



## RURAL HOUSEHOLD'S PARTICIPATION IN NON-FARM ACTIVITIES: THE CASE OF THE MAKUEY DISTRICT, NUER ZONE, GAMBELLA REGION, ETHIOPIA

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### ABSTRACT

Ethiopia is a farming nation where agriculture provides a living for a large portion of the inhabitants. Most rural households suffer from chronic poverty and food insecurity as a result of agriculture's deteriorating carrying capacity, land fragmentation, and low agricultural income. This makes rural households participate in non-farm activities to generate income to cope with these challenges. The study used a mixed study design. A step-by-step sampling procedure was used in this study in which the Makuey district was selected purposively, Puokuath and Bildak kebele were selected at simple, random, and stratified sampling procedures were applied to select sample respondents. The study also employed a descriptive, inferential, and econometric model for data analysis. Based on the findings, only significant discrete variables were the gender, literacy level, and household credit access. Similarly, the significant continuous variables were market distance and household income. Furthermore, the main challenges facing rural households' participation in non-farm activities were bad infrastructure and negative cultural perception. The binary logit model result indicated that market distance, literacy level, and credit access were significant and negatively influenced rural households, while incomes and the gender of rural households were significant and positively influenced the rural household's involvement in non-farm activities. The study recommended that the regional and district governments should access infrastructure and create awareness about the benefits of non-farm activities.

## INTRODUCTION

The authors' definitions of non-farm activity varied widely. According to Kaija (2007), the "non-farm sector" refers to activities that are not tied to farming or wage employment in the agricultural sector. According to Gordon and Craig (2001), non-farm activities are those that are not mostly related to farming, forestry, or aquaculture. Agricultural product processing and trade-offs, on the other hand, are classified as non-farm activities. As a result, non-agricultural enterprises play an essential role in African countries' development programs and are critical for the lives of the rural poor.

Based on the International Fund for Agricultural Development (2011), rural households are more dependent on non-enterprise income, making up nearly 35% of poor household income across the continent and around 50% globally. In developing countries where agriculture is the dominant economic sector, a variety of factors have a considerable impact on rural poverty and livelihoods. Rural households in these nations took part in various non-farm work options to lessen the impact of the difficulties, which were far more prevalent and varied in the rural section of Africa (David, 2010).

Ethiopia is a farming nation where agriculture provides a living for a large portion of the inhabitants. This means that the agricultural sector feeds more than 80% of the country's citizens and accounts for around 43% of the nation's gross domestic product and 83% of its foreign exchange gains (United Nations Development Programme, 2014). Most rural households suffer from chronic poverty and food insecurity as a result of agriculture's deteriorating carrying capacity, land fragmentation, and low agricultural revenue. They also experience fluctuations in their farming revenue due to the interrupted drought and extreme environmental circumstances that make farming a dangerous economic activity (Food and Agricultural Organization, 2012; Seid et al., 2016).

In the study area, subsistence farming has long been the principal source of income for rural households. Nevertheless, insects, pests, land degradation that reduces soil quality, and animal diseases all pose challenges to this subsistence farming system, resulting in agricultural failure and a food shortage. As a result, the rural families in the study region engage in non-farm industries in order to solve these challenges, generating additional income and enhancing their well-being (Benishangul Gumuz Region Development Gap Assessment, 2010). Rural non-farm economic activities not only provide employment opportunities to directly increase the income of rural households, but they also serve as a means of supplying inputs to the agricultural sector and an opportunity to add value to farm output. Marginal farmers who abandon farming because of low productivity should be allowed to find work in a wealthy non-farm sector. There is a growing recognition that rural people's livelihoods are not as dependent on agriculture as they were in the past, which

is reflected in greater interest in rural non-farm enterprises (Davis & Bezemer, 2004).

In order for intervention to effectively encourage household involvement, it is necessary to critically examine the elements that influence rural households' participation in the non-farm sector. In order for intervention to effectively encourage household involvement, it is necessary to critically examine the elements that influence rural households' participation in the non-farm sector. Since effective policies and programs that boost local communities' exposure to non-farm income-generating options would improve their standard of living (Gebrehiwot & Fekadu, 2012). As a result, a critical examination of the non-farm job opportunities available in the research area, as well as the factors determining households' engagement in activities other than agriculture, is critical for improving mechanisms for addressing poverty, food security, and livelihood improvement. However, little actual proof was discovered to study farmers' contribution to non-farm activities in the selected area. As a result, the specific aims of this study were to find out the challenges faced by rural households and the factors that drive them to take part in non-farm economic activities in the Makuey district.

