

The Role of Livelihood Diversification for Household Food Security: The Case of Kebridahar District, Korahey Zone of Somali Region, Eastern Ethiopia

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Abstract

The majority of the Ethiopia populations live in a rural area which their livelihood heavily depends on rain-fed agriculture. The rainfall pattern of the area is fluctuating from season to season, which causes food insecurity problems. The rural people of the study area participated different income-generating activities but it seems ineffective. To investigate the impact of livelihood diversification on household's food security in study area, multi-stage sampling methods was employed to select 119 representative household heads from kebridahar district. The collected data were analyzed by using descriptive statistic and econometric model of probit Logistic Regression was used for this. The data analysis tools were conducted such as Statistical Package for Social Sciences (SPSS) versions 20 and STATA Software. The study HHs 77.3 % of them said that participating in different livelihood activities has a positive impact for household food security whereas 22.7 % of them responded that participating difference livelihood activities have no longer impact on household food security because it needs start-up capital. The livelihood diversification impacted household food security among MHHs and FHHs differently. The main source of food in the study households categorized as 10.1% of them depends food from the own production, 79% of them depends food from their Purchase whereby, 10.9% of them depends their food source for government support. In this study 54.6% of the sampled households was food secure, whereby 45.4% of them was food insecure with 3140.19 kcal and 1437.54kcal intake respectively. The model revealed that sex being female head and limited extension contact was negatively impacted HH food security whereas, education level of household head and livestock holding positively impacted household food security. It can conclude livelihood diversification play great role for improving the household's food security status as a whole. Therefore the household's should contribution in different income generating activities as implication of household food security.

Keywords: food security, livelihood diversification, probit regression model,

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1. Introduction

The agricultural sector plays an important role in the national economy of Ethiopia for livelihood and socio-cultural systems. Currently, agriculture supports the service sector which contributes 39.3 % of the GDP while agriculture accounted for 36.3% and industry takes the balance (UN, 2018). Unlike, the majority of the populations live in a rural area which heavily depends on rain-fed agriculture for their livelihood (FAO, 2017a). Household food security largely depends on external factors including rainfall patterns, land degradation, climate change, population density, human security, low levels of rural investment, and the global market (WFP, 2011). Unless inclusive response to the on-going problem is initiated, the action of protecting the livelihoods of the poorest in rural areas will undermine the country's poverty reduction strategies (Najib *et al*, 2019).

The expectation which is achieving household food security and reducing rural poverty through increasing agricultural productivity without partaking in non/off-farm activities could not be successful in Sub-Sahara African countries like Ethiopia (Emanuel, 2011). However, there is growing evidence that the agriculture sector alone has failed to feed the rapidly growing population of the country. For instance, Catley (2016) and Abdisalan (2017) notified that more than 27 million people in Ethiopia become food insecure and a total population of 18.1 million people requires food assistance in 2016 due to prolonged drought, crop disease, Instability, and conflict.

Comprehensive rural development policy that empower farm, Off-farm and non-farm rural livelihood

diversification strategies in order to reduce food insecurity needed to be formulated under the rural development policies of Ethiopia (Geremew *et al.*, 2017). The author mentioned that livelihood diversification has a positive impact on rural households' food security both for consumption and market purpose. The resource-poor household, livelihood diversification is a survival strategy to cope up with the adverse livelihood shocks and to manage the risky environments, whereas resource-rich households diversify their livelihoods in an attempt to reap the benefits of development (Dilruba and Roy 2016).

Kebridahar district is one of the drought-prone and vulnerable districts in the Korehay zone of Somali regional State of Ethiopia that is characterized by permanent drought, malaria and high temperature that hesitate people to work permanently. As result, the study area is highly food insecure. Consequently, the rainfall pattern of the area is very fluctuating from season to season, which causes food insecurity problems too. For instance, the rural people of the study area participate in different off-farm and non-farm income-generating activities but it seems ineffective. However, sometimes the condition doesn't allow the rural people to diversify their income, particularly it was difficult poor resource people due to that the poor become more food insecure than the rich. According to HDRP (2018), 7.88 million people in Ethiopia have required food assistance in 2018.

