Determinants of Subsistence Farmers Participation to Non-Farm Activities in Itang Special District, Gambella Region, Ethiopia

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***Abstract*— The subsistence farmers are highly relying on farming activities as the main source of survival in Gambella region particularly in Itang Special District. Thisthreatens the livelihood of most subsistence farmers in the district. The aim of the study was to examine determinants ofsubsistence farmers' participation to non-farm activities in the study area. Multistage sampling technique was used to choose the study area and participants. The data werecollected from 150 randomly selected subsistence farmers in the study area. These data were collected through households' interview and document analysis. Moreover, the data were analyzed by using mean, standard deviation, percentage, frequency, chi-square test, t-test and binary logistic regression model. A result found that trading livestock, selling wild products, craftsman,trading of food and drinks and employed in organizations were the main non-farm activities among the subsistence farmers in the study area. In addition, the credit access, access to remittance, transport access, market access, skill training, livestock holding size and income influence the participation of households to non-farm activities. The concerned bodies need to strengthen the local institutions and alternative activities in the study area.**

***Keywords*— Determinants, Non-farm Activities, Participation,Subsistence Farmers and Itang District.**

I. BACKGROUND OF THE STUDY

Agriculture is the leading livelihood activity among many Ethiopia populations (CSA, 2008). 84% of the Ethiopia populations' livelihoods rely on a number of farming production(Fikremarkos, 2012). The agriculturegenerates employment opportunities for more than 80% of the population, accounts for more than 83% of foreign exchange earnings and contributes almost 43% to GDP of the Ethiopia (UNDP, 2014).

Although agriculture plays a role to society's livelihood and economy of the country; the landholding is declining due to the rapid population growth in the country (FAO, 2012). The majority of smallholder farmers are producing mostly basic staples only for the survival of their households as they cultivate less than 0.5 ha of land in the country (Arega et al., 2013). Theshare of agriculture production has showed a reasonable decline and its contribution from GDP has declined from 51.7% in 1997/98 to 42.3% in 2008/09 with a fall of 9.1 % (Getnet, 20I0). Thus, the majority of farming households are open to food insecurity and chronic poverty due to the failure of carrying capacity of agriculture as well as fragmentation of land size and little agricultural income (Seid et al., 2016).

As a result, participating tovarious livelihood activities is a better way out and an effective strategy for poverty drop (Yenesewet al., 2015). The subsistence farmers tend to involve inregular wage worker to alleviate production threat of rain fed farming and leave low yield crops which contribute to poverty trap in Ethiopia (World Bank, 2005). They are involving in diverseincomesfoundationsto complement the income of landless, generate employment for new participants into the labor force,aggregate farmingproduction and output, and improve purchasing capacity or in-kind income and acts as ameans of safeguarding food security (Mulat, 2001). The farmers involve into off-farm and non-agricultural activities to produce a way of leveling their income annually and seasonally; ease their susceptibility to different vulnerability context; decrease the diverse forms of risks and uncertainties associated with farming (Bedemo et al, 2014). Hence, farmers tend to diversify occupation to buffer the risk of bad weather, land constraints, and other problems that affect both crop and livestock production in the country.

II. STATEMENT OF THE PROBLEM

In Ethiopia, the poverty manifest onagricultural income dependenthouseholds and low paid work households (Berhanu, 2006). The deficiency of complementary income from non-agricultural activities has made the Ethiopian rural deprived more susceptible (Asmamaw, 2005).

Recently, thesource of income and employment are gradually turned to non- farm and off-farm activities (Haggblade 2007).Temesgen, Lingler& Hassan (2010)study in Blue Nile Basin found that non-farm source of income reduce reliant on food assistance and selling resources during climate risks among smallholder farmers.Loening and M. Imru (2009) found that non-farm sector contributes nearly 42%& 25% to the rural participant household income andoccupation respectively.

However, very small number of agriculturalists in Ethiopia has access to non-agricultural activities (Temesgen, Hassan &Ringler 2008). A study by World

Bank (2010) found that participating in diverse income sources in Ethiopia to adjust climate change is not high. Rijkers, Söderbom& Teal (2008) particularly disclosed that only 2% of all households in Ethiopia relied exclusively on non-agricultural business activities and 25% of rural households had one or more non-farm activities. According to Lanjouw (2000) and Hagblade et al. (2002), smallholder farmers' involvement in non-farm activities in particular locations is constrained by gender and social status.Similarly, Demisse&Workneh (2004) indicate that asset ownership, especially livestock plays a main role in influencing households' choices to expand non-farm activities in south Ethiopia.

