



Does gender matter for household livelihood diversification in Ethiopia rural areas?

Kiros Nigus Tsegay^{(a)*} Hongzhong Fan^(b) AM. Priyangani Adikari^(c) Hailay Shifare^(d)

^(a) School of Economics, Huazhong University of Science and Technology, Wuhan 430074, China

^(b) Professor, School of Economics, Huazhong University of Science and Technology, Wuhan, 430074, China

^(c) Department of Economics, Faculty of Social Sciences and Humanities, Rajarata University of Sri Lanka, Mihintale, 50300,

^(d) School of Public Administration, Huazhong University of Science and Technology, Wuhan 430074, China



ARTICLE INFO

Article history:

Received 24 August 2021

Received in rev. form 22 Sep. 2021

Accepted 23 Sept 2021

Keywords:

Gender, Livelihood Diversification, logistic model.

JEL Classification:

O15

ABSTRACT

Nowadays, the non-farm sector gives more attention and high expectations in reducing poverty in sub-Saharan African. Because participation of farm households in the non-farm sector out of their farm activities will play a great role to reduce poverty. Cross-sectional data were used to collect data in 2020 from farm household heads of 371 respondents with the mixed methodology to investigate the effect of demographic factors in none/off-farm economic activities on gender perspective in Ethiopia. In this study, we employ a Logistic regression model to explore the probabilities of household heads' participation in none/off-farm economic activities out of their farm. The result indicated, age and education level have a positive effect and statistically significant effect on increasing non-farm activities with the coefficients of 3.406, 1.956 respectively, confirmed that these variables should take into account in policy development to increase their impact on livelihood diversification. And Gender has a negatively significant on livelihood diversification. FHH is more participants in non-farm economic activities than MHH. Credit access does not contribute to increasing livelihood diversification instead; it contributes to agricultural specialization, not diversification. Surprisingly, family size has insignificant results in non-farm economic activities. The outcome indicated it has its implications for the Ethiopian policy and strategy. The government should give more attention to the progressive aspects of non-farm economic activities to eradicate poverty. Whereas, decreasing its negative impact on poorer households by controlling obstacles of non-farm activities.

© 2021 by the authors. Licensee SSBFNET, Istanbul, Turkey. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).

Introduction

Developing countries and African sub-Saharan countries, their economic activities are depending upon on-farm. The Ethiopian government focuses on the policy of Agricultural development led industrialization (ADLI), since, agriculture is the main economic activity in Ethiopia. However, the rural smallholder farmers in Ethiopia are unable to produce enough to feed themselves. Many farm households are still on the aid of a productive safety net program (Shigute et al. 2017). To ensure for farmer's minimum level of feeding, Shigute et al (Dedehouanou et al. 2018a; Gebru et al. 2020).

This indicates that farmers should look for livelihood diversification portfolios of none/off-farm activities for security and survival. Ellis (2000). livelihood diversification can contribute a great role to reduce poverty and promoting economic growth in sub-Saharan African countries (Alobo Loison 2019b; Haggblade, Hazell, and Reardon 2010). Example SSA, Flat, R et al. (2016) They concluded in their analysis for poverty reduction, looking only agricultural sector will not be adequate, beyond the agricultural sector participating in the extra-sectoral option are needed, in detail, they concluded that to reduce poverty improving off-farm activities are the important way of strategies than a singular focus on agricultural production for poorer smallholders with subsistence farming and traditional resources.

* Corresponding author. ORCID ID: 0000-0002-0163-1440

On the other hand, it is better to help smallholder farmers who are in danger should enter into non-farm sector. The prior empirical studies have been investigated the relationship between demographic characteristics of the farmer household and livelihood diversification. However, the result is quite mixed and controversial. This is because researchers use different sample (Cross-country or regional) levels of economic growth of the study area, Econometric model, different variables. According to Aloblo Loison (2015) evidenced that money regions in Africa, non-farm participation of farm households is still lacking. It is still 30 to 50% (Fabusoro et al. 2010). In Ethiopia, non/off-farm activities are still 24% (Van den Broeck and Kilic 2019).

Furthermore, the gender dimension of non-farm activities has been overlooked. This affects both the option and outcome of livelihood diversification and the living standard. The prior empirical studies on the livelihood diversification in different areas (Andersson Djurfeldt, Djurfeldt, and Bergman Lodin 2013; Djurfeldt and Wambugu 2011) included gender perspective in their analysis concluded that there are high gender disparities. Yet, gender-specific studies on gender difference and overall effects, and tendencies of non-farm economic activities in rural areas are mainly missing. Most of the findings showed that the participation of FHH in livelihood diversification is lower than MHH. The prior empirical studies have been investigated how the demographic characteristics of the farmer household affected livelihood diversification.

This review in this paper makes a comprehensive, systematic, and updated literature review and highlights necessary research gaps while critically evaluating the prior studies. It provides a detailed discussion of prior empirical studies investigating the effect of gender in livelihood diversification. The previous empirical studies Haggblade et al. (2010), Aloblo Loison (Aloblo Loison 2019b) suggested that both women and men in sub-Saharan countries are actively engaged in non-farm economic activities however, because of the social, economic, physical bottlenecks females mostly lack the productive asset as the result they participate in low return activities.. (Haggblade et al. 2010; Lanjouw and Lanjouw 2001) found the gender-specific related challenge makes rural women limited from the labor market and non-farm activities. For pro-poor economic growth, these gender differences in access have consequences for livelihood diversification. Gender difference in economic production remains a challenge with the majority of women still facing discrimination (Doss et al. 2018). There is evidence that FHH participates actively in the non sector economies (Aloblo Loison 2019; Aloblo Loison 2015; de Brauw et al. 2013) relatively, poor regions had toughly had gender inequality than rich regions. Nevertheless, Female-headed households who are found in rich regions had higher livelihood diversification compare to those poor countries Djurfeldt et al. (2013). As stated above empirical results of gender and its effect on livelihood diversification in rural areas is controversial and ambiguous.

Then it is left as an empirical question to be in a particular context. Our objective in this article is mainly to investigate the demographic characteristics concerning gender dimension non-farm activities and its determinant using the logistic regression model. With the question does gender matter for household livelihood diversification in Ethiopia rural areas? This study will contribute suggestively both to the prior works plus the current body of knowledge. And understanding the gender perspective of livelihood diversification and the determinant factors by employed a logistic regression model from rural Ethiopia. For the remainder, the next section has been organized as follows; part two, Literature review. Part three, methodology Section 4 analyzing, discussion section 5. conclusion.

Literature Review

Livelihood Diversification and Gender

Social roles are the set of socially accepted and approved behavior patterns associated with a particular social position (status) in a cultural group or society. For example, a man may have the status of father in his family. Gender roles stem from the social and cultural construction of what a male or a female is expected to do, perform, or take responsibility for a given context (Adeoti, Cofie, and Oladele 2012). For improving agricultural production and economic development, both the participation of men and women is very important. Women are the major players in the farm labor force engaged in production, harvesting, and processing activities and they are the major agricultural producers and they are active in trade and informal economy (Joseph and Elda 2018). In addition, women farmers produce the majority of food and they are responsible for fulfilling the basic needs of the family.

