European Journal of Business and Management
ISSN 2222-1905 (Paper) ISSN 2222-2839 (Online)
Vol.15, No.13, 2023

Determinants of Nonfarm Economy: The Case of North-Mecha District, Northwest Ethiopia

Mamo Adane Alem[1*] Meseret Mulu Demilie[2]
1. Ethiopian Agriculture Authority, North Ethiopia Center, Bahir Dar, Ethiopia
2. College of Agriculture and Environmental Sciences, University of Gondar, Gondar, Ethiopia
* E-mail of the corresponding author: adanemamo@gmail.com

Abstract
Solely depending on farming is unlikely to improve food security because of pressure exerted on agricultural land by diversified activities and hence rural societies usually participate in nonfarm activities that play an increasingly important role in rural household income. ***A cross-sectional study was carried out in*** North Mecha district, Northwest Ethiopia to assess and describe the types of nonfarm livelihood activities adopted in the area, identify factors influencing farmers' decision for diversification into the nonfarm livelihood activities, to examine the constraints to nonfarm livelihood diversification in the district and to compare annual additional income of households participated in nonfarm livelihood diversification. Data were obtained from 168 randomly selected households using comprehensive and pre-tested structured questionnaire administered to individual heads of households through interview. Purposive and random sampling techniques were used to select the study area and sample households, respectively. Data that were collected using the survey questionnaires were analyzed by employing chi-square test, Independent sample t-test, probit model and thematic analysis. Households in the study area were forced to diversify their livelihood into nonfarm livelihood activities due to land constraints, family necessity, low demand**,** risk aversion as well as higher returns earned by households that had been participating in nonfarm activities. Limited access to sufficient capital**,** poor infrastructures as well as lack of technical support and training were the major constraints which hindered farmers from undertaking nonfarm activities. The regression model result revealed that family size, education, training access, marital status, landholding and sex were major factors that determined the propensity of rural household's participation to nonfarm activities. We argue that entrepreneurial training and skill development, facilitating resource allocation and infrastructure development would enhance the participation of smallholder farmers in nonfarm activities. To achieve this, policy makers and other stakeholders should integrate nonfarm livelihood strategies into rural farming economies.
Keywords: Households, Nonfarm livelihood activities, Probit model, Northwest-Ethiopia
DOI: 10.7176/EJBM/15-13-03
Publication date: July 31st 2023

1. INTRODUCTION

Achieving the goal of reducing poverty only through increasing agricultural productivity and redressing the issues of access to key agricultural resources without nonfarm livelihood diversification could not be successful in the sub-Sahara African countries (Dercon, 2006). However, Ethiopian government has been putting more emphasis to the agriculture sector as a strategy to resolve the challenges in food security (Rijkers and Soderbom, 2008), which is characterized by low labor productivity, a declining in farm size, soil degradation, subsistence farming, and tenure insecurity, imperfect agricultural markets and poor infrastructure (Beyene, 2008).

Thus, farming as a primary source of income has become failed to guarantee sufficient livelihood for most farming households in rural Ethiopia; if there had not been other sources of income apart from agricultural production, the land scarcity by the farmers coupled with agricultural risks could not generate enough income to feed household members and they cannot fulfill household needs (Gebrehiwot and Fekadu, 2012). Therefore, crop and livestock production are no longer the only sources of rural households´ income in the country. This indicates that, solely depending on agriculture is unlikely to improve food security because of the increase in population pressure and drought (Tegegne, 2020).

Many policy makers have an intense interest in promoting income-generating activities via nonfarm livelihood diversification at household level (Gebrehiwot and Fekadu, 2012). The rural nonfarm activities are those all economic activities in rural areas except agriculture, livestock, hunting and fishing, that is, all activities associated with waged work or self-employment for income generation. Thus, nonfarm activities are located in rural areas but are not agricultural activities; and they generally include the rural institutional framework (hospitals, roads, schools, etc.), manufacturing (agro-processing), adaptive, switching from cash crop cultivation to commodity trading (Kebede and Zewdu, 2014).

In the previous Ethiopian Government (Derg regime), the agricultural policy advocated for collective and state-owned farming and nonfarm systems. Hence, private ownership of resources was very restricted. Government support like training and finance was restricted to cooperatives and state owned enterprises.

According to Tassew (2000), even during this period, nationalized public institutions were given responsibility to promote nonfarm sector but efforts directed towards cooperatives on which individuals trained in crafts were unable to establish themselves because they lacked credit, tools, raw materials and business skills. After 1991, the economy of the country was liberalized, individual property rights were allowed and participation to nonfarm activities substantially increased. However, though the policy of the current government emphasizes both farming and nonfarm sector, the focus of the economic reform is exclusively on farming sector (Dercon, 2006; Haggblade and Reardon, 2010).

Studies done on livelihood diversification in Ethiopia, such as by Dercon (2006), Gebrehiwot and Fekadu (2012), Adugna and Wagayehu (2012), Amare and Belaineh (2013), Arega *et al*., (2013), Kebede and Zewdu (2014), Yenesew *et al.* (2015), Dessalegn and Moges (2016), Birhanu and Getachew (2016), Amare (2018), Tegegne (2020) have concentrated much on livelihood diversification as a whole with less emphasis on nonfarm diversification. Some studies have also surfaced to highlight the determinants of nonfarm livelihood diversification but empirical evidence on it are mixed (Nagler and Naude, 2014). For instance, the positive influence of education on nonfarm livelihood diversification was reported by in Southern Ethiopia by Adugna and Wagayehu (2012) contrasting earlier studies that education was not a significant determinant of nonfarm diversification (Beyene, 2008).

It is therefore, so important to identify empirically untested and the commonest determinant factors influencing farmers' decision for diversification in the nonfarm livelihood activities at household level in line with assessing the types of nonfarm livelihood activities adopted in the area. Also, the study was designed to compare annual income of households earned from participating in nonfarm livelihood diversification, that previously conducted studies hardly indicated the contribution of nonfarm livelihood activities through income add up to the households' total income at household level in the study area.

2. CONCEPTUAL FRAMEWORK

The conceptual framework for this study was adapted from the sustainable livelihood framework of *Serrat (2008) that emphasizes understanding of the context within which people live, the assets available for them, livelihood strategies they follow in the face of existing vulnerability contexts as well as livelihood outcomes they intend to achieve.* In the adapted framework, livelihood strategies have been named as nonfarm livelihood diversification activities, which the study considered them as a mechanism that the rural farmers in the study area adopted as a result of 'push-' or 'pull factors'. *Push factors are the negative factors that can cause farm households* to have low returns from agricultural activities or in an attempt to capture new work opportunities. Most rural households decide to engage in nonfarm activities *to cop up* shocks and stresses by creating alternative business so as to raise their income.

