldenhanna and Oskam (2001). Moreover, they also found that households with heads who are married and literate are more likely to engage in trade of different items.

4. Statement of the problem

There is a rapid population growth in Ethiopia which resulted in small and fragmented land holding reducing labour productivity and leading to a widespread underdevelopment over the country. The rapid growth rate of youth population, especially, led to youth dependency burden which in turn increases the consumption of basic goods and services and decreases the capacity of domestic savings affecting investment and economic growth (Hailemariam et al., 2011).

As MoFED (2008) indicates, the current high population growth rate brings burden on natural resources, especially on land. The population density of Ethiopia increased from 49 person per Km^2 in 1993 to 71 in 2009 (CSA, 2009) and agricultural density (a ratio of rural population to cultivated land area per hectare) increased from 5.2 person per hectare in 1995/1996 to 7.1 person in 1999/2000. Thus, scarcity of land is a critical bottleneck nationally in general and in the study area in particular. Farm households are endowed more with labour than with capital and land.

In addition to land scarcity, agricultural production is seasonal and, therefore, rural labour cannot be employed throughout the year which needs to widely develop non-farm activities (Woldehanna, 2000). These non-farm activities diversify the economy and it could be a crucial strategy for the government to fight against poverty, as it absorbs labor thereby minimizing unemployment. But, the existing development conditions give less attention to non-farm activities and their linkages to agriculture. This is partly due to the fact that the role of the rural non-farm sector in the rural economy is underestimated. The rural non-farm activities and their linkage with farm activities are not as such recognized and this knowledge gap is reflected in policies of most developing countries (Lanjouw and Lanjouw 1997).

Many rural households are not undertaking non-farm activities due to lack of asset to start the business. Others are confined with less important activities that cannot allow them to grow out of poverty. Thus, identification of the factors determining access and income from non-farm activities is crucial for policy makers to inform and adjust policies in the rural domain (Reardon et al., 2007).

Most households in the study area rely on rain fed agriculture for their livelihood, but population growth has led to fragmentation of available arable land, and average farm size has dropped below one hectare. The traditional development approach of providing technology and infrastructure to increase agricultural production has not succeeded in curbing the trend of increasing poverty, and alternative sources of productive employment must be sought in order to support the additional workforce created by population growth (van den Berg and Kumbi, 2006). Traditionally the rural economy was considered as purely agriculture. Hence policy makers at national levels equate improving the rural economy with promoting and supporting agriculture (Csaki and de Haan, 2003). Therefore, this study aimed to contribute to understanding on the determinants of non-farm participation and describe the characteristics of non-farm activities to the area in particular and for the zone in general.

5. Objective of the study

The overall objective of the study is to identify and analyze the determinants of participation of smallholder farmers in non-farm activities in the study area

6. Methodology

Data source and method of data collection

Data was collected from primary and secondary sources. Primary data was collected from households using a semi-structured questionnaire. In addition, discussions held with elders and key informants to access detail information. Formal and informal methods of data collection employed. Formal data collection was used by employing semi-structured questionnaire, which was administered by enumerators to collect data on various

social, institutional, economic variables from the sample respondents. The Informal method consists of group discussions by the authors with farmers, development agents, relevant agricultural professionals and administration officers at all levels. Secondary sources included published and unpublished materials about farm and non-farm activities. It was collected from relevant sources, such as reports, socio-economic survey documents of the area, maps, and books.

Sampling techniques and procedures

A multi-stage sampling technique was used to select sample households. In the first stage, the researchers stratified the peasant associations (PAs) into agro-ecological zones (namely highland – locally *'dega'*, midland – *'woinadega'* and lowland – *'kola'*). In the second stage, based on agro-ecological zones, one PA was selected randomly (one peasant association from each agro-ecology). In the third stage, based on random sampling methods the respondents were selected from peasant associations. Finally, a total of 145 farm households were selected. The size of the household on kebeles was determined based on the probability proportional to size principle.

Table 1: Selected Kebele Administrations and number of households sampled for the study.