Similarly, the subsistence farmers in Itangare more dominantly exhausting the farming activities as the main source of their survival. Still, the mainstream of the farmers hardly ever pursue the non-farm activities. This threatens the livelihood of most subsistence farmers in the district. Thisfarming system is getting harm from pests, land degradation and animal diseases which cause the decline in agricultural production and food deficit in the district. Alemseged et al (2014) found that 85 percent of the adults and 70 percent of the children eat only twice a day in the district. Nonetheless, the insufficientstudyhas been conducted in the district on the factors influencing the participation to non-farm activities. As a result, the study was undertaken to fill the gap in the study area.

III. OBJECTIVES OF THE STUDY

The general objective of this study is to examine the determinants ofsubsistence farmers'participation to non-farm activities in the study area.

The studyfocused the followings specific objectives;

- To identify the existing subsistence farmers'non-farm activities in the study area
- To examine the factors influencing thesubsistence farmersparticipation to non-farm activities in the study area

IV. RESEARCH METHODOLOGY

A. *Description of Study Area*

The Itangspecial districtis located at 45km away from the Gambella regional capital. It encompasses 24kebeles among which 95% are situated in the flood plain zones of Baro river basin (Alemseged et al, 2014:2).The districtis situated at 8°15′N 34°10′Ewith altitude ranging from 350 to 480 meters above sea level. It is adjoined on the south and southeast by the Anuak Zone, on the west by the Nuer Zone, and on the north by the Oromia Region; with 35686 (CSA, 2007). The crops production, animal herding and fishing are the mainstays of the population in the district (Alemseged et al, 2014). Bulks of the populations do not assume the non-farm activities in the district. The peoplemainlyoveremphasize the non-agricultural activities inthe district since long. The people are still keeping thetraditional farming system without being supplemented by non-agricultural activities.

B. *Sampling techniques and Sample Size Determination*

Multi-stage sampling technique was conducted to choosethe study area and the sample respondents. In the first stage, out of the 14 woreda in the Gambella Region, Itang Specialworeda was chosen purposively due to it is accessibility to the road, researcher and practice of non-farm activities. In the second stage, twokebelesamong 24 kebele were selected purposefully based on the non-farm activities performance in theWoreda. In the third stage, the populations of the subsistence Farmers werecarefullychosen using stratified sampling techniqueobtained from the sample frame. As a final point, the sample respondents were chosen using simple random sampling techniqueproportional to the size of the population.Then, the sample size for the study wascalculated using simplified formulagiven by (Arsham, 2007): $n=\frac{0.25}{(SE)2}$, Where n = sample size (which is=156) and SE= Standard error (which is=4%).

C. *Data collection methods*

The study had collected both the quantitative and qualitative data. The same, the households' interview and the documents analysis were used to collect the primary and secondary data.

D. *Method of data analysis*

Thedescriptive statistics(frequency, percentage, mean, standard deviation and chi-square test) and the binary logit model were used to analyze the collected data through SPSS version 20.

E. *Hypothesis of the variables*

The dependent variable is participation of subsistence farmers to non-farm activities which is binary (i.e.it takes 1/0).Where1=participants to non-farm activities,0= non-participants to non-farm activities. Similarly, the 12 independent variables were logically hypothesized to determine the subsistence farmers' participation to non-farm activities in the study area. These variables are access to credit, distant to market, sex, landholding size, livestock holding size, skills training, access to transport,income, marital status, access to market information, family size and access to remittance.

Table 1:Independent variables of study

Variables	Nature	Scale	Sign
CRA (yes=1, no=2	Dummy	Nominal	+
MAD (km)	Cont..	Scale	_
SHH (male=1, female=2	Dummy	Nominal	+/_
LANHOL (hectare)	Cont..	Scale	+
LHSIZE(TLU)	Cont..	Scale	+
SKTR (yes=1,no=0)	Dummy	Nominal	+
MARST (married=1, single=2)	Dummy	Nominal	+
IH (birr)	Cont..	Scale	+
ACCTR (yes=1, no=0)	Dummy	Nominal	+
FARMMSI (number)	Cont..	Scale	+
ACCMI (yes=1, no=0)	Dummy	Nominal	+
CCREMI (yes=1, no=0)	Dummy	Nominal	_

V. RESULTS AND DISCUSSIONS

A. Non-farm activities

The subsistence farmers pursue the various non-farm activities in the study area. They are engaged in other non-agricultural activities across the district. In the reference period, the mainexisting non-farm activities are selling wild products, trading livestock, trading food and drinks, craftsman and governmental and non-governmental workin the study area. The study indicated that about 36.6%, 19.2%, 15.4%, 14.7% and 14.1% of the subsistence farmers participated in trading livestock, organizational employed, trading food and drinks, using crafts work and selling wild products respectively in the study area (Table 2).