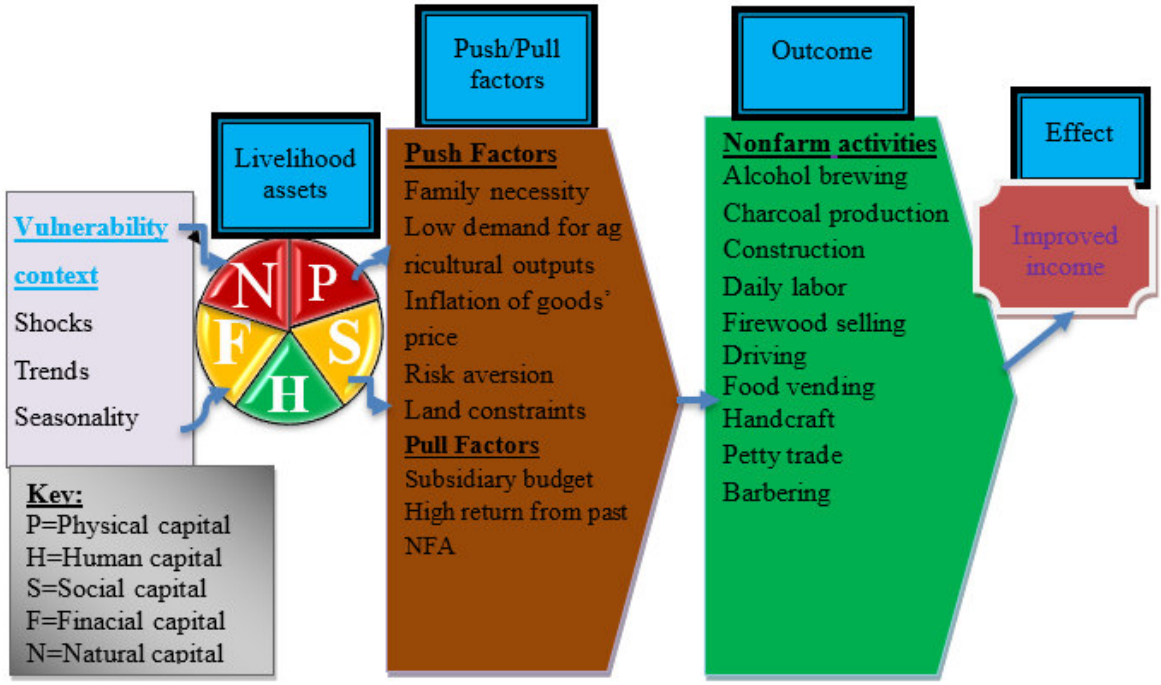

Figure 1: Conceptual frameworks of nonfarm livelihood diversification strategies in the study area

3. THE RESEARCH AREA and METHODS

3.1. Study Area Selection and Description

The study was conducted in three randomly selected *kebeles* of North Mecha district found in West Gojjam Zone of Amhara National Regional State, Northwest Ethiopia. The North Mecha district was selected from the districts of the Zone due to the expectation that the rural households in this area have had adopted well identified nonfarm activities; despite of the primary occupation of the dwellers in the district was farming. The rural people in the district achieved such supposition in practicing nonfarm livelihood activities was firstly by district's proximity to the Bahir Dar (the capital city of the region) that might foster nonfarm livelihood activities to Rural-Urban Linkages that helped the researcher to consider them aware of the importance of diversifying their livelihood into nonfarm livelihood activities. Second, the district was potential area for nonfarm livelihood activities, for example, for charcoal production as result of presence of abundant *Eucalyptus* trees. That is, the people in North Mecha district were endowed with natural resources that made them easily participate in nonfarm livelihood activities. Therefore, natural endowment and high level of preparedness of rural farm households to diversify their livelihood by adopting various types of nonfarm livelihood activities were the bases for selection of the district as study area.

Geographically, the district is located at about 630 km northwest of Addis Ababa, and 35 km southwest of Bahir Dar, capital city of Ethiopia and Amhara Regional State, respectively. It shares boundaries with South Achefer to the west, Bahirdar zuria to the north, Yilmana-densa to the east, and Debub Mecha district to the south direction. It is divided into 37 smallest administrative units called *kebeles.* The district has a total land area of 1,124,383 square kilometers, and total populations of 370,032. According to agro-ecological classification criteria, it is classified as *weynadega.* The elevation of the area ranges from 1500 to 2500 m. a. s. l; the mean annual rain fall ranges from 1500 to 2200 mm; and mean temperature ranges from 24 to 27ºC. The vegetation types covering the area are savanna grass, *Eucalyptus* tree and bushes. Mixed crop-livestock production system is the main livelihood strategy, but many non-agricultural activities are practiced in the study area.

3.2. Target Population and Study Design

The population for the study was made up of farmers at household level in the North Mecha district found in Amhara National Regional State of northwest Ethiopia. The target population therefore was composed of households who were randomly selected from three *kebeles* in the district. Cross sectional study design was used in order to capture information at a given point in time from selected samples to reflect the large population to which the finding was generalized. The study approach employed was mixed approach (quantitative vs. qualitative); the quantitative research approach was applied to identify the existing types of nonfarm livelihood diversification activities adopted at household level, examine the determinant factors and motives influencing rural household's participation in nonfarm income diversification. In addition, for non-quantifiable variables, qualitative research approach was employed.

3.3. Sampling Procedures and Sample Size Determination

The study district, North Mecha, was selected purposively, due to the reasons described under study area selection section, from rural districts of West Gojjam zone of Amhara regional state. Then, all *kebeles* in the district were stratified into three strata of *kebeles* based on their distance from the town of the district, *Merawi*; distance of *kebeles* to the market, *Merawi* in this particular study, was taken as a main variable the researcher wanted to see the effect of market distance on adopting nonfarm livelihood activities by rural households. Accordingly, the researcher wanted to group *kebeles* from 1.5 km up to 13.5 km into nearby *kebeles*; from 14 km up to 24 km as averagely distant *kebeles;* and from 26 km up to 45 km as distant *kebeles*. Then, from each respective stratum, one *kebele* was selected by simple random sampling technique; and accordingly, *Enamrt, Kurtbahir* and *Tateklesra kebeles* were selected as study sites.

With regard to selection of sample households, the researcher used sampling formula of Yamane (1967) as cited and described by Ana and Demmelash (2017) who took confidence level of 92.5% and 7.5% error term to calculate the sample size.

$$n = \frac{N}{1 + Ne^2}$$

Where, (n) stands for the sample size, (N) for the population size, and (e) for the margin of error.

Then, the number of households to be interviewed was determined proportionately to the total number of households dwelling in the respective *kebele*s and selection of individual sample household was made using simple random sampling technique. The total population in three of the selected *kebeles* accounted for 2,981 (Enamrt = 717, *Tateklesra* =964, *Kurtbahir* =1300). Accordingly, out of the total population (2981) in the three selected study *kebele*s, 168 sample households were selected for the study. A proportion was given to each of the three *kebeles* depending on the population of households in a given sample frame; proportionate sample size

determination was undertaken to select sample households from each *kebele* by multiplying population size of a given study *kebele* by the ratio of total sample households of all study *kebeles* (168) to total population size of target population of the study area (2981) (Table 1).

Table 1: Sample size distribution by study *kebeles* in North Mecha district

No.	Name of *kebele*	Total number of households in a *kebele*	Sample size per *kebele*
1	*Enamrt*	717	41
2	*Tateklesra*	964	54
3	*Kurt Bahir*	1300	73
	Total	2981	168

3.4. Data Collection Methods

Both quantitative and qualitative data were collected from primary and secondary data sources to attain the specific objectives of the study. They were collected using comprehensive and pre-tested structured questionnaire administered to individual heads of households through interview. The questionnaire was specifically designed for the study to gather information on nonfarm livelihood diversification activities and their determinant factors affecting farmers to participate and not to participate in doing nonfarm activities. The questionnaire had two main sections: (1) data on socio-demographic characteristics and (2) data about non-farm activities existing in the study area. The questionnaire was pre-tested for better actual field work and ease of analysis as well as to ensure consistence and clarity of the instrument by interviewing seventeen randomly selected households from *Bachima kebele,* which was selected for the pre-test because of its similar characteristics with the study *kebeles*. Moreover, it enabled the researcher to revise some questions that were difficult to interpret in the local dialect. Thus, some open-ended questions were modified into close-ended questions.