In most developing countries, predominantly in sub-Saharan Africa, Women not only process, Purchase, and prepare food but they are also playing a significant role in national agricultural production by producing both food and cash crop (Doss et al. 2018). Empirical studies indicated that they are more environmentally conscious compared to men farmers (Burton 2014; Kennedy and Kmec 2018). However, there are research outcomes that indicate the existence of gender inequalities in the agricultural sector. The involvement and contribution of females in food production are significant and cannot be overemphasized. Unfortunately, the function of women in food production is grossly undermined and overshadowed by the contribution of the male (Idumah and Owombo 2015).

In sub-Saharan, women's role in agricultural development and related fields play a great role (Idumah and Owombo 2015). Research conducted in India recognized that there is "feminization of agrarian distress" (Anderson and Sriram 2019). Research conducted in Nigeria examined women are providers of a large proportion of lab our in agricultural communities, (A.O 2013). Research the study conducted in Ghana (Hirons et al. 2018), FHH has relatively less land and has a lower income than MHH. In addition, Doss et al. (2018) Lack of capital information and market access is also another female household challenge that foils them from producing enough. Kyaw et al. (2018) Reported that rice producer farmers in the Magway Region MHH are more dominated the market

participation than female households. Adds there were agricultural inequalities of some crops to be “Men’s crops” plus others as “women’s crops (B. T. 2012). Alternatively, (Njuki and Sanginga 2013) revealed that women are contributed to produce relatively large livestock. Although their part in controlling and income from the sale has usually deteriorated. The shortage of information correlated to women is a challenge this is exposed them to land grasping. (Meinzen-Dick et al. 2019).

Empirical studies showed that the process of land inheritance is a big problem for women in the agricultural sector and value assets. Daughters were denied ownership and have weaker property than sons in money developing countries (Bhalotra, Brulé, and Roy 2020). There is a trend of disfavor or exclusion (Bhalotra et al. 2020). Furthermore, the mindset that land rights belonged to men indeed women ignored possession of land (Kocabicak 2018). The previous empirical studies found mixed results example research conducted in China (de Brauw et al. 2013). there was no productivity difference between plots possessed by both MHH and FHH. Research conducted in Cameroon (Ragasa et al. 2013) reported that in rural Cameroon, women farmers were empowered both by increasing agricultural production and employment opportunities (Uduji 2018). Conversely, in Ethiopia, women's discrimination is a challenge (Hallward-Driemeier and Gajigo 2015).

By implication, rural farm households in general participation of gender, in particular, are imperative to participate in non-farm economic activities to reduce poverty. Research conducted in East Ethiopia investigated that, source of income for MHH heads from their farm, off-farm, and non-farm economic activities had increased by 03, 0.72, and 0.97 respectively than MHH (Naybor, Poon, and Casas 2016). Research conducted in Uganda (Sharaunga and Mudhara 2016) investigated that, mover than 70% of the widowed poor women is dependent on subsistence agriculture. Suggesting that it is because of the gendered mobility disadvantage among them. In addition, add respective patterns of movement illustrate special restrictions and flexible space-time budget among women with less diversified livelihood. Carriazo, Berdegue, and Soloaga (2015) Research conducted in Africa investigated that, female household heads are more independent and have more control over resources than other women who are not household heads.

Research conducted in rural Kenya on household livelihood diversification and gender They conclude that male household headed generally have lower nonfarm income compared to female-headed households and mostly, female-headed households are participating in the petty trade activities than male household (Loison and Loison 2015). Andersson Djurfeldt et al.(2013) investigated the interaction between the off-farm sector and the agricultural sector they found that significant differences in cash income between male-headed and female-headed. The result indicated that gender difference income is higher in poor regions. However, not in the rich regions. Nevertheless, FHH in richer regions had higher nonfarm incomes compare to those in poor regions. By implication, women may have equal commercial opportunities and participation in non-farm economic activities.

In the study conducted in Uganda, Dube et al.(2019) recognize that MHH gained suggestively higher income than FHH. Suggesting that the reason behind the problem is because of inequality of access to produce the resource. However, (Smith et al. 2001) Studies in Uganda using the qualitative method recognize that gender difference is created mainly depending upon occupational livelihood diversification they concluded that FHH has more participated in the agriculture sector.

For instance, crop production and livestock production. Research conducted in rural Malawi on livelihood diversification and gender. Found that FHH is more likely to participate in agriculture and labor rather than a singular focus on the farm. But male household heads received more income than the female household head because of the low-lab our and low agricultural income (Simtowe 2011). However, research conducted in northern Chana, using cross-sectional data from 13,580 respondents and applied the chi-square method for their analysis found that men were more engaged in paid wages than women were. However, women participating in more low-income activities in the non-farm economic activities (Hudu Zakaria, Afishata Mohammed Abujaja and Salifu 2015). Van den Broeck & Kilic (Van den Broeck and Kilic 2019) investigated the non-farm economic activities and gender perspective in Africa. Found that the big reason for the low probability to enter to none-farm activities for a female-headed household is associated with marital status. (Shan and Ahmed 2020) examined that MHH had a significant effect on non-farm economic activities.

They suggested, most of the rural areas traditionally believe that male participants have more access and social acceptance (Dary and Kuunibe 2012) female member in any aspect which represents less diversified livelihood Conversely, the study conducted in rural Kuunibe (de Brauw et al. 2013) employed logit model reported that the probability of participation in livelihood diversification increase with being a woman (Vasco and Tamayo 2017). By implication, women are more likely to participate in non-farm economic than men. (Dedehouanou et al. 2018b) conducted in Ecuador found FHH has more participation in livelihood diversification than MHH however, the income they get from the non-farm activities is less than the MHH .similar studies on livelihood diversification strategies in Indian, found female household heads are more active in none-farm activities but less likely to specialize in non-farm activities (Rahut and Micevska Scharf 2012).

Livelihood Diversification and its Determinants

Livelihood diversification refers to the participation of farm households in multiple sources of livelihood rather than looking at farming. Rural household livelihood diversification is required for the reason of fulfilling their household needs. Empirical studies recognized that in developing countries, livelihood diversification of rural households is useful. Suggested that the basic reason is to alleviate rural household income inconsistency, discourse external shocks in production, and irregular rainfall (Fabusoro et al. 2010; Leng et al. 2020; Ma, Abdulai, and Ma 2018). None-farm participation support rural households to get working capital and finance

for agricultural inputs in lack of credit access (Pfeiffer, López-Feldman, and Taylor 2009). For example, a study conducted in Mexico examined that increasing off-farm income by one peso increases the purchase of input by 0.33 pesos.