No	Agro-ecology	Selected Kebele Administration (randomly)	Total number of households	Total # of sampled households	# of non-participant sampled households	# of participant sampled household
1	Highland (*'dega'*)	*Demba Koysh*	350	46	22	24
2	Midland (*'woinadega'*)	*Koysha ogdamo*	436	58	26	32
3	Lowland (*kola'*)	*Abla sipha*	312	41	21	20
	Total		1098	145	69	76

7. Methods of data analysis & Estimation

To analyse the collected data both descriptive and econometric method of data analysis are used. Descriptive analysis includes mean, tables, percentage, frequency; whereas the econometric model includes analysis of determinants of participation. All types of data were analysed by using STATA - 12.

The survey data differentiates among two types of non-farm activities: handicrafts and trade activities. As a liquidity requirement, risk and labour productivity may differ between activities, these leads to estimate separate equations for each activity. The data gives information on the participation of non-farm activities; therefore, dummies of participation as the dependent variable were used for analysis. Assuming linearity of the labour supply functions and a bivariate normal distribution of the error terms in the labour supply equations, it was estimated using a bivariate probit model. The reduced form of the bivariate probit model equations for labour supply of non-farm production is adopted and put as:

Lnf = Lnf (P, T, A, K, Z, I) ……………………………………………………….. (1)

Where Lnf = labour supply to non-farm production;

P = proxy prices;

T = location

A = assets;

K = other fixed capital;

Z = a vector household characteristic;

I = individual characteristic

Dummies of participation as dependent variable were used for analysis. Assuming linear combination of the labour supply functions and a bivariate normal distribution of the errors terms in the labour supply equations, this gives the following bivariate probit model: The bivariate probit model is an appealing model of choice behavior because it allows a flexible correlation structure for the unobservable variables (Huguenin et al., 2009). Bivariate probit was used to fit the distribution of different alternative (claim) types.

$$L_{nf1} = \beta_1 X + \varepsilon_1 \qquad P_{nf1} = 1 \ \ if \ \ L_{nf1} > 0 \ \ \text{…………………… (2)}$$

$$L_{nf2} = \beta_2 X + \varepsilon_2 \qquad P_{nf2} = 1 \ \ if \ \ L_{nf2} > 0 \ \ \text{…………………… (3)}$$

Where

X= P, T, A, K, Z, I (represent a vector of explanatory variables which clearly explained in the reduced labour supply model)

ε_i = represent the random disturbance terms (stochastic components)

β_i = represent the estimated Coefficient

8.   Results and Discussion
Household characteristics of sampled households

The study was based on data collected from a total of 145 farm households selected from Humbo district of Southern part of Ethiopia. Of the total 145 sample households, all reported that they were participating in farm activities and 76 participated in non-farm activities. The average age of the whole household was 47.63 years, ranging between 26 and 70 years old. There was statistically significant (at 1% level) difference between the mean age of participant and non-participant individuals. The survey data shows, the average age of individuals in the participation of non-farm activities was a little bit less than that of the non-participants.

Table 2: General characteristics of sample individual data

	Non-farm participants	Non-	Non-farm participants	Total	t/ X^2 Value
Age	58		35	47.63	5.00***
Household Head sex (1=yes)	0.84		0.51	.68	59.79***
Family size of HHH	4.47		8.4	6.35	0.387***
Infrastructures					
Distance to all Weather road (hours)	1.96		0.61	0.575	1.96*
Distance to Market (hours)	1.96		1.98	1.97	0.40
Location variables					
Low land (1=yes)	0.25		0.27	0.26	0.47
Medium (1=yes)	35.40		34.64	0.14	1.50
High land (1=yes)	28.40		31.84	0.60	0.71
Education variables					
Illiterate (1=yes)	0.42		0.058	0.24	217.25
Primary (1=yes)	0.31		0.07	0.20	81.56
Above primary (1=yes)	0.26		0.86	0.55	17.67***

* Significant at 10%, ** Significant at 5% and *** Significant at 1% probability level
Source: Survey data, 2014

As shown in Table above, the average family size of non-participant and participant households was 6.35 persons. There was statistically significant (at 1% level) difference between the mean family size of non-farm participant and non-participant households.