Prior to commencement of an interview process, in order to gain cooperation and trust, a verbal informed consent was obtained from the selected participants that were assured of voluntary participation by explaining the purpose of the interview**,** the confidentiality of response, the risks and benefits of participation in the study and the opportunity to withdraw at any time without prejudice. In order to get better involvement of the interviewees and thus obtain data as per schedule, respondents were interviewed at days free of their work. Moreover to enrich the primary data analysis and support it by some related theoretical concepts, 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 such as journals, articles, books, internet and annual reports.

The interview process had been facilitated with the help of key individuals in the study area, like professional personnel and administrative body of each study *kebele.* The working language in the region is Amharic and the researcher is a speaker of the language; there was no problem of communication between the researcher and interviewees. The field survey was conducted from 25/05/2022 to 25/10/2022.

3.5. Methods of Data Analysis

Data obtained from questionnaire survey were coded and entered in to a Microsoft Excel Spreadsheet. All statistical analyses were performed using STATA statistical software version 14 for Windows. Descriptive statistics such as frequencies and percentages were employed to describe and analyze the characteristics of demographic data as well as the nonfarm activities adopted by the household in the study area. In addition, the difference in annual additional income for the households that participated and did not participate was examined using the independent sample t-test. Besides, Chi square test as well as probit model were also used to analyze factors influencing participation in the nonfarm livelihood activities in the study area. It considered factors that influenced households' decision of participation or non-participation in non-farm livelihood activities.

3.6. Dependent Variable Specification

Participation in the nonfarm livelihood activities was dependent variable that is binary, taking only two values, 1 if the household participate in nonfarm activity, 0 if not. Participants in nonfarm livelihood activities were defined as household who engaged at least in a single nonfarm activity at the time of study and non-participants were defined as those households who didn't engage in any of nonfarm activities during data collection.

3.7. Independent Variable Specification

The participation in nonfarm activities were determined by different explanatory variables, which were hypothesized as factors to influence farmers decision to participate in different nonfarm activities at household level; age of a household head, sex of a household head, educational level, marital status, family size, distance to central market, training access and land holding. Among these factors, land holding and distance to central

market were expected to have a negative influence on diversification, and the remaining ones were expected to positively influence participation in nonfarm activities.

Age: since in a rural society livelihood decision are mostly taken by a household-head, we will consider the age of household-head only and it will hypothesize that the household with a younger head will have higher desire and access to nonfarm activities and positive influence to dependent viable. Age is dummy variable as categories young and old (Asare *et al*., 2021).

Sex: it is one of the determinants of nonfarm livelihood diversification. Men and women have different access to resources and opportunities; it is expected that sex of headed is positive effects on livelihood diversification strategies (Ellis, 2000b).

Educational level: the relationship between nonfarm livelihood diversification and education is hypothesizing to be positive. Education is the key to literacy, regarding educational level of the household head, the more educated household heads are engaged in nonfarm diversification strategies (Haggblade *et al.,* 2002).

Marital status: it is one of the determinant factors that affect households to diversify their livelihood to the non-farm activities. Most of the time female headed households had a better engagement in nonfarm activities like food vending. While male household head have seen to choose Agriculture and off-farm activity diversification to fulfill basic need of the home (Haggblade *et al.,* 2002).

Family-size: it is an important factor for livelihood diversification; in a large family, some members can remain engaged in traditional farming while others could optional for nonfarm activities. It will also reduce the risk of livelihood failure. Therefore, the relationship between nonfarm livelihood diversification and family size has been hypothesized to be positive (Adugna and Wagayehu, 2012).

Distance: proximity to market or town has a significant influence on livelihood diversification and increases the prospects of nonfarm livelihood activities for the rural households. Thus, the relationship between nonfarm livelihood diversification and long distance to the town has been hypothesized to be negative (Haggblade *et al.,* 2002).

Training access: most of the villages in North Mecha district are located highly dispersal in district and also communicating system was very poor. Households who have taken training are supposed to have better skills, knowledge and experiences to improve nonagricultural production and productivity for fulfilling their family requirements (Dercon, 2006).

Landholding: landholding size for this study was hypothesized to have negative relationship with the diversification of nonfarm livelihood activities. Many land holders in hectares are engaged in agriculture while fragmented land holders or having small land holder are engage in nonfarm activities (Lanjouw and Shariff, 2002).

Table 2: Prior expected signs and measurements of determinants affecting participation in nonfarm livelihood activities

No	*Explanatory variables*	*Measurement*	*Expected sign*
1	***Sex of household head***	***1 if male and 0 otherwise***	+
2	***Age of household head***	***Age at time of interview***	-
3	***Education level of household head***	***0=No educational background***	+
		1=Grade 1-4	
		2= Grade 5-10	
		3= Above grade 10	
4	***Marital status*** of ***household head***	***0=single***	+
		1=married	
5	***Family size***	***Number of household members***	+
6	***Land holding***	***Number of hectares of land*** owned	-
7	***Distance to the town***	***Distance in kilo meter***	-
8	***Access to training***	***1 for those with having taken training, 0 if not***	+

4. RESULTS AND DISCUSSION

4.1. Background Characteristics of Respondents

In this study background characteristics of households like sex, age and educational background were examined in order to provide a basis for differentiating between responses as well as, as a part of determinants of nonfarm livelihood diversification. Thus, all 168 sample households were interviewed via questionnaire to provide their background information. Firstly, the sex of the household head was considered as it is one of the most important factors that determine rural households' participation in non-farm livelihood activities. As shown in Figure (2),

the sample households were composed of 79% (n=132) males headed and 21% (n=36) of female headed (Figure 2). This result depicts that a relatively greater proportion of the household heads were males compared to females, which clearly indicates the dominance of male household heads over female household heads in the study areas. This dominance of male headed households in study area could be attributed to decision making role played by men on issue related to diversification from farming activities to non-farm activities and other family matters. The result is consistent with the traditional system pertaining to most rural areas of Ethiopia where men are breadwinners of their families.

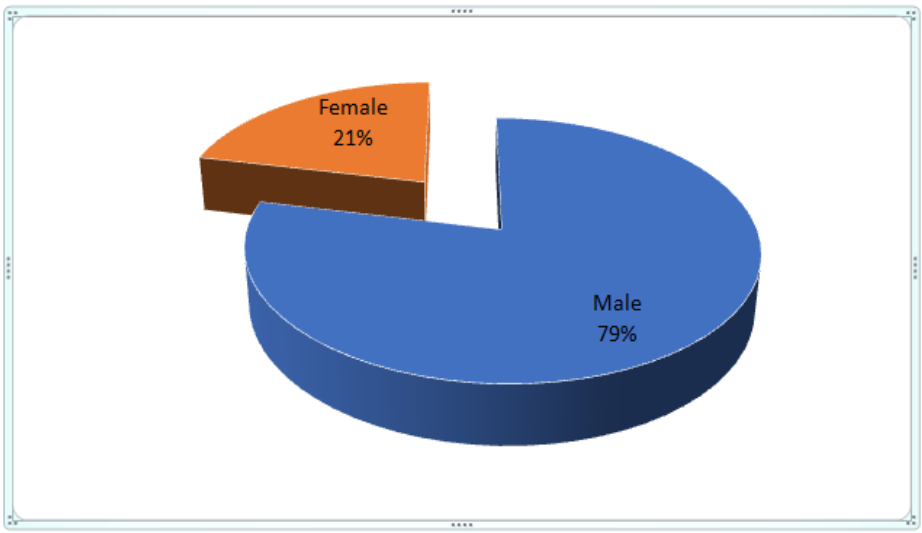

Figure 2: Gender-wise Proportion of Respondents in the North Mecha district

Age is also one of the most important factors influencing rural households' participation in nonfarm activities. In the study, the entire sample household representatives had provided their age. As portrayed by density plot in the Figure (3) bellow, the average age of respondents involved in the survey was about 38.6 (Std. Dev= 10.9) years with the minimum and maximum ages of 19 and 67 years, respectively. The median age of the respondents was 41 years with a quartile deviation of 28 years, and the skewness of 0.466, indicating that majority of the respondents were younger than the mean age of 38 years. These figures imply that majority of the farmers in North Mecha district were young people, further suggesting that in the study area young people were found in all sectors, agricultural and nonagricultural sectors.