Analyzing the role of livelihood diversification on how it impacts on specific dimensions of poverty, more particularly on household food security is very essential. However, the literatures on livelihood diversification for households' food security in Ethiopia are different from one place to other. Available empirical studies on the extent to which diversification among livelihood activities on promising household food security may have revealed diverse studies mentioned such as Thuo (2011) and Hanazaki *et al.* (2012) did not confirmed that the general declaration that livelihood diversification improves food security at the household level. The limited studies were conducted on the extent to which livelihood diversification impacted differently the food security status among diversified and undiversified households in the study area.

The communities in the study area are mainly engaged in non-farm and animal rearing as major livelihood activities. Regarding livestock management, they domesticate for the seek of production and marketing of animals in order to survive their life for sale of animals which doesn't have an attractive local market. Followed by scarcity of rainfall and lack of irrigation water availability for crop cultivation and domination of *Prosopis Julliflora* (*living alone*) trees on farmland by having long root which does not allow growing any other crops and plants near on it due to that factors most households in the study area complains food security problems. The reason why during rainfall was not cultivate the land is not known and understood. This unsatisfactory livelihood strategy leads to the household food problem. This study was conducted in rural kebeles of the Kebridahar district of Somali Regional State which deals about the aforementioned gaps of unsatisfactory livelihood strategies by examining the impact of livelihood diversification on household's food security in the study area.

2. Methods

A cross-sectional research design was involved of both qualitative and quantitative types. A multi-stage sampling method was employed to select the representative household heads for this study. The study district was selected purposively among ten districts of the zone by knowing the background of the area to investigate the existence of the gap between diversified and undiversified on bases of livelihood activities for the rural household's food security. Then three rural kebeles were selected through the lottery method in the second stage by considering time, financial resources, and district population representation. Then 119 representative sample respondents were selected by using probability proportional to sample size from the three kebeles. Both primary and secondary sources of data were used. The qualitative data was analyzed through narration, summarization, and discussion and interpretation to get the accuracy results of the role of livelihood diversification on household's food security; whereas, the quantitative data were analyzed using simple descriptive statistics such as frequency, mean, and standard deviation. Test of significance group differences (t-test and chi-square test) were used. The data analysis tools which were conducted for this were Statistical Package for Social Sciences (SPSS) versions 20, Microsoft excel and STATA Software. To examine the role of livelihood diversification for household's food security in general and impact of livelihood diversification for household's food security in particular probit Logistic Regression Model was used for this. In study Household caloric acquisition/consumption of seven-day recall method was used in order to identify food secure and insecure households. The household's daily caloric food consumption per adult equivalent was calculated by dividing the household's daily food consumption by the family size after adjusting for adult equivalent using the consumption factor for age and sex categories. Then the results were compared with the minimum subsistence requirement per AE per day which is 2200 kcal (Mulugeta *et al.* 2018). This means that the nationally recommended minimum subsistence requirement per adult per day (2,200 Kcal) was used as a threshold level. Accordingly, households who consume below this minimum requirement (2200 kcal per adult per day) were categorized as food insecure and those households who consume above the threshold were considered as food secure.

Table 1 Hypothesized relationship of independent variables

Variables name	Measurements of variable	Types of variables	Expected relationship
HH food security status	1 secure/ 0 insecure	Dummy	+/-
Sex of HH:	1=Male, 0=female	Dummy	+/-
Age HH:	Year	Continuous	-
Access to transportation	1 Yes, 0 no	Dummy	+
Educational level of HH head	Year	Continuous	+
Dependency ratio	Km	Continuous	+
Livestock owned	TLU	Continuous	-/+
Distance from the market	Km	Continuous	-
Participation in safety net program	1=yes, 0=no	Dummy	+
Membership to cooperatives	1=yes, 0=no	Dummy	+
Saving	1 yes, 0 no	Dummy	+
Access to credit	1=yes, 0=no	Dummy	+
Frequency of extension contact	year	Continuous	+