## **RESEARCH METHODS**

### **Study Area Description**

The study was piloted in the Makuey district, one of five districts in Gambella Peoples Regional State's Nuer zone. It's the center of the Nuer zone, and it's about 140 km from Gambella town. The district is in the west of Gambella town, and its estimated area covers 1,642 km<sup>2</sup>. The dominant economic activities of people living in the area are dependent on agro-pastoralism. Depending on the season, the district's weather ranges from 200°C to 350°C in the summer and winter seasons and from 320°C to 400°C in the spring and autumn seasons. Itang Special District, Jikow District, Lare District, Wanthoa District, Abobo District, and Jior District border the district.

### **Research Design**

The study used a mixed design with cross-sectional survey methodology to determine rural households' engagement in non-farm enterprises in the Makuey district. To obtain the necessary data for the study, both quantitative and qualitative methods were used.

### **Sampling Procedures**

A step-by-step sampling procedure was used in this study. The Makuey district was purposively chosen in the initial stage due to the prevalence of many non-farm enterprises in which local households may participate. In the second stage, two kebele, Puokuath and Bildak, were chosen at random from

among the 21 kebele using the lottery method. In the third stage, sample households in each kebele were stratified into two groups: non-farm participants and participants, and then selected households were chosen at random in each stratum. In each kebele, an equal number of participants and non-participants were gathered, and the sample size was established in all kebelles. Cochran's formula (1977) was applied to the calculated sample size.

$$n = (z^2 pq) / e^2, q = 1 - p(1) \\ ((1.96)^2 * 0.5(1 - 0.5) = 196) / ((0.007)^2)$$

Where  $p$  is the proportion of households in the Makuey district engaged in a non-farm occupation. If the degree of variability is unknown, Cochran (1977) suggests estimating the greatest variation, which is equal to 50% ( $p = 0.5$ ), and using a 95% confidence level. If there is any dispute about the value of  $p$ , Macfarlane (1997) suggests taking 50% of the sample size. There was no specific number (or percentage) of farm households participating in non-farm enterprises in the study area. As a result, the arbitrary maximum variance of 0.5 was used in this study.

### Method of Collecting Data

Throughout the process, the study employed sources that were both primary and secondary, along with qualitative as well as quantitative data, in order to provide useful and pertinent data. Structured and unstructured surveys, key informant interviews, and focus group discussions were used to obtain primary data from the sample participants. Furthermore, secondary data were mostly gathered from district-level official records, archive research in books, journals, and manuals, and yearly reports of district magazines. The heads of households from the selected kebelles served as units of analysis.

### Data Analysis Method

#### *Binary Logit Model*

Descriptive and inferential statistics, as well as an econometric model, were employed. The descriptive statistics consisting of frequency, percentage, mean, and standard deviation were applied. In addition, the t-test for independence and the chi-square test, respectively, were used to compare participation and non-participant sample respondents to various independent variables. Moreover, a binary logit model was applied to determine the participation of rural households in non-farm activities in the Makuey area.

As mentioned above, the most widely used model to estimate a dichotomous dependent variable's dependence on numerous independent variables was the binary logit model. Therefore, participation status is a dual dependent variable with a value of 0 for non-participants and 1 for participant respondents. The logit model's functional form is as follows (Gujarati 2004):

$$P_i = E \left( Y = \frac{1}{X_i} \right) = 1 / (1 + e - (\alpha + \beta X_i)) = 1 / (1 + e - (Z_i)) \quad (2)$$

For simplicity of presentation, the logit is transformed into a linear expression of several independent variables:

$$Li = \ln (Pi) / ((1 - Pi)) = Zi = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \dots \beta_n X_n \quad (3)$$

Table 1. The operational definition of the variables

	Nature	Measurement	Hypothesis
Dependent variable			
Participation status	Dummy	0=Non-participant, 1=Participant	-/+
Independent variables,			
Gender	Dummy	0= Female, 1= Male	+
Literacy level	Dummy	0=Illiterate, 1= Literate	+
Household incomes,	Continuous	Ethiopian Birr	+
Training access	Dummy	0=No, 1=Yes	+
Age	Continuous	Years	+
Household size	Continuous	Total family member	+
Credit access	Dummy	0=No, 1=Yes	+
Cooperative access	Dummy	0=No, 1=Yes	+
Market distance	Continuous	Kilometer	-

Source: Related Data (2023).