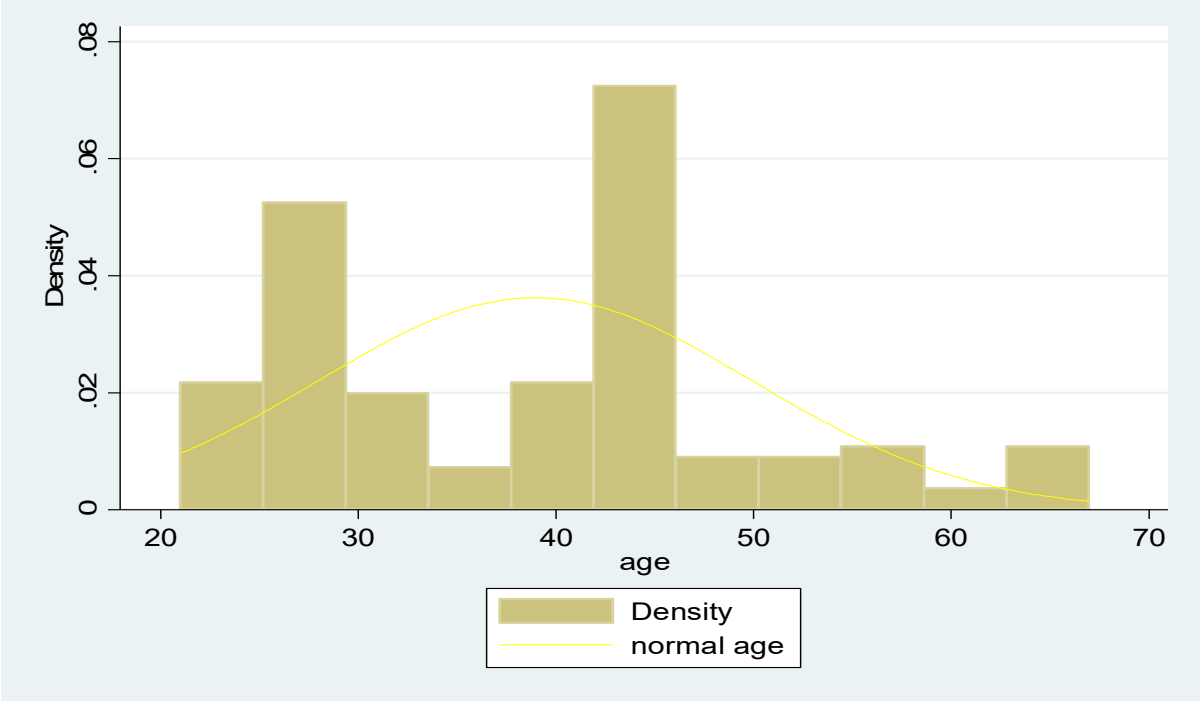

Figure 3: Ages of Respondents in the North Mecha district

In addition to sex and age, the study also considered the educational attainments of respondents as education helps to widen the skills needed for specific tasks and can trigger the training processes that increase confidence, establish useful networks or contribute to productive investment like nonfarm livelihood activities. All respondents provided their information regarding educational background and most (37.5%, n= 63) of them had no educational background, and 33.33% (n=56) of them attained their education from grade 1 to 4. The remaining respondents of 17.86% (n=30) and 11.31% (n=19) had attained their education from grade 5 to 10 and above grade 10, respectively, though the difference is insignificant. Based on The result indicates that majority of the farmers in the district had low levels of education, which may be due to the relatively less technical expertise required for an individual to engage him/herself in livelihood activities in rural areas of Ethiopia. With respect to kebele where respondents belonged from, there were some differences in educational attainment among the three study *kebeles* the though the difference was statistically insignificant (Table 3).

Table 3: Educational level of respondents at household level by *kebeles* in North Mecha

Educational level	*Kebele*			Significance	
	Enamrt	Tateklesra	Kurtbahir	Pearson chi square (X^2)	P
Educational background	18	23	22		
Grade 1-4	12	16	28	3.67	0.721
Grade 5-10	7	8	15		
Above grade 10	4	7	8		
Total	41	54	73		

4.2. Household Primary Occupation

The sources of income farmers in the study area engaged in were assessed and found comprising three basic components, namely farming (agriculture), nonfarm livelihood activities and farming and nonfarm livelihood activities in combined. Accordingly, greater proportion of farmers was engaged in farming (58.33%, n=98), which means farmers cultivate their farms for subsistence as well as for cash income that depend on harvesting of surplus agricultural outputs. About 19.05% (n=32) of farmers in the study area had participated in nonfarm livelihood activities like charcoal production, alcohol brewing and the like due to different push and pull factors in the area that will be described latter in this paper. However, the remaining 22.62% (n=38) of farmers had participated in both farming as well as farming and nonfarm livelihood activities due to different reasons which will be also discussed latter.

With respect to gender, the description of primary occupation of farmers in the study area indicated that farming was considered as the primary occupation for a greater proportion of male respondents as compared to female respondents (Table 4). Out of 98 households engaged in farming, 87.76% (n=86) and 12.24% (n=12) were males and females, respectively. But, out of 32 households engaged in nonfarm livelihood activities, 40.66% (n=13) respondents were females. The reason may be that, a greater proportion of farmland were owned by men-headed households, which allows them to engage more in farming as compared to women headed households. It could also be because women preferred household enterprises to farming so that they could have time to honour their reproductive roles. The remaining thirty eight respondents engaged in both farming as well as nonfarm livelihood activities with proportion of 0.71 (n=27) and 0.29 (n=11) of males and females, respectively. There was statistically significant difference between sex of respondents and their primary occupation at 1% significance level (X2= 13.19, p=0.001).

Table 4: Primary occupation of respondents at household level by sex of respondents in North Mecha district

Primary occupation	Sex		Significance	
	Female	Male	Pearson chi2(X^2)	P
Farming	12	86		
Nonfarm livelihood activity (NFA)	13	19		
Farming and NFA	11	27	13.189	0.001
Total	36	132		

Even though a Pearson Chi-square test has not showed significant difference at 5% significance level, the types of primary occupation varied from kebele to kebele (Table 5). The majority of respondents from Kurtbahir kebele (48.98%, n=48) had engaged in farming while greater proportion of respondents from Enamrt kebele (40.63%, n=13 out of 32) had engaged in nonfarm livelihood activities. In Tateklesra kebele, however, both farming and nonfarm livelihood activities had been practiced more than in the former kebeles (39.47%, n=15)

(Table 5). The difference may largely be due to the degree of variance in resource endowment, including demographic structure as well as information linkage from urban to rural settings that usually depends on proximity to central markets.