This is, therefore, the allotment of household assets and labor resources which financed the inputs (Démurger, Fournier, and Yang 2010). Livelihood diversification is a broad concept it can be seen at the macro and micro level from the perspective of macro-level it means a shift from agricultural to industries and then service sector (Fabusoro et al. 2010). Nevertheless, our focus is livelihood diversification micro-level or household level from the perspective of “push factor” and the “pull factor” (Kundu and Das 2019). According to Khan et al. (2020) reported that viewpoints from the push factor focused by limited risk-bearing of farm operators with the inadequate financial system, it arising from climate uncertainty, Land deprivation, have played a great role in increasing demand for off-farm employment (Alobo Loison 2015; Khan et al. 2020; Kundu and Das 2019). Nevertheless, it should be considered and to be recognized during selecting a portfolio of activities (Démurger et al. 2010). A Push factor rural livelihood diversification is supportive for subsistence nonetheless, it has a low contribution in reducing poverty (Bezemer, Dirk J and Headey 2008). The pull factor is the determinant factor it has emerged from the existence of commercial farming and nearness (Reardon, Barrett, and Webb 2001), the pull factors play a great role because they attract to improve the standard of living and for reducing poverty (Alobo Loison 2019b). Livelihood diversification of farm households in rural areas should be beyond self-insurance of risk mitigation (Reardon et al. 2001). It copes with during surprised income at the time of crop failure and loss of livestock. None-farm participation may reduce the instability of rural household farmers' income and enhance their ability to resist and properly handle the challenges of farm income risk (Jette-Nantel et al. 2010). Empirical studies revealed that agriculture income and non-farm labor supply participation are negatively correlated (Bhaumik, Dimova, and Nugent 2011). Explained that the availability of extra labor off-farm employment is scarce when farmers are engaged in livestock-related operations such as dairy (Alasia et al. 2009).

The Rural off-farm sector has a great role in Africa countries since most of the countries in Africa have rapid population growth. On the other hand, agricultural resources are increasingly limited (Dedehouanou et al. 2018a; Fakayode, S. B., Babatunde, R.O., Olowogbon, S.T., and Adesuyi 2010). Henceforth, both the off/non-farm sector and agriculture sector should be given equal importance to the welfare of the rural communities (Morera and Gladwin 2006), It was found that, in Africa, the non-farm activity is highest in areas with better agricultural productivity and income, emphasizing the importance of inter-sectoral linkage (Reardon 1997). In addition, the problems caused by sudden losses of incomes are the foundations for the public policy programmed to provide a safety net when there is a need (Poon et al. 2011).

Although the opportunities for lucrative non-farm income do not equal for all operators, non-farm income diversification in rural Africa is widely practiced (Barrett, Bezuneh, and Aboud 2001). In sub-Saharan Africa, the contribution of off-farm income to the total household income is in the range of 30 to 50 percent (Fabusoro et al. 2010). Research conducted in Ethiopia, Nigeria, Tanzania, Uganda, and Malawi the off-farm employment status in Ethiopia is still low 24% (Van den Broeck and Kilic 2019). Farm households who are limited to only farm income either have a larger landholding size than the average or are located in inaccessible areas (Chaplin et al. 2003).

Research and Methodology

Brief Background of the study area

Data was gathered from Raya Azido district southern part of Tigray province. Tigray region, situated between 120 15' and 140 57'N latitudes 360 27'E and 390 59'E longitudes, northern part Ethiopia. 53% of the land is below 1500 meters about sea level it is lowland (kola), 39% located at 1500-2300 meter about sea level and have medium-altitude 8% is over 2300 meters about sea level and is classified as highland (Beyene, Gibbon, and Haile 2006). The region is bordered by Eritrea on the north, Sudan on the west, the south Amhara region, and the Afar region on the east. There are a total of seven zones with 34 rural districts and 18 big cities. Generally, more dynamic agricultural region The main livestock reared in this district are cattle, sheep, goats, and camel. Livestock is used as a source of draught food, and source of income in addition to crop production. In addition to Vegetables (Like; Onion, tomato, and hot pepper), Taffe and sorghum are the dominant crops covering around 75% of the districts' cultivated land. However, the yield of these crops is very low (TEKA 2009).

Location Map of the Study Area

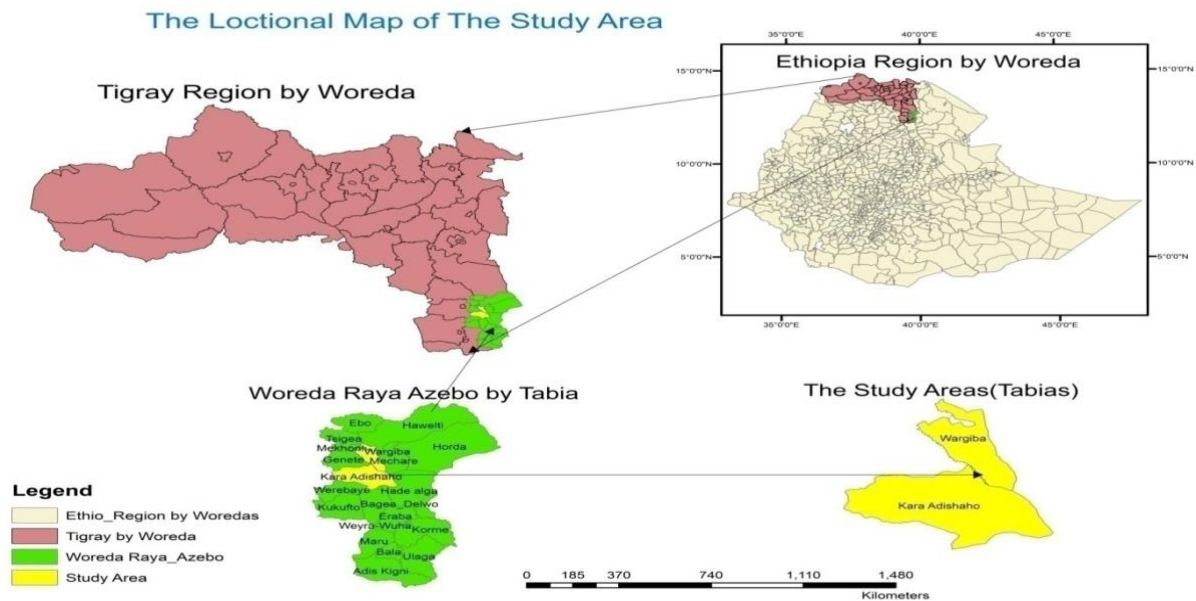


Figure 1: Location Map of the Study

Quantitative survey data

Quantitative survey data was the main source of data in this study. The questions were developed about the gender issue in analyzing and the aspects of livelihood sources, in diversified the livelihood of smallholder farmers and their source of livelihood from the sampled households and about the determinant factors for off/non-farm participating, the structured survey questionnaire was administrated with the help of data collectors and discussed the questions before the field survey. Rural household respondents were selected by following multiple sampling techniques. Systematic random sampling was used to select respondents from the list of farmers of each Tibia which are found in the district. Probability sampling is an essential aspect of statistical methods to make some generalizations about the population (C.R. Kothari 2004; W.creswell 2013). The sample size was;

determination by using the Slovenian formula (T.Isip 2010).

$$n = N/1+N(e)2$$

n = required sample size

N = Total population size

E = the level of precision (5% level of precision

Based on the above formula **371** rural households were selected from the **5084** Target population of smallholder farmers. As we can see from the survey the household heads can be characterized as the MHH and FHH.