Pi denotes the likelihood of being a non-farm participant household, Li denotes the logit, Xi denotes a vector of explanatory factors, and  $\beta_n$  denotes a matrix of variables to be evaluated. It must be emphasized that the coefficients estimated do not indicate the influence of changing the relevant independent factors on the likelihood (P) of the event arising. The coefficients direct the impact of each of the independent factors on their log odds (Li) (Neupane et al., 2002). As a result, the ratio of odd's is the best tool for determining the effect of independent variables on the probabilities.

## RESULTS AND DISCUSSION

### Statistical Test for Discrete Variables

The descriptive analysis discusses fundamental information on categorical variables among respondents using descriptive statistics, including frequency and percentage distribution. These variables were gender, literacy level, credit access, cooperative access, and training access. In addition, the chi-squared test was employed to test the statistical significance of the link for discrete variables. A chi-square test is used to describe categorical variables in Table 2. The results indicate that gender, literacy level, and credit access of sample respondents show a significant relationship between non-participant and participant respondents at 5%, 10%, and 10%, respectively ( $p = 0.023$ ;  $0.062$ ;

and 0.065). At any probability level, cooperative and training access for sample respondents show no statistically significant association with the dependent variable.

Table 2. Descriptive analysis for discreet variables

		Participation					
Variables		Non participant		Participant		$\chi^2$	P-value
		Freq.	%	Freq.	%		
Gender	Male	40	46	69	63	5.14	.023*
	Female	46	54	41	37		
Literacy level	Illiterate	56	65	57	52	3.50	.062**
	Literate	30	35	53	48		
Credit access	No	74	86	83	75	3.40	.065**
	Yes	12	14	27	25		
Cooperative access	No	45	53	56	51	.039	.844
	Yes	41	47	54	49		
Training accesss	No	59	59	84	76	1.47	.225
	Yes	27	31	26	24		
<b>Total</b>		<b>86</b>	<b>100</b>	<b>110</b>	<b>100</b>		

Source: Own Survey Data (2023). \*, \*\* mean significant at 5% and 10% of probability level.

### Statistical Tests for Continuous Variables

To describe the sample's basic information, inferential statistics like the standard deviation and mean are employed. These continuous variables included the sample respondents' age, market distance, household income, and household size. Similarly, the t-test was employed to identify the statistical mean difference among participants and non-participants.

Table 3. Descriptive analysis for continuous variables

		Participation			
Variables		Non participant(N=86)		Participant(N=110)	
		$\bar{x}$	$\sigma$	$\bar{x}$	$\Sigma$
Age		26.36	5.91	25.99	6.31
Market distance		3.47	2.85	2.64	2.29
Household incomes		4,485.48	2,628.62	3,908.4	1,950.25
Household size		10.71	9.67	9.24	7.63

Source: Own Survey Data (2023). \*, \*\*\* Indicate mean the difference for 0.05 and 0.1 level of precision.

Table 3 explains continuous variables using a t-test, which shows that the market distance and household incomes of sample respondents show a

statistically significant mean variance between non-participant and participant respondents at 5% and 10% probability levels, respectively. At every degree of precision, there was no statistically significant variation in the sample respondents' age and household size.

### **Rural Household's Challenges in Non-farm Activities**

Although rural non-farm businesses have varied repercussions for rural families, not all rural households in the Makuey district have equal access. The selected participants described various evidences of barriers to non-farm activities in the Makuey district. The main obstacles to non-farm businesses were described as weak markets (17%), bad infrastructure (32%), a lack of skills and expertise (11%), a lack of financial resources (15%), and a negative cultural perception (25%). Bad infrastructure and negative cultural perceptions, as shown in Table 4, were the most difficult factors influencing participants in rural areas. This finding is in line with the literature of Varsha (2016), who discovered that a small-scale survey in India faces significant infrastructure challenges. In line with this, Yohannes and Tafese (2017) also reported that the negative attitude of society is a major challenge to non-farm activities in Boricha Woreda, Sidama Zone, Ethiopia.

Table 4. Challenges faced by participants in the Makuey district

<b>Challenges</b>	<b>Freq.</b>	<b>%</b>
Weak markets,	34	17
Bad infrastructure	63	32
Lack of skills and expertise	21	11
Lack of financial resouces	30	15
Negative cultural perception	48	25
Total	196	100

Source: Own Survey Data (2023)

### **Factors Influence Farmer's Participation in Non-farm Activities**

Only five of nine explanatory variables were statistically significant, based on the binary logit model results in Table 5, with the other four variables being statistically insignificant. The statistical significance variables are discussed in more detail below. The market distance is significant and negatively influences rural households' participation in things other than farming. Considering a 10% probability level, this means that for every kilometer of market distance, the possibility of rural households participating in non-farm activities reduces by 0.889. This observation is consistent with the findings of Assefa (2011) & Tafesse et al. (2015).