The survey result showed that 68% of the households sampled were headed by male from participated in non-farm. The chi-square test showed that there was statistically significant (at 1% Level). The proportion of male household head in non-farm participant was higher than the non-participant.

As presented in the above table, three educational dummies are indicated for education condition as no education (illiterate), primary (grade 1-4) and greater than primary (grade1-4).The percentage of educated individuals was high in non-farm participant than nonparticipants.

9.   Farm characteristics
Land

Expansion of farmlands and irrigation possibilities are limited because of the rugged topography of the study area. Not only the small size of the land challenges in the farming community but also the fragmentation of the farm plots makes the farming life difficult. Most of the farmers' who own land in the District have 1-3 plots[1], which are far away from each other, ([3]HDOOARD). Land rights, whether owned, shared in or rented in, may determine participation of non-farm activities. The average total size of the cultivated land owned by the sample respondents was 1.01 plots. The mean total own cultivated land of non-farm participants and non-participants were 0.99 and 0.98 plots, respectively and the difference was significant.

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3 Based on data from HDOOARD, 1 plot on average is 1023m2 = 0.1023ha
(Lowland = 1150m2, mid land = 960m2, high land = 960m2)

Table 3: Land ownership

	Non-farm Non-participants		Non-farm participants			
	Mean	St. Dev.	Mean	St. Dev.	Total	T-Value
Cultivated land size	0.98	0.97	0.99	0.89	1.01	0.14
Private	0.86	0.75	0.88	0.69	0.88	0.74
Rent	0.10	0.19	0.12	0.19	0.10	0.01***
Share	0.07	0.17	0.09	0.20	0.08	
Topography						
Plain	0.17	0.29	0.23	0.34	0.21	0.94
Steep	0.11	0.22	0.15	0.26	0.13	0.09
Hilly	0.14	0.18	0.16	0.21	0.15	0.02**

* Significant at 10%, ** Significant at 5% and *** Significant at 1% probability level

Source: Survey data, 2014

Non-farm Participant farmers had private owned land of 0.88 plots in an average while the non-participants farmers had private owned land of 0.86 plots. This difference was statistically significant. The mean difference of the share cropping for the two groups was statistically significant at 1 % significance level. Given that the non-participant farmers relatively rented larger number of plots of land than the non-farm participants, it can be said that land ownership has an influence on non-farm participation.

Livestock

TLU (tropical livestock unit) was calculated to measure livestock holding of the households. According to the survey data the mean TLU of the sample respondents was 1.93.

Table 4: The average size of livestock ownership of respondents

	Non-farm Non-participants		Non-farm participants			
	Mean	St. Deviation	Mean	St. Deviation	Total	T-Value
Total TLU	1.78	1.47	2.07	1.60	1.93	
Oxen	0.57	0.52	0.62	0.65	0.59	0.14
Cow	0.65	0.57	0.86	0.60	.0.75	0.74
Calves	0.25	0.28	0.27	0.31	0.23	0.01
Sheep	0.03	0.07	0.04	0.06		
Goat	0.06	0.12	0.05	0.09	0.05	0.94
Chicken	0.23	.88	0.26	0.82	4.19	0.09
Donkey	0.50	1.57	0.52	1.56	0.25	0.02**

** Significant at 5% level

Sources: Survey results, 2014

In general, the agricultural sector of the district is characterized by small farms, scarcity of land for expansion, low yield, and shortage of draught animals and lack of adequate grazing land. To this effect, the farming economy is not in a position to feed and sustain the increasing population of the area. Therefore, farmer's engagement in non-farm activities is of paramount importance to supplement the farm income and improve the living conditions of the community.