Qualitative data

The mixing method was used. Nowadays, the majority of social scientists agreed that there are no core problem areas that should be studied completely with a single research technique. Besides, mixed methodologists explain the methodological effectiveness of the multiple methods. Therefore, using both methods helps to minimize the drawbacks of using qualitative or quantitative approaches. As philosophical support for mixed methods studies (W.creswell n.d.) in a quantitative study, the focus is on the representation of the subject and how variables interact, shape events, and arouse outcomes (Antwi and Kasim 2015), The qualitative study gives due attention to words rather than quantification (Antwi and Kasim 2015; Bryman, Becker, and Sempik 2008).

Model Specification

This article examined the effect of the determinant factors of livelihood diversification of smallholder farmers. To see the effect of the determinant factors consequently, we have constructed the conceptual model based on the logistic regression. This article has used important variables such as Gender, Age, Family size, Educational level, credit access. The econometric models have used based variables (dependent and explanatory) Rural houses hold heads can diversify their livelihood by participating in none/off-farm economic activities out of their farming. This may be affected by different factors. The dependent variable is smallholder farmers Livelihood diversification (Whether the household diversifies his/her livelihood strategy or not using non-farm participation as”: 1 if yes, 0 otherwise). The observation level here is the household head.

$$Y_i = \beta_i \chi_i + \epsilon_i$$

Y is the latent variable observed by the following conditions;

$Y_i = 1$ if $Y_i > 0$, $Y_i = 0$ otherwise

Where: Y is the dependent variable, This refers that smallholder farmers Livelihood diversification (Whether the household diversifies his/her livelihood strategy or not using non-farm participation as a proxy-based on the question that "is there any household member who participated in such activities during 2020 production year": 1 if yes, 0 otherwise (Alobo Loison 2019a; Kassie, Kim, and Fellizar 2017b).

Results and Discussion

Socio-Economic Characteristics of rural households

Gender

As we see in table 1 The composition of the respondents of the household from 371 household respondents 209 of them are male-headed and 162 households are females headed. This means that male respondents have more representative in the sample than female head household by implication, this could have its side effects on job-related livelihood diversification. The previous empirical literature has different findings on the issue of gender participation in a different source of livelihood. Such as Khatun & Roy (2012) it is a biological difference, (A.O 2013) women more participates in labor than men in Nigeria. Gender is open for research according to the regional context.

Age

Age is a determinant factor in participation in livelihood diversification. We have classified the age group into three different parts. Hence, the greatest number 68.2% household heads are age 35-64 from this 25.6 % and 46.6% are female and male households respectively. In addition, from the 16-34 age group sample households are about 18.1% of which 100% are female households. None of the male households are found in this age group. Overall, the majority of the respondents are found in the productive age group with an average age of 45 years and the age is 25 and 75 years. Minimum and maximum respectively. This indicated that the sample household head has more experience on-farm activities with composed of sample respondents of different age groups. By implication, this age has the highest expectation to participate in none/off-farm activities.

Family size

As indicated in table 1. (62.5%) of the respondents have 4-6 family members out of this 25.6% are female and 36.9% are male households. On the other hand, it also shows the average size of a household is 5 people, with 2 and 10 minimum and maximum persons respectively. When we look at the maximum size, it gives the impression too, and can expect it affects the participation of non-farm economic activities. However, it is the average household size of the rural region (He, Town, and Samre 2013). It may have an impact on non-farm economic activity (Eneyew and Bekele 2012; Khatun and Roy 2012).

Educational level

225 household respondents are illiterate of which 163 are female and 63 males. Whereas 128 of the respondents can read and write. Out Of 146 respondents, 125 of them are from grades 1-8 and the other 18 are above grade 9 Most of the previous empirical studies (Eneyew and Bekele 2012; Khatun and Roy 2012) found that education has a positive relationship with livelihood diversification of smallholder farmers. Meanwhile, the majority of the respondents are illiterate which affects the probability of the household on the livelihood diversification and may decline.

Table 1: Summary, Socio-Economic Characteristics of rural households

Gender * Age * Family size * Education Cross tabulation						
		Gender				
		Female	Male	Total		
Age	16-34	Count	67	0	67	
		% within Age	100.0%	0.0%	100.0%	
		% within Gender	41.4%	0.0%	18.1%	
	35-64	% of Total	18.1%	0.0%	18.1%	
		Count	95	158	253	
		% within Age	37.5%	62.5%	100.0%	
	>=65	% within Gender	58.6%	75.6%	68.2%	
		% of Total	25.6%	42.6%	68.2%	
		Count	0	51	51	
Family Size	1-3	% within Age	0.0%	100.0%	100.0%	
		% within Gender	0.0%	24.4%	13.7%	
		% of Total	0.0%	13.7%	13.7%	
	4-6	Count	67	0	67	
		% within Family size	100.0%	0.0%	100.0%	
		% within Gender	41.4%	0.0%	18.1%	
	7-9	% of Total	18.1%	0.0%	18.1%	
		Count	95	137	232	
		% within Family size	40.9%	59.1%	100.0%	
Education	Illiterate	% within Gender	58.6%	65.6%	62.5%	
		% of Total	25.6%	36.9%	62.5%	
		Count	0	72	72	
	1-8	% within Family size	0.0%	100.0%	100.0%	
		% within Gender	0.0%	34.4%	19.4%	
		% of Total	0.0%	19.4%	19.4%	
	>=9	Education Illiterate	162	63	225	
		Count	72	28	100	
		% within Education	72.0%	28.0%	100.0%	
1-8	% within Gender	100.0%	30.1%	60.6%		
	% of Total	43.7%	17.0%	60.6%		
	Count	0	128	128		
>=9	% within Education	0.0%	100.0%	100.0%		
	% within Gender	0.0%	61.2%	34.5%		
	% of Total	0.0%	34.5%	34.5%		
>=9	Count	0	18	18		
	% within Education	0.0%	100.0%	100.0%		
	% within Gender	0.0%	8.6%	4.9%		
		% of Total	0.0%	4.9%	4.9%	

Source: Survey Data (2020).

Logistic Regression Model Result of off/none Farm Participation.

The chi-square is 91.868 % which is significant at 0.00. % According to the regression outcome the expected (B) result of the variable age, educational level presented positive signs at 3.406, 1.956, and 1.315 respectively, and at the same time statistically significant likelihood. This suggests that the younger age household, who can able to read and write are essential variables in explaining the effect of livelihood diversification in Ethiopia. In the meantime, Gender and credit access is a negative sign.

Discussion

Our study endeavored to investigate the effect of demographic characteristics on livelihood diversification from the perspective of gender. We used the logistic regression model. Based on this our empirical evidence is indicated in the next finding. Variables like age, education, statistically significant variables with positive expectations. This indicates that age and education have a significant role to increase livelihood diversification (off/non-farm) participation. Whereas, credit access affecting negatively and it is significant. Credit access does not contribute to the livelihood diversification of the household heads. This result is similar to the result of (Alobo Loison 2019b). The overall result indicated that age, education level, and road access are the ways of increasing livelihood diversification of farm households out of their farm, this demonstrated household heads who are in the age category of 35-64, who can read and write are the key contributors of livelihood diversification.