3. Results and discussion

3.1. Impact of livelihood diversification on household food security

The participating in diverse livelihood income activities has an important influence on household food security status. The findings in this study have shown that food insecurity is a problem in the study area as measured and also as observed by the respondent's appearance. According to FGDs and Key Informant Interviews, livelihood diversification generates a positive significant impact on food consumption for male-headed households than that of female-headed households. This section presents the relationship between the livelihood arrangements of households and the impact of these livelihood strategies in achieving one of the crucial livelihood outcomes of household food security. Livelihoods strategies underpin food security (Patel et al. 2015). The most important aspect of livelihood to understand while analyzing household food security is how people produce food by themselves, and the means of securing income to buy food from other sources. Conversely analyzing the impact of livelihood diversification on household food security was used both description statistic and probit regression model to test the food security status of the households.

3.2. Improvement of household food security with livelihood diversification

When the members of the household improve livelihood involvements of different sectors of agricultural and non-agricultural activity, the opportunity of earning an income reduces preference of vulnerability to risk climate-related occurrence and enhancing household food security. For instance, the respondent interview illustrated in figure nine 77.3 % of the household responded that participating in different livelihood activities has a positive impact for household food security whereas 22.7 % of the sample household responded that participating difference livelihood activities have no longer positive impact on household food security. This means before diversifying livelihood activities initial asset or capital is a prerequisite for participating in other options. For that reason, if they try to do your small amount of asset/ capital for diversification in seeking more benefit you may have a high probability to lose yours. This information was also supported by the FGD discussant about the issues of participating different livelihood activities has great role for minimizing household food security problems, but they encourage educating the participant through giving training in order to aware the risk perspectives of the involving new livelihood activities and take the risk of uncertainties. This finding agreed with the finding of the (Michael, 2015) stating that participating in diverse livelihood income activities has an important influence on household food security status but rural residents need assistance to overcome constraints to promote remunerative and also diverse livelihood income activities which were, in turn, improve their food security status too.

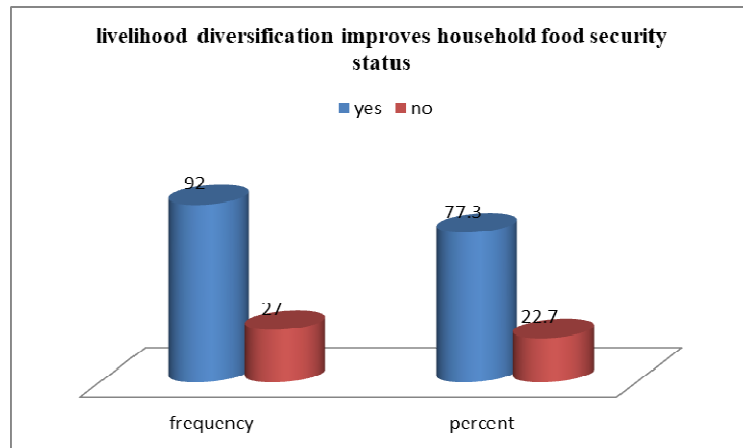


Figure 1 Improvement of household food security with livelihood diversification
Source own survey computation, 2020

3.3. Impact of livelihood diversification on food security on the basis of gender-based household heads variation

Investigation of differences in the study's outcomes between men and women is particularly important to reveal where gender disparities exist, what are the causes of their potential, and how to address them. One interesting feature of data collected at the individual level is that it is possible to examine gender differences in food security (FAO, IFAD, UNICEF, WFP and WHO, 2018). According to FGD and key informants analysis of the study area about livelihood diversification impact of household food security (as their discussion by gender variation are activities between MHHs and FHHs, because men have higher idea gathering information by interacting different people about their household's livelihood improvement by increasing experiences related to food security as compared FHHs. Likewise households headed by females can be attributed to the small sized livelihood options because of cultural taboo and religious factors which occur in developing countries like Ethiopia and particularly in the study area. It is also possible that additional participation of livelihoods options for FHHs in the study area was limited by failing to improve their households' food security. Therefore, the assumption that the impact of livelihood diversification on household's food security is higher for Male headed households compared that of female-headed households. This information is consistent with the finding of (Clement, 2014) A study conducted in the Eastern Cape, South Africa, also found that household food production for female headed household food consumption resulted in lower levels of as compared male headed household. Although wage income was considered important, household food production was critical for addressing the immediacy of food security concerns which also men has higher chance than female (Rogan, 2018).