Trading food and Drinks:The trading of foods and drinks is one of the dominants non-farm activities identified in the study area. The farmers were involving in selling different local and national food and drinks in the study area.About 25.3% and 4.1% of the participants and non-participants households have engaged in food and drinks trading in the study area(Table 2). Bekele&Abdi (2013) result suggested that the most vital basis for non-farm incomes is sale of homemade and drinks.As a result, the frequency difference between the participants and non-participants was found to be statistically significant (p-value=<0.001).

Trading Livestock:Trading livestock is the matching non-farm activities pursued by the subsistence farmers in the study area. The farmers exchange the cow, oxen, heifers, bulls etc. at the local or the regional market center across the district. The survey result indicated that about 22.9% and 52.1% of the participants and non-participants households have involved in livestock trading in the study area (Table 2). A study by Yohannes and Tafese (2017) showed that about 45.5% of households market their livestock and livestock products. Hence, the frequency difference was found to be statistically significant (p-value= 0.041).

	Participants		Non-participants		X^2	p-value
Activities	F	%	F	%		
Trading food and drink	21	25.3	3	4.1	2.1	<0.001
Trading livestock	19	22.9	38	52.1	5.33	0.041
Selling wild products	10	12	12	16.4	3.70	0.486
Craftsman	14	16.9	9	12.3	6.23	<0.001
Employed	19	22.9	11	16.1	1.92	0.006

(Source: Own Survey, 2020)

Selling Wild Products:The farmers are selling wild products to several market centers in the district. These products are wilds vegetable and fruits, charcoal and fire woods. As such, the study showed that about 12% and 16.4% of the participants and the non-participants were engaged in wild products selling (Table 2). Doyo(2018) result confirmed that nearly 6.11% of the households receive income from charcoal and firewood sales.

Craftsman:The subsistence farmers are involving to the various artistries activities in the study area. These main income activities were identified as blacksmith, pottery and so on in the study area. These activities were engaged principally by the older and the women groupsin the study area. The result revealed that around 16.9% and 12.3% of the participants and non-participants have involved in craftingactivities in the study area (Table 2). Yohannes and Tafese (2017)showed that about 10% households were engaged in hand craft activities. In the meantime, the frequency difference was found to be statistically significant (p-value=<0.001).

Governmental and NGO Employed:The Governmental and NGO employment is themainincome activities among the subsistence farmers in Itang special district. In the study area, some of the farmers are engaged in the permanents works. The survey result showed that about 22.9% and 16.1% of the participants and non-participants have participated to non-farm activities in the study area (Table 2). This indicated that the greater number of the farmers have engaged to non-farm activities in the study area. Tewodros and Tesfaye(2016) finding indicated that 5.8% of the households have involved in non-farm wage employment in HoroWoreda. As a result, there was significant difference between the participants and the non-participants (p-value=0.006).

B. Determinants of Non-farm activities

The multicollinearity among the hypothesized dummy independent variables was checked during the analysis of this study. The results of the discrete independent showed that the contingency coefficient were below one. The Variance Inflation Factor results showed that all values of the variables were below 10. Then, thegoodness of fit test showed that the p-value (=0.847) of the Homer-Lemshew goodness of fit test is greater than the significant levels. At this respect, the binary logit model showed that the credit access, access to remittance, access to transport, access to market, livestock holding size, skill training and income were statistically significant explanatory variables.