Gender

As reported in table 2 the result shows that female household heads have a positive and significant correlation with off/non-farm participation than male household heads implies that FHH is more active than MHH in participating in off/none farm economic activities in the study area. This outcome is consistent with the findings of (Alobo Loison 2019b). However, it contradicts the findings of (Naybor et al. 2016) based on survey data from 153 respondents, who found MHH are more active in income sources generated from off-farm for the Ethiopian sample. The qualitative data from the descriptive section showed that female households were more active in petty trade participation. As we found from the qualitative data it is because they are not the owner of the land. The mean age of female household respondents was 25 years' land distribution has been stopped since 1991 because of the governments fired of further fragmenting of land the majority of women respondents age indicates after stopping land distribution. Women owning land employing inheritance from family and rent or buy land for farming.

Age

Rural Household heads have a significant effect on non-farm economic activities. Indicating that, the younger household head can participate more in none –farm economic activities than old age, this may be because the majority of (68.2%) from this 25.6% female respondents in the study area are found productive age group and it is 3 times important for livelihood diversification. The finding was supported by our hypothesis. When the household head becomes getting older their participation in non-farm activities out of their farm becomes reduced the outcome is similar to the study of (Makate et al. 2019). The expected reason is that their age is adversely affected by different natural and physical fitness. However, this finding contradicts (Khatun and Roy 2012) who found the older age participating in none-farm activities than the younger age.

Level of Education

Educational level has a significant correlation with livelihood diversification of farm households. The result was supported our proposed hypothesis. Household heads who performed formal education have a greater probability of their livelihood diversification than the illiterate household heads, This corroborates Getnet in Ethiopia (2021). However, contradicted the findings of Kassie et al (2017a) found educational level harms the diversification of livelihood. The data indicated that MHH is more participants in formal education than FHH.

Family size

Family size has an insignificant result with none-farm activities. Indicating that household heads with relatively has extended family members reduce livelihood diversification. Because the study area is relatively potential in agriculture and has medium access to the agricultural market. Large family in farmers group was highly expected to diversify their livelihood diversification, but amazingly it was not significant. The total family members in the sampled (N) 1855 out of this 115 of them were not in their Tibia for multiple cases, 28%, 23%, and 19% were in small towns of their district, in the capital city, and other regions. Most of them are in the youth group.

Credit Access

More Secure for Agricultural Intensification Rather than Diversification credit access has negatively and significantly correlated with the livelihood diversification of farm household heads. This indicated that credit access has generally increased access to agricultural input for promoting agricultural intensification rather than diversifying their livelihood out of on-farm this finding is similar to the study of (Alobo Loison 2019a). FHH as we found the data qualitatively, women take a small amount of credit for fear of repayment. As the result, they have low benefits from agricultural loans for input credit, probably Furthermore, intensification, especially in crop production, has been happening already, this is linked to increasing input use. Agriculture intensification is not for diversification rather it is for specialization (Rashid et al. 2013). However, input use in sub-Saharan Africa is minimal. (Shanka 2020).this lead smallholder farmers to subsistence farming.

Table 2: Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	287.290 ^a	.354	504

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Table 3: Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	91.868	8	.000

Table 4: Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp (B)
Step 1^a	Gender	-2.202	.511	18.569	1	.000	111
	Age	3.406	.520	42.861	1	.000	30.145
	Education	1.956	.431	20.573	1	.000	7.070
	Family size	.575	.426	1.817	1	.178	1.777
	credit access	-1.816	.405	20.097	1	.000	.163

road access	1.315	.508	6.698	1	.010	3.726
Distance from the town	.096	.388	.061	1	.806	1.100
Constant	-1.908	.978	3.809	1	.051	.148

Variable (s) entered on step 1: Gender, Age, Education, Family size, credit access, access to road, distance from the town.

Conclusion

The household demographic factors; gender (being FHH) was positively and significantly correlated with livelihood diversification they are participating in none/off-farm economic activities than MHH however FHH was participating in low return income. This finding is similar to the findings of (Hudu Zakaria, Afishata Mohammed Abujaja, and Salifu 2015). Education and age have important determinants in livelihood diversification the younger household head and household heads who can able to read and write have a significant effect on non-farm economic participation this finding is similar to the findings of (Eneyew and Bekele 2012; Khatun and Roy 2012) However, household heads who have relatively large family member were fewer participants in non-farm economic activities. May be concentrated on-farm activities. Surprisingly, membership in the farmer's group was not significant for taking an alternative job to diversify their livelihood. This finding contradicts (Eneyew and Bekele 2012; Khatun and Roy 2012). Generally, access credit for agricultural input becomes more important to MHH for secure land to promote agricultural intensification in farming than looking out of farming.

Our result of the study has several implications for development policy both the Ethiopian government and developing countries at large. The governments must come around to recognize the positive determinants that can be attaching the livelihood diversification to increase its impact to reduce poverty. Developing countries at large and Ethiopia in particular, their economic activities is depending on agriculture. Then the governments should follow a policy of combining the agricultural and the non-agricultural sector to increase livelihood diversification both MHH and FHH. In addition, targeting poverty reduction needs cloth up the weak side of non-farm participation and gender gap by giving special focus on the vulnerable rural households who are limited in credit access, education opportunities, the entry barrier to inter rural non-farm sector these can help to cloth gender gap especially for FHH.

Livelihood diversification for rural households should be beyond survival which can be used for humble and exposed example women for livelihood Still, the outcome indicating that women's participation in non-farm activities can take as big potential and must give attention to development policy. Henceforth, the government policy and strategies must encourage the development of high-return none economic activities of household heads (MHH or FHH) must also into consideration and their specific need. To reduce poverty selective support is important. For example, female households who are vulnerable and safety nets, and other needs. Then governments policy promotes livelihood diversification opportunities this can help the rural household to find an alternative source of income and survival.

References

- Alobo Loison, (2019)). Applying Public Participation Geographic Information Systems for Coastal Wading Bird Conservation. *Coastal Management* 47(2):227–43. <https://doi.org/10.1080/08920753.2019.1564957>.
- A.O, Adenugba. (2013)). The Role of Women in Promoting Agricultural Productivity And Developing Skills For Improved Quality of Life In Rural Areas. *IOSR Journal of Engineering* 03(08):51–58. DOI: 10.9790/3021-03855158.
- Adeoti, Adetola I., Olufunke Cofie, and Oladimeji I. Oladele. (2012)). Gender Analysis of the Contribution of Urban Agriculture to Sustainable Livelihoods in Accra, Ghana. *Journal of Sustainable Agriculture* 36(2):236–48. DOI: 10.1080/10440046.2011.620229.
- Alasia, Alessandro, Alfons Weersink, Ray D. Bollman, and John Cranfield. (2009)). Off-Farm Labour Decision of Canadian Farm Operators: Urbanization Effects and Rural Labour Market Linkages. *Journal of Rural Studies* 25(1):12–24. DOI: 10.1016/j.jrurstud.2008.04.002.
- Alobo Loison, Sarah. (2015)). Rural Livelihood Diversification in Sub-Saharan Africa: A Literature Review. *Journal of Development Studies* 51(9):1125–38. DOI: 10.1080/00220388.2015.1046445.
- Alobo Loison, Sarah. (2019a)). Household Livelihood Diversification and Gender: Panel Evidence from Rural Kenya. *Journal of Rural Studies* 69(February 2017):156–72. DOI: 10.1016/j.jrurstud.2019.03.001.
- Alobo Loison, Sarah. (2019b)). Household Livelihood Diversification and Gender: Panel Evidence from Rural Kenya. *Journal of Rural Studies* 69:156–72. DOI: 10.1016/j.jrurstud.2019.03.001.
- Anderson, Simon, and Vidhya Sriram. (2019)). Moving Beyond Sisyphus in Agriculture R&D to Be Climate Smart and Not Gender Blind. *Frontiers in Sustainable Food Systems* 3(October):1–12. DOI: 10.3389/fsufs.2019.00084.
- Andersson Djurfeldt, Agnes, Göran Djurfeldt, and Johanna Bergman Lodin. (2013)). Geography of Gender Gaps: Regional Patterns of Income and Farm-Nonfarm Interaction Among Male- and Female-Headed Households in Eight African Countries. *World Development* 48:32–47. DOI: 10.1016/j.worlddev.2013.03.011.