Table 5: Primary occupation of farmers at household level by study *kebeles* in the North Mecha district

Source of income	*Kebele*			Significance	
	Enamrt	Tateklesra	Kurtbahir	Pearson chi2(X^2)	P
Farming	18	32	48	8.3601	0.079
Nonfarm livelihood activity (NFA)	13	7	12		
Farming and NFA	10	15	13		
Total	41	54	73		

4.3. Nonfarm Livelihood Activities Adopted in the Study Area

As described above, farming was the most practiced primary occupation of households in the study area and was characterized predominantly by agricultural activities whether it is their primary or secondary activity. This section will examine the nonfarm livelihood activities pertaining in the study area. Out of a total of 168 households who responded about their participation in non-farm livelihood activities, almost half of households responded to have participated in nonfarm activities while 58.33% of households responded that they did not participate. The Figure (4) bellow implies that out of 168 sample households, 41.67% (n=70) of households had participated in diversifying their livelihood into nonfarm activities as their diversification strategies. The disaggregated result could also show that 19.05% (n=32) of participants had engaged only in nonfarm livelihood activities, and the remaining 22.62% (n=38) of them had participated as their secondary activities to farming.

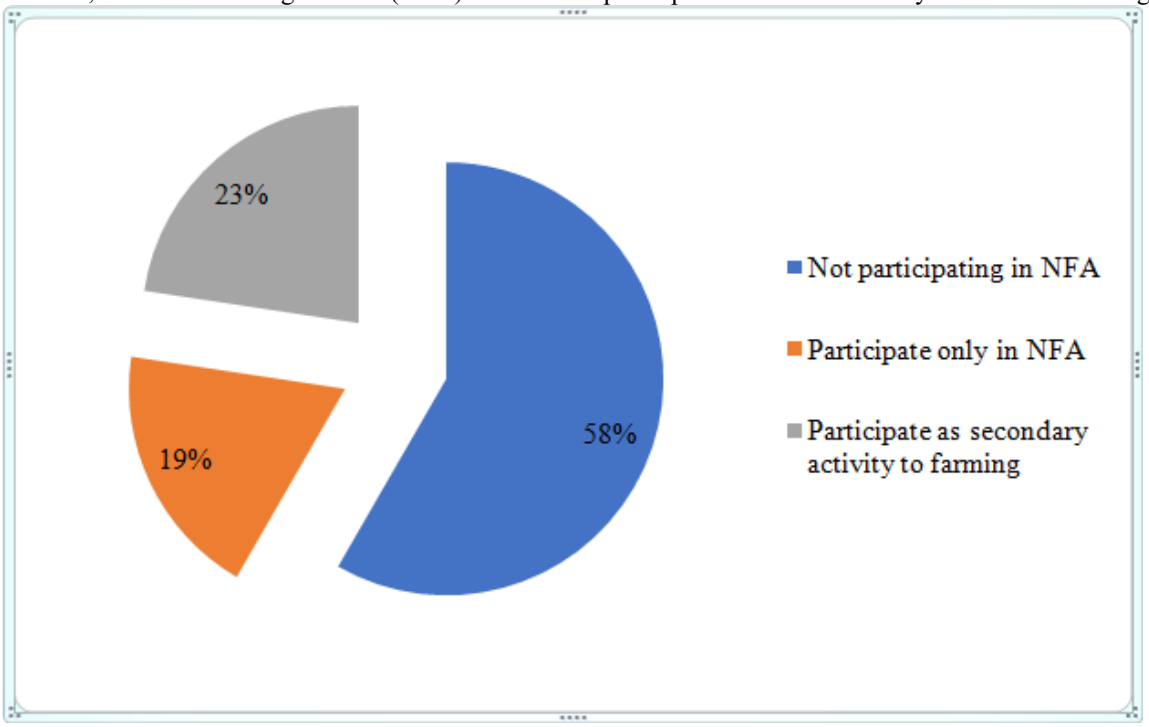

Figure 4: Proportion of participants in NFA in the North Mecha

Different types of non-farm activities that rural households had primarily participated in the North Mecha district are shown in the Table (6) bellow. It appears that charcoal production (34.29%, n=24), alcohol brewing (15.71%, n=11) and petty-trade (10%, n=7) were the most prominent nonfarm livelihood activities in the district. The result in the Table (10) also shows the other non-farm livelihood activities that were practiced in the study area included driving/transport, food vending and drinking spot, construction, barbering, handcraft, firewood selling and daily labor.

Given the fact that male and female can involve in diversification of their livelihood strategies, both male headed and female headed households had participated in nonfarm livelihood activities. But, the descriptive statistics indicates that a greater percentage of male headed households had participated in the nonfarm livelihood activity, i.e., out of 168 sample households, 46 27.38%) (n=46) males and 14.29% (n=24) females had

participated in nonfarm livelihood activities. Proportionally, however, participation in nonfarm activities by females was greater than that of by males, i.e. out of 36 female headed households interviewed, 66.67% (n=24) females had participated in the activity while only 34.85% (n=46) had participated in nonfarm livelihood activities (Table 6). This result shows the attractiveness and diversification of female headed households toward nonfarm activities than male headed.

Table 6: Distribution of common nonfarm livelihood activities by sex in North Mecha district

Nonfarm activities	Sex		Total	Significance	
	Female (%)	Male (%)		Pearson Chi square (X^2)	P
Firewood selling	2 (66.67)	1(33.33)	3(100)		
Alcohol brewing	9 (81.82)	2 (18.18)	11(100)		
Barbering	0 (0)	4 (100)	4 (100)		
Charcoal production	2 (8.33)	22 (91.67)	24 (100)		
Construction	2 (40)	3 (60)	5 (100)		
Daily labor	0 (0)	2 (100)	2 (100)	31.8268	<0.001
Driving/transport	0 (0)	5 (100)	5 (100)		
Food vending and drinking spot	4 (80)	1 (20)	5 (100)		
Handcraft	1 (25)	3 (75)	4 (100)		
Petty trade	4 (57.14)	3 (42.86)	7 (100)		
Total	24 (34.29)	46 (65.71)	70 (100)		

The disaggregated results in the Table (6) above also indicated that, petty trade, construction and selling of firewood were non-farm livelihood activities performed almost equally by both sexes. However, male-headed households have mostly been engaged in charcoal production, driving/transport, barbering and handcrafting while food vending and drinking spot, alcohol brewing and selling of firewood were the major source of nonfarm income for female headed households. The disaggregated result also, as shown in Table (6), show that nonfarm activities such as driving/transport and barbering were performed by males only. On the other hand, activities such as food vending and drinking spot were usually reserved for females. The difference in participation in nonfarm activities by sex of respondents in the study area was found to be statistically significant at 1% significance level ($p < 0.001$). This implies that the sex of rural farmers prevented them from diversifying into certain non-farm activities, which is in consistent with most studies conducted in Africa revealing that female-headed households are more likely to participate in livelihood activities undertaken in the home, such as local beer brewing and vending, than male-headed households.

Moreover, the different types of nonfarm livelihood activities that households in the study area had engaged in were varied by age in that different age groups have different level of participation in the activity. That is, there was a difference between age groups amid participation in nonfarm activities. Accordingly, out of 70 households who participated in nonfarm activities, 47% (n=33) of the households were aged from 19-30 while 31% (n=22) of them were between 31 and 42. The rest 21% (15) participants were aged between 43 and 54. Hence, the participation in the activity by age was decreasing as the household head age increased, despite of statistically insignificant (X^2 = 310.8977, P = 0.507). The participation by education also shows that participation of literate households was greater proportion than that of illiterate; out of 19 households who attained above grade 10, 73.68% (n=14) participated in nonfarm livelihood activities. In contrast, out of 63 households who had no educational background, only 28.57% (n=18) participated in nonfarm livelihood activities. There was great difference between groups of educational level of participants (by 45.11%), and the difference was statistically significant ($X^2 = 14.27$, $p = 0.003$) (Table 7).