Therefore, the time needed to travel to the nearby main market has a negative and considerable impact on the respondents decision to participate in a non-farm enterprise. Nevertheless, Sanusi et al. (2016) discovered that

proximity to towns and roads boosted the chance of non-farm involvement. In other words, houses in the local town or market, as well as those along the major road, are more likely to have members who work outside the home.

The literacy level is significant and negatively influences rural households' engagement in the non-farm sector. For a 10% probability level, this means that as household literacy levels rise, the likelihood of rural households engaging falls by 0.558. The finding of Sabreen & Behera (2021), which was similar to our ideas, explained that literacy level has significantly and adversely influenced households to be involved in non-farm activities. Their findings suggested that higher literacy levels may enable individuals to access more opportunities in urban areas, leading to a decrease in interest in non-farm activities within rural settings. However, this contradicts the findings of Amogne et al. (2017) and Ussle (2019), who discovered a positive relationship between literacy level and non-farm activity. According to their findings, family members with a higher degree of education are more likely than their peers to take part in non-farm sources of livelihood in rural settings.

The household's income is significant and positively influences rural households' participation in non-farm activities. This indicates that for every 1 Ethiopian birr increase in household income, the chance of rural households participating in other industries increases with 1.000. According to Ebaidalla's (2019) study, people from wealthy families have greater opportunities to take part in non-farm activities than people from impoverished homes. This is because higher-income households have assets and greater access to finance, allowing their members to engage in things other than farming more easily.

Household credit access is significant and negatively influences rural households' involvement in non-farm enterprises. For a 5% level of precision, this means that when household credit access declines, the chance of rural household participation increases by 0.373. This standpoint was shared by Tsegay et al. (2021), who saw negative influences from rural households' involvement in non-farm economic activities. However, it differs from Bereket & Zenebe (2011) and Ashebir & Negussie (2016), who found that access to credit was substantial and good in terms of the decision to participate in non-farm work. This could be due to the fact that access to credit or other forms of finance allows and encourages poor households to engage in non-farm economic activity.

The gender of rural households is significant and positively influences rural households' willingness to take part in non-farm activities. Within a 5% probability level, the chance of rural households participating in non-farm activities increases with 2.210 because the sample household head is male. This finding aligns with Yesuf's (2015) results but differs from Zewdu & Birhanu's (2021) findings that female-headed households are more inclined than male-headed households to be involved in non-farm activities, which may be related



to the challenges related to farming or the bodily endurance needed for farming-related activities. As a result, females are observed to engage in more non-farm rural activities than their male counterparts.

Table 5. The Binary Logit Model Results For Explanatory Variables

Variables	B	Sig.	EXP(B)
Age	-0.009	0.710	0.991
Market distance	-0.118	0.060**	0.889
Literacy level,	-0.584	0.064**	0.558
Coperative access	-0.079	0.803	0.924
Household incomes,	0.000	0.093**	1.000
Credit access	-0.986	0.021*	0.373
Household size	-0.023	0.189	0.977
Training access	0.497	0.163	1.644
Gender	0.793	0.014*	2.210

Source: Software Output (2023). \*, \*\* mean significant at 5% and 10% of probability level

## CONCLUSIONS AND POLICY IMPLICATIONS

### Conclusions

The study determines the rural household's participation in non-farm activities. According to the findings, only major barriers to rural households' participation in non-farm economic activities were bad infrastructure and a negative cultural perception. Market distance, literacy level, and household credit access were significant and negatively influenced rural households, whereas household income and gender of rural households were significant and positively influenced rural households' involvement in non-farm economic work, according to the binary logit model.

### Suggestion

This study provides a comprehensive analysis of rural households' participation in non-farm economic activities in the Makuey district. By examining the challenges faced by these households as well as the factors that influence their participation in non-farm activities, we suggest several policy interventions and support programs to enhance their contribution to non-farm work for poverty reduction and local development. Firstly, there is a need for targeted skill training programs to improve the capacity of rural households to engage in non-farm enterprises. Additionally, access to credit and financial services should be facilitated to empower individuals to invest in and expand their non-farm enterprises. Lastly, infrastructural improvement, including better roads and electrical energy, is crucial to facilitating the growth and comprehensiveness of non-farm activities in the district. Overall, implementing these recommendations can contribute to sustainable rural development and poverty reduction in the Makuey district

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