- Antwi, Stephen Kwadwo, and Hamza Kasim. (2015) Qualitative and Quantitative Research Paradigms in Business Research: A Philosophical Reflection Performance Management Practices in the Ghanaian Local Government System View Project. *European Journal of Business and Management* 7(3):217–26.
- B. T., Mohammed. (2012)). Comparative Analysis of Gender Involvement in Agricultural Production in Nigeria. *Journal of Development and Agricultural Economics* 4(8):240–44. DOI: 10.5897/jdae11.034.
- Barrett, Christopher B., Mesfin Bezuneh, and Abdillahi Aboud. (2001)). Income Diversification, Poverty Traps and Policy Shocks in Côte d'Ivoire and Kenya. *Food Policy* 26(4):367–84. DOI: 10.1016/S0306-9192(01)00017-3.
- Beyene, Atakilte, David Gibbon, and Mitiku Haile. (2006)). Heterogeneity in Land Resources and Diversity in Farming Practices in Tigray, Ethiopia. *Agricultural Systems* 88(1):61–74. DOI: 10.1016/j.agsy.2005.06.004.
- Bezemer, Dirk J and Headey, Derek. (2008)). Munich Personal RePEc Archive Agriculture, Development and Urban Bias August 2007. (7026).
- Bhalotra, Sonia, Rachel Brulé, and Sanchari Roy. (2020)). Women's Inheritance Rights Reform and the Preference for Sons in India. *Journal of Development Economics* 146(July 2018). DOI: 10.1016/j.jdeveco.2018.08.001.
- Bhaumik, Sumon Kumar, Ralitzia Dimova, and Jeffrey B. Nugent. (2011)). Off-Farm Labor Supply and Labor Markets in Rapidly Changing Circumstances: Bulgaria during Transition. *Economic Systems* 35(3):378–89. DOI: 10.1016/j.ecosys.2010.09.005.
- de Brauw, Alan, Jikun Huang, Linxiu Zhang, and Scott Rozelle. (2013)). The Feminisation of Agriculture with Chinese Characteristics. *Journal of Development Studies* 49(5):689–704. DOI: 10.1080/00220388.2012.724168.
- Van den Broeck, Goedele, and Talip Kilic. (2019). Dynamics of Off-Farm Employment in Sub-Saharan Africa: A Gender Perspective. *World Development* 119:81–99. DOI: 10.1016/j.worlddev.2019.03.008.
- Bryman, Alan, Saul Becker, and Joe Sempik. (2008). Quality Criteria for Quantitative, Qualitative and Mixed Methods Research: A View from Social Policy. *International Journal of Social Research Methodology* 11(4):261–76. DOI: 10.1080/13645570701401644.
- Burton, Rob J. F. (2014). The Influence of Farmer Demographic Characteristics a Review. *Journal of Environmental Management* 135:19–26.
- C.R. Kothari. (2004). Research Design.
- Carriazo, Fernando, Julio A. Berdegue, and Isidro Soloaga. (2015). Cities, Territories, and Inclusive Growth : Unraveling Urban-Rural. 73:56–71. <https://doi.org/10.1016/j.worlddev.2014.12.013>.
- Chaplin, Hannah, Sophia Davidova, Matthew Gorton, Jerzy Wlikin, Dominka Milczarek, Adriana Lukaszewicz, Tomas Doucha, Zdena Cihelkova, Ladislav Jelinek, Katerina Nucova, Frantisek Nohel, Tibor Ferenzi, Gyula Modos, Maria Kyostal, Tamás Mizik, and Peter Csillag. (2003). Agricultural Adjustment and the Diversification of Farm Households in Central Europe Agricultural Adjustment and the Diversification of Farm Households in Central. *Contributed Paper Selected for Presentation at the 25th International Conference of Agricultural Economists, August 16-22, 2003, Durban, South Africa* 1–15.
- Creswell. (2013). *Research Design*.
- Dary, Stanley Kojo, and Naasegnibe Kuunibe. (2012). Participation in Rural Non-Farm Economic Activities in Ghana. *American International Journal of Contemporary Research* 2(8):154–61.
- Dedehouanou, Sènakpon Fidèle Ange, Abdelkrim Araar, Aichatou Ousseini, Abdoulaziz Laouali Harouna, and Maimounata Jabir. (2018a). Spillovers from Off-Farm Self-Employment Opportunities in Rural Niger. *World Development* 105:428–42. <https://doi.org/10.1016/j.worlddev.2017.12.005>.
- Dedehouanou, Sènakpon Fidèle Ange, Abdelkrim Araar, Aichatou Ousseini, Abdoulaziz Laouali Harouna, and Maimounata Jabir. (2018b). Spillovers from Off-Farm Self-Employment Opportunities in Rural Niger. *World Development* 105(February):428–42. <https://doi.org/10.1016/j.worlddev.2017.12.005>.
- Démurger, Sylvie, Martin Fournier, and Weiyong Yang. (2010). Rural Households' Decisions towards Income Diversification: Evidence from a Township in Northern China. *China Economic Review* 21(SUPPL. 1). <https://doi.org/10.1016/j.chieco.2010.05.007>.
- Djurfeldt, Agnes A., and Stephen K. Wambugu. (2011). In-Kind Transfers of Maize, Commercialization and Household Consumption in Kenya. *Journal of Eastern African Studies* 5(3):447–64. <https://doi.org/10.1080/17531055.2011.611671>.
- Doss, Cheryl, Ruth Meinzen-Dick, Agnes Quisumbing, and Sophie Theis. (2018). Women in Agriculture: Four Myths. *Global Food Security* 16(July 2017):69–74. DOI: 10.1016/j.gfs.2017.10.001.
- Dube, Ahmed Kasim, Wasiu Olayinka Fawole, Ramu Govindasamy, and Burhan Ozkan. (2019). International Journal of Agriculture, Forestry and Life Sciences Agricultural Development Led Industrialization In Ethiopia: Structural Break Analysis. *Int J Agric For Life Sci* 3(1):193–201.
- Ellis, Frank. (2000). Zyx Zy Zyx Zyxwvutsr. *The Determinants of Rural Livelihood Diversification in Developing Countries* 39(11):1896–1904.
- Eneyew, Adugna, and Wagayehu Bekele. (2012). Determinants of Livelihood Strategies in Wolaita, Southern Ethiopia. *Agricultural Research and Reviews* 1(5):153–1161.
- Fabusoro, E., A. M. Omotayo, S. O. Apantaku, and P. A. Okuneye. (2010). Forms and Determinants of Rural Livelihoods Diversification in Ogun State, Nigeria. *Journal of Sustainable Agriculture* 34(4):417–38. <https://doi.org/10.1080/10440041003680296>.