Table 7: Participation in Nonfarm employments by age and education

Variable	Number of NFA practiced	Percentage between groups	Significance of the difference	
Age category			X^2	P
19-30	33	47.14		
31-42	22	31.43	310.8977	0.507
43-54	15	21.43		
Educational level				
No educational background	18	25.71		
Grade 1-4	22	31.43	14.27	0.003
Grade 5-10	16	22.86		
Above grade 10	14	20		

4.4. Reasons for Participating or Not Participating in Nonfarm Livelihood Activities

The motives behind non-farm livelihood diversification were investigated to find the specific reasons for the

households' decision to diversify into nonfarm livelihood activities. A number of motives influence farmers' decision to diversify their livelihoods to the non-farm livelihood diversification activities. This section of the study examines the specific factors that influence households' decision to diversify into nonfarm sector. Farmers in the study area might be encouraged to participate in nonfarm livelihood diversification activities as part of household income diversification strategies designed to reduce risk from farming, which was the primary occupation for majority of the households but the productivity of the sector is inefficient and prone to risk in such a way that most farmers have diversified their livelihood into nonfarm livelihood activities.

The researcher started with taking all sample households' opinion about whether they diversified into the nonfarm sector or not. Thus, respondents were made to indicate what affected their decision to diversify their livelihood into the nonfarm sector. Households who were participating in nonfarm livelihood diversification activities as the primary occupation have mentioned the reason that they switched their occupation from farming to nonfarm activities. It was found that about 70% of households were forced to engage in nonfarm livelihood activities due to push factors, such as land constraints, family necessity, low demand for agricultural outputs and inflation of goods' price and ***risk aversion.*** The remaining 30% of households diversified into the nonfarm sector to take advantage of business opportunities in their communities, such as higher returns gained by households already participating in nonfarm activities and budget (subsidy) offered by the government of the region for non-employed youths.

Out of the 70 of the total households who engaged in nonfarm activities, about 22.86% of the households participated in non-farm activities as a result of family necessity they want to meet such as school need followed by 21.43% of households participating in non-farm activities because of low demand for agricultural outputs and inflation of goods' price. The remaining households said that they engaged in non-farm activities because of risk aversion (15.71%) and land constraints (10%). These results imply that most farmers in the study area diversified into non-farm livelihood activities due to hardship and the desire to improve their standards of living. The findings indicate that family necessity is the main pushing factor for the households of North Mecha district rural hubs.

On the other hand, out of total of 70 total households engaged in nonfarm activities diversifying into the nonfarm livelihood activities because of pulling factors; about 21.43% and 8.57% had participated due to budget (subsidy) offered by the government of the region for non-employed youths and higher returns gained from participants who had been participating in nonfarm activities. Therefore, a number of households were not restricted to only farming but rather either involved in non-farm livelihood activities or combined non-farm activities with farming, which is an important for household economy, used as insurance against the risk of farming.

The reasons that hindered households not to participate in the nonfarm livelihood diversification activities in the study area have also been surveyed. There were three main constraints mentioned by farmers that hindered them not to participate in the nonfarm livelihood diversification activities. As shown in Table (8) below, out of households that did not participate in nonfarm livelihood activities, 47.96% of the households indicated that the reason for not to participate in non-farm activities was limited access to sufficient capital to start with, and 27.55% of them indicated that it was due to lack of technical support and training**.** Moreover, the rest of households which accounted for 24.49% not participating in nonfarm activities indicated that it was due to poor infrastructures present in the area**.** The implication of these results is that, most households in the study area are not participating in nonfarm activities due to different challenges which act as barriers to their participation in such diversification activities.

Table 8: Summary of reasons for participating or not participating in nonfarm activities

No.	Reason	Frequency	Percent	Decision to participate	Nature of the reason
1	Budget (subsidy) offered by the government	15	8.93	Yes	Pulling factors
2	Returns gained from participants	6	3.57	Yes	Pulling factors
3	Family necessity	16	9.52	Yes	Pushing factors
4	Land constraints	7	4.17	Yes	Pushing factors
5	Low demand and increase of goods' price	15	8.93	Yes	Pushing factors
6	Risk aversion	11	6.55	Yes	Pushing factors
7	Poor infrastructures	24	14.29	No	
8	Lack of technical support and training	27	16.07	No	
9	Limited access to sufficient capital	47	27.98	No	-
	Total	168	100.00	-	

The result can therefore be explained on the following grounds. First, livelihood diversification into nonfarm livelihood activities at household level in the study area can mostly be attributed to family necessity. It appears that farmers were pushed to diversify their livelihood into the nonfarm sector with the objective of fulfilling family necessity, such as health and education. Second, the adoption of non-farm livelihood activities might provide a sure way of smoothing income and expenditure since reliance on farming alone may not be good enough to fulfill the need for family necessity.

4.5. Determinates of Participation in Nonfarm Livelihood Activities

Engagement in nonfarm economic activities in rural areas is conditioned by different factors. Theoretically several variables are present in the literature as influencing non-farm livelihood diversification. However, the researcher selected some of the variables that have produced varied results in the literature to verify their effect on the nonfarm livelihood activities in the North Mecha District. Probit model that allows easy testing of models to predict categorical outcomes with two categories was performed to examine factors affecting the diversification of livelihood from farm to nonfarm activities. In this study, the model was used to identify determinants of smaller farmers' participation of households to doing nonfarm livelihood diversification activities.

As indicated in the Table (9) above, participation in nonfarm livelihood activities was influenced by mix of both categorical and continuous variables: *kebele,* sex, age, education, marital status, family size, land holding, distance from central market/town and training access. The likelihood ratio statistics as indicated by the $\chi 2$ statistic was highly significant at 1% ($\chi 2$=***158.31***, $p<0.001$) suggesting that the model had strong explanatory power, meaning all the variables included in the probit model were jointly significant in influencing smallholder farmers' decision to partake in nonfarm livelihood activities. Regression results for determinants of participation in nonfarm activities and the corresponding marginal effects are presented in Tables (9) and (10), respectively.

Since the parameter estimates of the probit model provide only the direction of the effect of the independent variables on the response variable; estimates do not represent the actual magnitude of change or probabilities. Thus, the marginal effects from the model which measure the expected change in the probability of a particular choice being made with respect to a unit change in an independent variable have been reported along with estimation of probit model based on the coefficients.

Table 9: Probit estimates for participation in nonfarm employments

Variables	***Coefficient***	***Standard Error***	***Z***	***P>|z|***
Sex	-0.8665562	.2736139	-3.17	0.002*
Age	-0.0185758	0.0144248	-1.29	0.198
Education	0.5101413	0.1292031	3.95	0.000*
Marital status	0.8479811	0.2785853	3.04	0.002*
Family size	0.1269611	0.0452046	2.81	0.005*
Land holding	-1.783479	0.2768108	-6.44	0.000*
Distance from market	-0.0290501	0.0195637	-1.48	0.138
Training access	1.066257	0.2501636	4.26	0.000*
LR chi2(9)	***158.31***			
Prob>chi2	***0.0000***			
Log likelihood	***-34.949224***			
Pseudo R2	***0.6937***			
Notes;		**** 1% significance level***		

Based on the information presented in above Table (10), the probit model for this study was expressed as follows: nonfarm livelihood activities in the study area equaled to:

0.127 (Family size) + 0.848 (Marital status) - 0.029 (Distance) + 0.510 (Education) - 0.019 (Age) -0.867 (Sex) + 1.066 (Training access) - 1.783 (Landholding)

As age plays an important role as a determinant of nonfarm livelihood participation, it was considered in this study to analyze its effect on the decision of households in nonfarm livelihood activities. As indicated in the above model, a negative sing of age implies that age had negatively influenced farmers' decision for diversification into nonfarm livelihood activities in the study area. That is dwellers in the study area had participated less as they grow old in nonfarm livelihood activities. At the margin, a 1% increase in the age would result in the decline of the probability of livelihood diversification by 0.33% units. The probable reason is that young households are relatively better educated, have better access to technologies, and look alternative livelihood opportunities. Also, it is related to the natural factors in that as the age of the farm household increases, the farmer would be getting older and could not be capable of diversifying as many livelihood activities as possible. Thus, old farmers are more likely to concentrate on on-farm agricultural activities for just the purpose of maintaining their subsistence consumption need. However, the effect of age on households' decision to

participate in nonfarm livelihood activities was statistically insignificant, may be due to the majority of the sample household heads were in similar age groups as a matter of chance.