According to Mohammed, *et al.* (2018) agriculture is the basic economic sector in which the country relies on its social and economic development. Even though 80% of the population has been engaged in food production, but they fail to feed a relatively large proportion of the population from their domestic production. In Ethiopia, 83% of small-holder farmers participated in farming activities and only 27% were engaged in non-farm/off-farm economic enterprises. Non-farm employment provides additional income that enables farmers to spend more on their basic needs include food, education, cloth, and health care services.

However, food security exists when all people at all times have the physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life (World Food Summit, 1996.).

The basic factors influencing the food security status of households are the socioeconomic characteristics and resources of individual households which is quite difference male and female in study area. Rural people needs considerable intervention in the food security situations and action by providing training and becoming an aware of the external factors that enhance their productivity of different livelihoods involvements both gender specially female headed household.

3.4. The main source of food in the study households

Understanding how people obtain their food is essential for determining what was the limit - or opportunity to expand their needs. For instance, the fundamental component sources of food of the household are based on the livelihood zone involved by the household weather is pastoral, agro-pastoral, and farming. Therefore, the investigation was done from different angles such as the researcher's direct observation of respondents' livelihood involvement and their responses on food security-related and FGD and KII elaboration about the

impact of livelihood diversification on household food security in the study area. This combined information most households seem unstandardized the ability to feed the family based on their production capacities. According to the study survey, 10.1% of the respondent depends on food for consumption their own farm production, 79% of respondents depends on food consumption for their Purchase whereby, 10.9% of the study respondents, their food source of the family depends upon government and NGOs support. Generally based on the information from the household survey indicate that only 10.1% of them depends on food for their own farm production to feed their family. This is mainly based on rainfall cultivation products of highly vulnerable to climate-related hazards and trends, whereby rest of all respondents were waiter of other hand production products either to buy in the market or direct donation. This finding is in line with the finding of Tanya *et al.* (2015), the main sources of food for pastoralists are their milk and purchased grains, sugar, and oil as main sources and food aid and gifts contribute food for poorer pastoralists whereas agro-pastoral zones, as illustrated above, own crop production provides an additional source of food, covering 20 - 40% of minimum calorie needs across the board as well agriculture takes on increasing importance, and the larger contribution especially livestock. Nevertheless, still, significant components of the local production are maize and sorghum which is a major crop grown in most of the country particularly in Somali region.

Table 2 Main source of food in the study household

Source of food	Frequency	Percent
own farm production	12	10.1
Purchase	94	79.0
government support	13	10.9
Total	119	100.0

Source own survey 2020

3.4.1. Food shortage faced by study household over the last 12 months and their main cause

The frequency analysis of descriptive statistics results presented in Table 3 shows that 92.4% of the households complain that they face food shortage in the last 12 months, whereby only 7.6% of the households in the study did not complain food shortage faced short over the last 12 months. Furthermore, the households who complain food shortage encompass 35.3% of them complains that the faced food shortage was food price fluctuation of due to climate-related vulnerability of high price on food, likewise 28.6% of them complain shortage of food due to production failure. Also 13.4% of them complain that they face food shortage because of low level of family ability to pay food from the market and lack of support. Whereas 10.1% of sampled households complain food shortage due to drought occurrence which affected agricultural productivity of both crop and animal that influence their livelihood activities negatively.