Table 2: Binary Logit Result

Variable	B	S.E	Wald	Sig.	Exp (B)
LANHOL	-.02	.025	.731	.748	1.2
LHSIZE	-.05	.060	4.837	.06*	1.7
IH	.000	.000	.761	.022**	1.0
SKTR	.012	.007	2.944	.006**	1.01
MAD	-.027	.026	1.086	.021**	1.2
SEHH	1.444	.763	3.576	.475	4.6
ACCTR	.446	1.004	1.197	.002***	.40
ACCREMI	.149	.072	2.577	.009***	1.0
ACCMI	.029	.686	.002	.922	.91
FARMSI	.299	.877	.116	.522	1.3
MARST	.474	.071	.320	.276	7.9
CRA	.028	.606	3.002	.001***	.75
Constant	-45.160	.608	.000	.999	.00
LR $Ch^2(16)=142$, p-value=0.000 Hosmer-Lemshow $Ch^2(8)=3.124$, p-value=0.456 Number of Observation=156					

(Source: The binary logit model output)

Note: *, ** and *** represent the variables that are statistically significant at 10%, 5% and 1%.

LHSIZE (Livestock holding size):There was a negative significant association between livestock holding size and participation to non-farm activities (p-value=0.06). This shows that the increase of livestock holding size would decrease the farmers' participation to non-farm activities. The estimate indicated that increasing the number of livestock holding by one TLU, would reduce the probability of the farmers decision to participate to non-farm activities by 1.7. This implies that the households with the large number of livestock do not engage in non-farm activities in the study area.Ashebir and Neguste (2016) showed that the livestock size influence the engagement to non-farm activities.

SKTR (Skill Training):the skill training positively influence the participation to non-farm activities of the farmers (p-value=0.006). This exposes that the increases of skill training increase the non-farm activities participation among the farmers. While keeping the other variables constant, the increases of skill training would increases the probability of non-farm participation among the farmers by 1.02. This shows that the farmers engage in non-farm activities when they have taken the skill training. Wondim (2019) review found out negative effect of skill training on livelihood activities participation.

CRA (Credit Access):The credit access influence the farmers participation to non-farm activities positively (p-value=0.001). This means that the increase of the credit access, increase the farmers decision to participate in non-farm activities in the study area. The estimate shows that as the credit access services increase, the probability of non-farm activities participation would increase by 0.75. This necessitates that the households with more financial support involve in different enterprise. Gebrehiwot and Fekadu (2012) result indicated that the credit access influence the participation to livelihood activities.

MAD (Market Distance):The association between the market distance and participation to non-farm activities was negatively and statistically significant (p-value=0.021). This demonstrates that the increase of the market distance decrease the participation of the farmers to non-farm activities. While other variables are kept constant, the increase of market distancewould decreasethe probability of the farmers' participation to non-farm activities by 1.2. Amare (2018) result indicated that the market access had negative relationship with the choice of the farmers to enter into livelihood different non-farm activities.

IH (Income of Households):The income of the farmers was positively and statistically significant (p-value=0.022). This indicates that having more income increases the engagement to non-farm activities in the study area. Thus, the estimate shows that the increases of farmers' incomes

by one birr would increases the probability of participation to non-farm activities by 1. This is in connection with the fact that the income are often demanded to pursue the business activities across the Itang Special District. Yishak (2017) result indicated that annual incomes determine the participation to non-farm activities.

ACCETR (Access to transport):Theaccess to transport was found to be positively and statistically significant at 1% (p-value=0.002). This showed that as the access to transport of the farmers increases; the participation to non-farm activities increases as well. The estimate indicates thatthe increase of the transport access would increases the probability of non-farm activities participations by 0.40 among the farmers. This means that the subsistence farmers that access the transport services participate to the non-farm activities more than others.

ACCESREMI (Access to Remittance):Theaccess to remittance was found to be positively and statistically significant (p-value=0.009). This shows that as the access to remittance increases; the participation to non-farm activities increases. This indicates that the increase of the access to remittance would increases the probability of non-farm activities participation by 1. This means that the farmers whohave remittance involve more to non-farm activities in the study area. Gebrehiwot and Fekadu (2012) result revealed that the regular remittance influence the participation of farmers to livelihood activities in the study area.

VI. CONCLUSIONS

The subsistence farmers have involved in non-farm activities in the study area. The engagement to non-farm activities is the tool that lessens the poverty among the marginalized farmers in the Itang special district. The dominant activities engaged by the farmers are trading livestock, selling wild products, trading food and drinks, governmental/NGO employed and crafts man activity in the study area. The several factors influenced the subsistence farmers' participation to non-farm activities in the study area. The credit access, access to transport, access to market, livestock holding size, access to remittance and skill training were the determinants factors of subsistence farmers' participation to non-farm activities. Therefore, the provision of training, supply of financial services and transport amenities, establishing market center and creating alternative livelihood options should be strengthen in the study area.

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