10. Characteristics of non-farm activities

Non-farm activities have an important role in household economy. Under credit constraint and risky environment, non-farm income can increase household's farm productivity by mitigating risk and promoting farm investment (Evans and Ngau 1991) and finance consumption. Non-farm income provides farm households with insurance against the risk of farming and thereby enabling them to adopt new technologies. More importantly, non-farm activities offer cyclical and seasonal employment to supplement meager farm incomes in many drought prone areas of Africa. The major non-farm economic activities that help rural households in the study area comprise trading (selling of crops, cattle, foods and drinks) and traditional handicraft activities. From the total sample households in this study, 47.5% of them were engaged in non-farm activities besides farming. The mean income from non-farm activities was 2,632.23 Eth. Br.

Table 5: Rate of participation and average income of non-farm activities

	Handicraft	Trade
No. of individuals participating	26	43
Rate of participation (%)	18	82
Mean income of non-farm (Br)	1876	3388.46
	(6109)	(3703)
Maximum income (Br)	6300	16000
Minimum income (Br)	716	340

Standard deviations in parenthesis
Source: Survey Data, 2014

Trade
Trade in the study area is not only bound within the district locality but also in other places out of the study area. Traded items such as cereals, fruit and vegetables and livestock are bought on a market day and are sold on the same or another market day or at another place.

Trading activities are important sources of income for farmers in the study area. Group discussion revealed that there were several part time trading farmers who bought various consumer items such as salt, pepper, spices and clothes from distant areas and sold them to the local community. The long distance trade involves visit to places like sodo, shashmene, hawassa which is about 17, 35 and 90km away from the study area, respectively, and the traded goods include cereals, fruit and vegetable, small ruminant animal trade, skins and retailer's commodity trade. The survey result shows that 82% of the individuals participating in non-farm activity were engaged in trade. The mean annual income from trade was about 3,388.46 Eth Br. The dominant forms of trade items include cash crop, grain, cattle, livestock and food and drink and retailer's commodity trades.

Handicraft activities
There are a number of crafting activities in which farmers can potentially participate in the study area. Among the non-farm participant farmers 12% were engaged in crafting activities. These include pottery, carpentry, masonry, cementing, blacksmiths, tannery and weaving. Craft workers produce clothes, iron-tips, knives, simple chisels, axes, water and cooking pots for the community. Group discussion indicated that most of individuals undertake handicraft activity as supporting of agricultural income. The survey result indicates, the mean annual income from handicraft activities of sample respondent was 1876 Eth Br, the highest and the minimum income reported were 6300 and 716 Eth Br, respectively.

11. Econometric Results of Estimates of Participation
The dependent variables measure participation for each non-farm activity. These activities are handcraft activities and trade activities. The independent variables show assets, household characteristics, education, location and price proxy as presented in table below.
The STATA 12 econometric software was used to estimate this model. A total of 11 explanatory variables in five groups (asset, household characteristics, individual (education) characteristics, location and price proxy) were considered in the model. Out of these, 5 and 6 variables from handicraft and trade activities were found to have a significant influence on the participation of non-farm activities, respectively.

Table 6: Bivariate probit estimates for participation in non-farm activities

	Handicraft activities	Trade activities
Assets		
Total land size	-1.74, ***	-1.16, ***
	(0.37)	(0.20)
Total TLU	0.12*	0.01
	(0.069)	(0.072)
Household characteristics		
Sex head (male=1)	1.65	0.55***
	(0.45)	0.54)
Age head (years)	-0.16 , ***	-0.03
	(0.03)	(0.02)
Family size	-0.28	0.76 ***
	(0.10)	(0.15)
Dependency ratio (Children + elderly)/adults	-0.238	-0.77
	(0.20)	(0.39)
Education characteristics		
Education, above primary (>4)(yes=1)	1.95 ***	1.21***
	0.57)	(0.37)
Illiterate (yes=1)	0.18	-0.42
	(0.73)	(0.43)
Location (Agro ecology)		
Low land, Kola (yes=1)	1.33 ***	-1.60 ***
	(0.54)	(0.53)
Mid land, woinadega (yes=1)	-0.49	0.46
	(0.43)	(0.36)
Proxy price		
Distance to nearest Market (in hours)	-0.05	-0.002 ***
	(0.02)	(0.01)