- Fakayode, S. B., Babatunde, R.O., Olowogbon, S.T., and Adesuyi, W. S. (2010). An Appraisal of Beekeeping Activities among Beneficiaries and Non-Beneficiaries of Ekiti State Agricultural Credit Agency (ESACA) Scheme in Nigeria.
- Frelat, Romain, Santiago Lopez-Ridaura, Ken E. Giller, Mario Herrero, Sabine Douchamps, Agnes Andersson Djurfeldt, Olaf Erenstein, Ben Henderson, Menale Kassie, Birthe K. Paul, Cyrille Rigolot, Randall S. Ritzema, Daniel Rodriguez, Piet J. A. Van Asten, and Mark T. Van Wijk. (2016). Drivers of Household Food Availability in Sub-Saharan Africa Based on Big Data from Small Farms. *Proceedings of the National Academy of Sciences of the United States of America* 113(2):458–63. <https://doi.org/10.1073/pnas.1518384112>.
- Gebru, Kebede Manjur, Kifle Woldearegay, Frank van Steenberg, Aregawi Beyene, Letty Fajardo Vera, Kidane Tesfay Gebreegziabher, and Taye Alemayhu. (2020). Adoption of Road Water Harvesting Practices and Their Impacts: Evidence from a Semi-Arid Region of Ethiopia. *Sustainability (Switzerland)* 12(21):1–25. <https://doi.org/10.3390/su12218914>.
- Getnet, Mersha Tewodros. (2021). Rural Households Livelihood Portfolios and Determinates of Livelihood Diversification in North-Western Ethiopia. 0–27.
- Haggblade, Steven, Peter Hazell, and Thomas Reardon. (2010). The Rural Non-Farm Economy: Prospects for Growth and Poverty Reduction. *World Development* 38(10):1429–41. <https://doi.org/10.1016/j.worlddev.2009.06.008>.
- Hallward-Driemeier, Mary, and Ousman Gajigo. (2015). Strengthening Economic Rights and Women’s Occupational Choice: The Impact of Reforming Ethiopia’s Family Law. *World Development* 70(November):260–73. <https://doi.org/10.1016/j.worlddev.2015.01.008>.
- He, Communities, Samre Town, and STaharti Samre. (2013). College Of Business And Economics Department Of Management The Role of Small Towns in Diversifying the Livelihood of Rural Declaration The Thesis Entitled ‘ The Role of Small Towns in Diversifying the Livelihood of Rural Communities ’ Is My Original Work.
- Hirons, M., E. Robinson, C. McDermott, A. Morel, R. Asare, E. Boyd, T. Gonfa, T. W. Gole, Y. Malhi, J. Mason, and K. Norris. (2018). Understanding Poverty in Cash-Crop Agro-Forestry Systems: Evidence from Ghana and Ethiopia. *Ecological Economics* 154(February):31–41. <https://doi.org/10.1016/j.ecolecon.2018.07.021>.
- Hudu Zakaria, Afishata Mohammed Abujaja, Hamza Adam and Walata Yakub, and Salifu. (2015). Does Gender Makes Any Difference in Livelihoods? *International Journal of Agricultural Extension and Rural Development Studies* 1(1):36–51.
- Idumah, Felix Oaikhen, and Paul Temegbe Owombo. (2015). Gender Differentials In Production Efficiency In Food Crops. (June).
- Jette-Nantel, Simon, David Freshwater, Martin Beaulieu, and Ani L. Katchova. (2010). Farm Income Variability and Off-Farm Diversification in Canadian Agriculture. *Southern Agricultural Economics Association* 29.
- Joseph, I., and N. Elda. (2018). www.econstor.eu.
- Kassie, Geremew Worku, Sangho Kim, and Francisco P. Fellizar. (2017a). Determinant Factors of Livelihood Diversification: Evidence from Ethiopia. *Cogent Social Sciences* 3(1):1–16. <https://doi.org/10.1080/23311886.2017.1369490>.
- Kassie, Geremew Worku, Sangho Kim, and Francisco P. Fellizar. (2017b). Determinant Factors of Livelihood Diversification: Evidence from Ethiopia. *Cogent Social Sciences* 3(1). <https://doi.org/10.1080/23311886.2017.1369490>.
- Kennedy, Emily Huddart, and Julie Kmec. (2018). Reinterpreting the Gender Gap in Household Pro-Environmental Behaviour. *Environmental Sociology* 4(3):299–310. <https://doi.org/10.1080/23251042.2018.1436891>.
- Khan, Imran, Hongdou Lei, Irshad Ali Shah, Imad Ali, Inayat Khan, Ihsan Muhammad, Xuexi Huo, and Tehseen Javed. (2020). Farm Households’ Risk Perception, Attitude and Adaptation Strategies in Dealing with Climate Change: Promise and Perils from Rural Pakistan. *Land Use Policy* 91(October 2019):104395. <https://doi.org/10.1016/j.landusepol.2019.104395>.
- Khatun, Dilruba, and B. C. Roy. (2012). Rural Livelihood Diversification in West Bengal : Determinants. *Agricultural Economics Research Review* 25(1):115–24.
- Kocabicak, Ece. (2018). What Excludes Women from Landownership in Turkey? Implications for Feminist Strategies. *Women’s Studies International Forum* 69(February):115–25. <https://doi.org/10.1016/j.wsif.2018.06.005>.
- Kundu, Amit, and Sangita Das. (2019). Push and (or) Pull? Drivers of Labour Force Participation in Indian Agriculture. *Indian Journal of Labour Economics* 62(3):413–30. <https://doi.org/10.1007/s41027-019-00182-9>.
- Kyaw, Nyein Nyein, Soojung Ahn, and Sang Hyeon Lee. (2018). Analysis of the Factors Influencing Market Participation among Smallholder Rice Farmers in Magway Region, Central Dry Zone of Myanmar. *Sustainability (Switzerland)* 10(12). <https://doi.org/10.3390/su10124441>.
- Lanjouw, Jean O., and Peter Lanjouw. (2001). The Rural Non-Farm Sector: Issues and Evidence from Developing Countries. *Agricultural Economics* 26(1):1–23. [https://doi.org/10.1016/S0169-5150\(00\)00104-3](https://doi.org/10.1016/S0169-5150(00)00104-3).
- Leng, Chenxin, Wanglin Ma, Jianjun Tang, and Zhongkun Zhu. (2020). ICT Adoption and Income Diversification among Rural Households in China. *Applied Economics* 52(33):3614–28. <https://doi.org/10.1080/00036846.2020.1715338>.
- Loison, Sarah Alob, and Sarah Alob Loison. (2015). Rural Livelihood Diversification in Sub-Saharan Africa : A Literature Review Rural Livelihood Diversification in Sub-Saharan Africa : A Literature Review. *The Journal of Development Studies* 51(9):1125–38. <https://doi.org/10.1080/00220388.2015.1046445>.
- Ma, Wanglin, Awudu Abdulai, and Chunbo Ma. (2018). The Effects of Off-Farm Work on Fertilizer and Pesticide Expenditures in China. *Review of Development Economics* 22(2):573–91. <https://doi.org/10.1111/rode.12354>.
- Makate, Clifton, Marshall Makate, Munyaradzi Mutenje, Nelson Mango, and Shephard Siziba. (2019). Synergistic Impacts of Agricultural Credit and Extension on Adoption of Climate-Smart Agricultural Technologies in Southern Africa. *Environmental Development* 32(April):100458. <https://doi.org/10.1016/j.envdev.2019.100458>.