As sex is one of the determinants of nonfarm livelihood activities participation, it was also taken as one of the explanatory variable to look at its effect on diversification of livelihood of households from farming to nonfarm activities. As shown in the model above, since males and females have different physical fitness, male-headed households had entered with a negative sing in the model, which is statistically significant at 1% level. This is to mean that male-headed households were less to participate in nonfarm livelihood activities as compared to female-headed households, i.e. male-headed households had less chance than female-headed households to diversify their income source. From the table one can understand that a household headed by males have less probability of participation in nonfarm activities by 0.335. This could be due to the fact that traditionally, female headed households are participating in different non-agricultural activities as farming needs ploughing that females are usually unable to do.

Educational level of the household head was found to be one of the most important determinants of livelihood diversification as prior expectation. It was among the preventing barrier for entry of households into nonfarm activities, because it was found that education of the household head had positive and significant effect at 1% significance level, indicating a positive relationship as far as the decision to participate in nonfarm livelihood activities was concerned. This implies that household heads with a higher level of education are more likely to engage in non-farm sources of incomes in rural areas than their counterparts. The marginal effect of 0.198 exhibited that one extra group bypass possibility of households could increase the probability of their engagement in nonfarm economic activities by 19.8% when other things being constant. This might be due to their better ability to look existing opportunities of income-generating activities like nonfarm livelihood activities (Zhu and Luo, 2006). Formal education increases the knowledge that one needs to become competent to choose activities that generates more income and up to date with all the modern technologies that make entrepreneurship much easier. Therefore, enhancement in the educational level would escalate the probability engagement in nonfarm livelihood diversification Desalegn and Moges, 2016).

Moreover, the results in table (10) suggest that as family size increased, sample households were more likely to participate in nonfarm livelihood activities may be because of the shortage of the cultivable land that would proportionally become less and less as family size grows up. An increase in family size tends to decrease the labor productivity in farming and thus having large family size in limited farming activities alone could not meet food security and livelihood strategy and hence farmers might tend to involve in activities that bring additional income. In terms of marginal effects, the probability of participation in nonfarm livelihood activities positively increased with family size and was significant at 1%. This was in line with expectations, i.e., as shown in table 13, the marginal effect of a unit change in family size, computed at mean of household size, enhances the probability of nonfarm participation by 0.045, which implies that the probability of nonfarm participation increases by 4.5% for one person increase in family size. This might suggest that households with more family size may have greater surplus of the labor resource/power to participate in the nonfarm activities as farm income is not sufficient to meet their necessary needs.

Landholding was also found to have a negative and significant effect on the households to participate in nonfarm livelihood activities at 1% level of significance. This implies that households land are less likely to engage in nonfarm livelihood activities. The coefficient of the variable landholding in the Table (10) implies that a unit increases in probability of to have land in hectare, decreases the probability of the households' participation in nonfarm livelihood activities by 63.62% holding other factors unchanged. In other words, families with no land are too reliant on nonfarm activities; households with land are typically safeguarded for food to continue their livelihood while households with no land are often food insecure and thus they are forced to engage themselves in other activities, for example, engaging in nonfarm sector.

As marital status is expected to increase dependence in a given family, in the present study it was one of the determinant factors that had affected households to diversify their livelihood to the nonfarm activities. It had a positive and significant effect on the households' participation in nonfarm livelihood activities at 1% level of significance. This shows that when household heads were married, they were more likely to participate in nonfarm livelihood activities as compared to single led counterparts. The marginal effect of 0.304039 exhibited that one extra married household in the population could increase the probability of its engagement in nonfarm economic activities by 30.4% when other things being constant. This might be because of paring of two labor forces in the new family influences the participation in nonfarm activities positively as it increases family size in other way.

In the present study, the distance to the market center had negative effect on participation in nonfarm livelihood activities. This implies that as the relative distance of kebele from market center/Merawi increased, the extent of participation in nonfarm livelihood activities decreased by 1% holding other factors remain unchanged. This means too long distance accesses of the market have less opportunity for farmers traveling to participate in nonfarm livelihood diversification activities because of the presence of opportunities for labor

market in the town and being far away from the town increase the transaction costs of involving farming. However, the difference in distance to the market center was statistically insignificant. Putting differently, Closeness to market center would influence positively farmer's participation in nonfarm livelihood activities due to the fact that when a kebele is place where shorter to distance in the nearest town, *Merawi* in ths particular case, farmers shared information about nonfarm livelihood diversification activities.

As indicated in Table (10), the regression result also showed that having training access found to have positive and statistically significant effect to participation in non-farm livelihood activities at 1% level of significance, i.e., it increased the probability of involvement in nonfarm activities suggesting skilled households were likely to engage themselves in more paying activities. The marginal effect, of a unit change in training access, computed at sample mean of training access, on the probability of nonfarm livelihood diversification participation was 0.4060327 (Table 11). This implies that a unit increase in skills acquisition due to training leads to increase in likelihoods of participation in non-farm livelihood activities by 40.6% holding other factors unchanged. This is plausible explanation in that, the purpose of achieving sustainable rural livelihoods is crucial to provide quality training in a variety of rural skills.

Table 10: Marginal Effects for Probit Estimates of nonfarm participation

Variables	***dy /dx***	***Standard Error***	Z	***P>|z|***
Sex	-0.3351548	0.09902	-3.38	0.001*
Age	-0.0066272	0.00512	-1.29	0.196
Education	0.1980564	0.05032	3.94	<0.00*
Marital status	0.304039	0.08912	3.41	0.001*
Family size	0.0452949	0.01582	2.86	0.004*
Land holding	-0.6362774	0.09933	-6.41	<0.001*
Distance from market	-0.010364	0.00686	-1.51	0.131
Training access	0.4060327	0.0868	4.68	<0.001*
Notes; *, represent significance at 1% levels				

4.6. Annual Additional Income Returned From Participating in Nonfarm Activities

In rural areas where formal financial institutions are not soundly functioning in rural areas of the study area, and hence nonfarm livelihood activities were very important in obtaining monetary asset. The independent samples t-test was computed to compare the mean differences annual additional incomes between households engaged in nonfarm livelihood activities and those that engaged in only farming. The mean annual additional income earned by the households engaged in nonfarm activities was considerably higher than those not engaged in farming alone (mean= 75,957.44; SD =67,376.75).