R = -0.85 (0 .078)

* Significant at 10% level, ** significant at 5% level, *** significant at 1% level

Sources: Survey results, 2014

The signs of the coefficients for agricultural assets are crucial for the participation in non-farm activities in the rural areas. The coefficient of the most important productive asset, land is negative and significant for both activities, indicating that small land holding households are more likely to be engaged in non-farm activities in the area. Similar outcomes were found by Van den berg and kumbi (2006) in Oromia, Ethiopia indicating that entry barriers are of limited importance and that non-farm activities are a means to use surplus labour from agriculture productively. As Winters et al. (2009) indicated, households with smaller cropped area may decide to engage in non-farm activities to make up for their limited resource base (crops and livestock), and hence the coefficient on landholdings would be negative. Farmers at better levels of land holdings may choose to specialize in farming.

The coefficient for total TLU is significant for only handicraft activities. There is no significant effect of total TLU in both activities.

Among household characteristics, the coefficient of household sex suggests that females are more likely to participate in sale of crops, cattle, and food and drink activities. This statistical significance result reflects traditionally females dominate in sale of crops, cattle, and food and drink activities and male in handicraft activity.

The statistical significance and negative coefficient of the variable household head age reflects the younger household head participation dominates the handicraft non-farm activities. For cultural reasons, the families ties are such that the younger members of the family provide for and take care of the elderly, and therefore, the elder members of the family probably do not participate intensively in non-farm activities.

The positive coefficient for family size is also significant for sale of crops, cattle, food and drink activities, this is possibly due to more labour increases the contribution for the activities increased. Larger family size household is possibly to delegate the required work load of this activities like purchasing crops, cooking and/or local drink preparation activities to the family's member which supports to engage in non-farm activities of the area. In this regard, households having more family members who participate in the sale of crops, cattle, food and drink activities increase. There is no significant effect of family size in the other types of activities.

An interesting result in the regressions is the positive and significant effect of education on

participation in both types of non-farm activities. Formal education greater than grade 4 was found enhancing the participation of farmers in both types of non-farm activities. This indicates that educational attainment is one of the most important determinants of participation in non-farm activities. The skilled and educated farmers have a positive interest in the involvement of non-farm activities in the study area. This is because non-farm activities require some skills and training. Hence, households with some skill and educational background tended to engage in non-farm activities. Education tends to improve rationality and stimulate diversified use of resources. Similarly, studies conducted by Barret, Reardon and Webb in (2001); Van den berg and kumbi (2006) have reported similar results.

The coefficient of the location variable, low land agro-ecology is negative and has a significant effect on participation in trading activities. This is due to the fact that a dispersed rural area negatively affects participation in trading activities. The land size of low land agro ecology relatively higher than the other agro ecology zone of the district therefore, the people in lowland areas concentrated on agricultural activities. Alternatively it has positive and significant relation with handicraft activities. The coefficient of the mid land location variable is not significant.

With regard to the price proxies, as expected, households that live closer to market sites are more likely to be engaged in trade activities. The relationship of distance to the nearest market and the likelihood of participation in trade was positive and significant. There is no significant effect on participation in the other type of non-farm activities.

12. Recommendations

Understanding the determinants of participation in non-farm activities and the characteristics of the non-farm activities would help policy makers to design and implement more effective policies and programs for non-farm enterprises. Accordingly, development strategies should not only emphasis in increasing agricultural production but concomitant attention should be given in promoting non-farm activities in the rural areas. Secondly, findings of the study also revealed that educated farmers are more likely to involve in non-farm activities. Thus, education could be an effective instrument in increasing participation in non-farm activities. Therefore, the task of upgrading the skills and production techniques of local farmers should be given a special attention. Development programs to promote non-agricultural employment should focus on the establishment of skill training centers at local level.

13. References

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