- Meinzen-Dick, Ruth, Agnes Quisumbing, Cheryl Doss, and Sophie Theis. (2019). Women's Land Rights as a Pathway to Poverty Reduction: Framework and Review of Available Evidence. *Agricultural Systems* 172(October 2017):72–82. <https://doi.org/10.1016/j.agsy.2017.10.009>.
- Morera, Maria C., and Christina H. Gladwin. (2006). Does Off-Farm Work Discourage Soil Conservation? Incentives and Disincentives throughout Two Honduran Hillside Communities. *Human Ecology* 34(3):355–78. <https://doi.org/10.1007/s10745-006-9022-4>.
- Naybor, Deborah, Jessie P. H. Poon, and Irene Casas. (2016). Mobility Disadvantage and Livelihood Opportunities of Marginalized Widowed Women in Rural Uganda. *Annals of the American Association of Geographers* 106(2):404–12. <https://doi.org/10.1080/00045608.2015.1113110>.
- Njuki, Jemimah, and Pascal C. Sanginga. (2013). *Women, Livestock Ownership and Markets: Bridging the Gender Gap in Eastern and Southern Africa*.
- Pfeiffer, Lisa, Alejandro López-Feldman, and J. Edward Taylor. (2009). Is Off-Farm Income Reforming the Farm? Evidence from Mexico. *Agricultural Economics* 40(2):125–38. <https://doi.org/10.1111/j.1574-0862.2009.00365.x>.
- Poon, Kenneth, Alfons Weersink, Brady Deaton, Alessandro Alessia, Lina Dipietro, Linda Kemp, Martin Cloutier, and Martin Beaulieu. (2011). Demand and Supply Analysis of Farm, Farmer and Farm Family Data. *Cahier de Recherche/ ...* (January).
- Ragasa, Catherine, Guush Berhane, Fanaye Tadesse, and Alemayehu Seyoum Taffesse. (2013). Gender Differences in Access to Extension Services and Agricultural Productivity. *Journal of Agricultural Education and Extension* 19(5):437–68. <https://doi.org/10.1080/1389224X.2013.817343>.
- Rahut, Dil Bahadur, and Maja Micevska Scharf. (2012). Livelihood Diversification Strategies in the Himalayas. *Australian Journal of Agricultural and Resource Economics* 56(4):558–82. <https://doi.org/10.1111/j.1467-8489.2012.00596.x>.
- Rashid, Shahidur, Paul A. Dorosh, Mehrab Malek, and Solomon Lemma. (2013). Modern Input Promotion in Sub-Saharan Africa: Insights from Asian Green Revolution. *Agricultural Economics (United Kingdom)* 44(6):705–21. DOI: 10.1111/agec.12083.
- Reardon, Thomas. 1997). Using Evidence of Household Income Diversification to Inform Study of the Rural Nonfarm Labor Market in Africa. *World Development* 25(5):735–47. [https://doi.org/10.1016/S0305-750X\(96\)00137-4](https://doi.org/10.1016/S0305-750X(96)00137-4).
- Reardon, Thomas, Christopher B. Barrett, and Patrick Webb. (2001). *Nonfarm Income Diversification and Household Livelihood Strategies in Rural Africa: Concepts, Dynamics, and Policy Implications* Christopher B. Barrett. Vol. 24.
- Shan, Tabia Binte, and Jasim Uddin Ahmed. (2020). Determinants of Livelihood Diversification of Rural Households in Sylhet. *Asian Journal of Agricultural Extension, Economics & Sociology* (December 2020):97–104. <https://doi.org/10.9734/ajaees/2020/v38i1130457>.
- Shanka, Dereje. (2020). Roles of Eco-Friendly Low Input Technologies in Crop Production in Sub-Saharan Africa. *Cogent Food & Agriculture* 6(1):1843882. <https://doi.org/10.1080/23311932.2020.1843882>.
- Sharaunga, Stanley, and Maxwell Mudhara. (2016). Dimensions of Empowerment Influencing Women in KwaZulu-Natal to Diversify Away from Agricultural-Based Livelihoods. *Agrekon* 55(1–2):103–32. <https://doi.org/10.1080/03031853.2016.1159586>.
- Shigate, Zemzem, Anagaw D. Mebratie, Robert Sparrow, Zelalem Yilma, Getnet Alemu, and Arjun S. Bedi. (2017). Uptake of Health Insurance and the Productive Safety Net Program in Rural Ethiopia. *Social Science and Medicine* 176:133–41. <https://doi.org/10.1016/j.socscimed.2017.01.035>.
- Simtowe, Franklin Peter. (2011). Livelihoods Diversification and Gender in Malawi. *African Journal of Agricultural Research* 6(2):248–59. <https://doi.org/10.5897/AJAR09.386>.
- Smith, David Rider, Ann Gordon, Kate Meadows, and Karen Zwick. (2001). Livelihood Diversification in Uganda: Patterns and Determinants of Change across Two Rural Districts. *Food Policy* 26(4):421–35. [https://doi.org/10.1016/S0306-9192\(01\)00012-4](https://doi.org/10.1016/S0306-9192(01)00012-4).
- T.Isip, Frankling Bel. (2010). Encouraging The Use Of Slovin's Formula In Computing Sizes in DMS Survei Related Projects. 1–5.
- TEKA, ADUGNA GESSESSE. (2009). Analysis of Fruit and Vegetable Market Chains In.
- Uduji, Joseph I. (2018). Young Rural Women Participation in the E-Wallet Programme and Usage Intensity of Modern Agricultural Inputs in Nigeria.
- Vasco, Cristian, and Grace Natalie Tamayo. (2017). Determinants of Non-Farm Employment and Non-Farm Earnings in Ecuador. *CEPAL Review, No. 121* 53–67.

Publisher's Note: SSBFNET stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



© 2021 by the authors. Licensee SSBFNET, Istanbul, Turkey. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).

International Journal of Research in Business and Social Science (2147-4478) by SSBFNET is licensed under a Creative Commons Attribution 4.0 International License.