Table 11: Comparison of mean of annual additional income between participated and non-participated households in nonfarm activities in North Mecha district

Group	n	Mean	Std. Err.	Std. Dev	95% CI	*t*-value	*p*–value
Participated	70	75957.44	8053.06	67376.75	59892.02- 92022.86	t= -10.148	<0.001
Non-participated	98	6676.02	533.60	5282.393	5616.97-7735.07		

As shown in Table (12) above, the mean difference was statistically significant at 1% significance level (t=-10.1479; p<0.001`). The returned annual additional income might be used for rural households as entry income for further productive sources of income, like giving chance to purchase inputs needed in the farming and family necessity. Therefore, participation in the nonfarm livelihood activity provides the possibility for the households with low marginal labor productivity in farm activity to diversify their production in nonfarm sector and hence increase income.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

The present study described the socioeconomic characteristics of rural households in the North Mecha district, ascertained the various forms of nonfarm livelihood activities engaged by rural households, identified the motive and constraints to participation in nonfarm livelihood activities among rural households and finally estimated the income earned from the nonfarm activities. Crop-livestock mixed production was a primary occupation of the respondents in study area but the sector was risky in such a way that 41.67 percent (n=70/168) of sample households had diversified into nonfarm livelihood activities. Hence, it was supplemented by nonfarm livelihood activities which were used as sources of livelihood for a greater proportion of both male- and female-headed households. The prominent nonfarm livelihood activities practiced in the study area were charcoal production, alcohol brewing and petty trading which demand less skill and entry capital. Both "pull factors" and "push" factors motivated households to undertake non-farm livelihood activities, especially family necessity and low demand of agricultural outputs and increase of goods' prices. Besides, probit model result revealed that,

educational level, training access, land holding, family size, sex and marital status have played better role for households to engage in nonfarm economic activities. Rural households participated in nonfarm livelihood activities earned more annual additional income than those that did not, indicating that nonfarm activities played a significant role as a source of income in the study area. Based on this conclusion, the following recommendations have been made to improve nonfarm livelihood diversification.

- Understanding the determinants of participation in nonfarm activities and description of nonfarm activities would help policy makers to design and implement more effective policies and programs for nonfarm sector.
- Also, the study found that the mean annual additional income of farmers engaged in nonfarm activities was considerably higher than those not engaged in farming alone, indicating households engaged in nonfarm activates live better-off than those that are not. Accordingly, development strategies should not only emphasis in increasing agricultural production but concomitant attention should be given in promoting nonfarm activities in the rural areas.
- The results of the study also revealed that farmers who have been trained about entrepreneurship are more likely to involve in nonfarm activities. Thus, education could be an effective instrument in increasing participation in nonfarm activities. Therefore, the task of upgrading the skills and production techniques of local farmers should be given a special attention. Development programs to promote nonagricultural employment should focus on the establishment of skill training centers at local level.
- Moreover, since the data for this research were collected at snapshot and do not consider the dynamic nature of rural livelihoods through time (better addressed through longitudinal studies), further research should be carried out by taking this limitation into account so as to investigate the actual contribution of nonfarm activities in improving the wellbeing of rural households in the study area.

5. 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.

Amare Molla. 2018. Determinants of livelihood diversifcation strategies in Borena pastoralist communities of Oromia regional state, Ethiopia. *Agric & Food Secur* **7**:41.

Amogne Asfaw, Belay Simane, Ali Hassen & Amare Bantider. 2017. Determinants of non-farm livelihood diversification: evidence from rain-fed-dependent smallholder farmers in north central Ethiopia (Woleka sub-basin), *Development Studies Research*, **4**:1, 22-36.

Ana Damenaa and Demmelash Habteb. 2017. Effect of Non-farm Income on Rural Household Livelihood: A Case Study of Moyale District Oromia Regional State, Ethiopia. *American Scientific Research Journal for Engineering, Technology, and Sciences (ASRJETS);* Volume **33**, No 1, pp. 10-36

Arega Bazezew, Woldeamlak Bewket and Melanie Nicolau. 2013. Rural households' livelihood assets, strategies and outcomes in drought-prone areas of the Amhara Region, Ethiopia: Case Study in Lay Gaint District. Afr. *J. Agric. Res*. **8**(46):5716-5727.

Asare K.Y., Koomson F., Agyenim J. B. 2021. Non-Farm Livelihood Diversification: Strategies And Constraints In Selected Rural And Peri-Urban Communities, Ghana. *Journal of Agribusiness and Rural Developmen*, 1-12.

Beyene A. D. 2008. Determinants of Off-Farm Participation Decision of Farm Households' in Ethiopia. Agrekon: *Agricultural Economics Research Policy and Practice in Southern Africa.* **47** (1): 140–161.

Birhanu Negeri, Getachew Demissie. 2016. Livelihood Diversification: Strategies, Determinants and Challenges for Pastoral and Agro-Pastoral Communities of Bale Zone, Ethiopia. *International Review of Social Sciences and Humanities.* Vol. **11**, No. 2, pp. 37-51.

Brhanu Tsegaye. 2010. Determinant of non-farm livelihood diversification across ecologically differenct rural settings. *International journal of academic research and development*, 211-218.

Dercon S. 2006. Economic reform, growth and the poor: Evidence from rural Ethiopia. *Journal of Development Economics*, **81**(1), 1–24

Dessalegn Anshiso, Moges Shiferaw. 2016. Determinants of Rural Livelihood Diversification: The Case of Rural Households in Lemmo District, Hadiyya Zone of Southern Ethiopia *Journal of Economics and Sustainable Development*; Vol.**7**, No.5

Ellis, F. 2000. The Determinants of Rural Livelihood Diversification in Developing Countries. *Journal of Agricultural Economics,* **51** (2): 289–302.

Gebrehiwot Weldegebrial, Fekadu Beyene. 2012. Rural household livelihood strategies in drought-prone areas: The case of Gulomekeda District, Eastern Zone of Tigray National Regional State, Ethiopia.

Haggblade S., Hazell P. and Reardon T. 2002. Strategies for Stimulating Poverty Alleviating Growth in the Rural Nonfarm Economy in Developing Countries, World Bank, International Food Policy Research Institute, Washington DC.

Haggblade S., Reardon T. 2010. The Rural Non-farm Economy: Prospects for Growth and Poverty Reduction; USA World Development Vol. **38**, No. 10, pp. 1429–1441.

Kebede Kassa, Zewdu Eshetu. 2014. Situation Analysis of Rural Livelihoods and Socioeconomic Dynamics for Sustainable Rural Development: the Case of Legehida Woreda (district), South Wollo of Ethiopia; *Research Journal of Agriculture and Environmental Management* 3 (3): 201–208.

Lanjouw, P., Shariff, A. 2002. Rural non-farm employment in India: Access, income and poverty impact. Working Paper Series No. 81(81).

Nagler P., Naude W. 2014. Non-farm entrepreneurship in rural Africa: patterns and determinants (IZA Discussion Paper no. 8008). Bonn, Germany: Institute for the Study of Labor.

Rijkers, B., M. Soderbom, and F. Teal. 2008. Rural Non-farm Enterprises in Ethiopia: Challenges and Prospects.

Serrat O. 2008. Department for International Development. *Sustainable Livelihoods Guidance Sheets*. Department for International Development, London. Available at www.livelihoods.org. Accessed on April 11/2022.

Tassew Woldehanna. 2000. Economic analysis and policy implications of farm and off-farm employment: A case study in the Tigray region of Northern Ethiopia. PhD Dissertation Wageningen Agricultural University, The Netherlands

Tegegne Derbe 2020. Determinants of Smallholder Farmers' Livelihood Strategies in Wogera District of Ethiopia; *ERJSSH*.

Yenesew Sewenet. Y., Eric N. O., and Fekadu Beyene. 2015. Determinants of livelihood diversification strategies: The case of smallholder rural farm households in Debre Elias Woreda, East Gojjam Zone, Ethiopia; *African Journal of Agricultural Research*.