Table 3 Household food shortage faced by the study household and their cause

household faced food shortage over the last 12 months	Frequency	Percent
Yes	110	92.4
No	9	7.6
Total	119	100.0
The main causes of food shortage	frequency	Percent
production failure	34	28.6
lack of money to pay food	16	13.4
lack of support	15	12.6
the high price of food	42	35.3
drought	12	10.1
Total	119	100

Source own survey computation 2020

3.4.2. Food consumption status per day for households in the study area

Among the sampled respondents from kebridahar district kebeles, the daily food consumption as illustrated in the table 4 about 4.2% of the respondents get only one time a day food for consumption these households are single activity or low livelihood participant, and 36.1% of the respondents they get food two times a day such as breakfast and lunch, whereby 44.5 % of the study households indicated that they get food three times a day such as breakfast, lunch, and dinner where most of them lay under diversified households which involve more than one livelihood activities. While, 15.1 of the respondents responded that they have food access in normal three times followed by snacks when they feel hungry, for instance, most of these households were those who involve more than two livelihood activities. In general, it can be concluded that livelihood diversification has a positive impact on household food security. Based on the daily food cooking for household consumption, it can conclude that a household who consume a portion of food less than three times a day is food insecure whereas the households who consume food three times and more a day is food secure which means 40.3% (48) and 59.7% (71) respectively. However, the foods to be taken have to consider hygienist, nutrition content, and quantity.

According to dietitians and other food experts, 46-65% of the total calories to be consumed daily should come from carbohydrates, 10-35% from protein, and 20-25% from fats. A snack containing 35g of carbohydrates provides roughly 12% of recommended daily value which is around 300g and daily values recommendations of dietary for adults are an average of 2,000 calories a day (Claudia, 2019).

Table 4 household food consumption per day

Daily household food consumption	Frequency	Percent
one time in breakfast only	5	4.2
two times breakfast & lunch in only	43	36.1
three times in breakfast, lunch & dinner	53	44.5
three times in breakfast, lunch & dinner with a snack	18	15.1
Total	119	100.0

Source: Own survey result (2020)

3.5. Food security status of the study households

Based on the household calorie acquisition for consumption per adult per day food intake was used in this study for analysis by identifying the difference between food secure and insecure households with the impact of the diversified and undiversified household. However, the calories consumed by the individuals in the household were compared with the minimum nationally recommended calorie of 2200 kcal per adult per day. For instance, based on the above information if the consumption/acquisition is less than the recommended amounts then, the household was categorized as food insecure and if greater than, or equal to as food secure. Even though household food security is measure different parameter based on time variability and researcher interest in this study is constructed direct survey for food consumption of the last previous seven (7) days information from the households' food cooking head were collected, then the data ware converted into kilocalories by summing up and then divided to household size measured in AE.

Nevertheless, based on the aforementioned criteria the amount of energy in kilocalorie available for the household was compared with the minimum requirement per adult per day which is 2,200 kcal. In this study, 65 (54.6%) of the sampled households were found to be food secure, whereby 54 (45.4%) of them were found to be food insecure. Since on the perspective of food security, the two groups of secure and insecure nine (9) people from diversified households were insecure and 45 people from undiversified households were food insecure on the other hand, 54 people from those diversify their livelihood were food secured and 11 people from those undiversified their livelihood were food secured. However, the mean Calorie intakes of the two groups were categorized as followers the mean of the diversified households is 3140.19 kcal with a standard deviation of 3425.76 kcal whereas the mean of undiversified households is 1437.54kcal with a standard deviation of 329 kcal. Nevertheless, the mean difference was 1702.65 kcal. This result is an agreement with the findings of (Titay, *et al*, 2017).

For instance, based on this study livelihood diversification has played a great impact on achieving household food security in general and improving income source opportunity in particular.

Table 5 Food security status of the study households

Household	Frequency	Food secure	Food insecure
Diversified	63(52.9%)	54(83.1%)	9(20.4%)
Not diversified	56(47).1	11(16.9%)	45(79.6%)
Total	119(100%)	65(54.6)	54(45.4)
mean comparisons between two groups	119	3140.19 kcal	1437.54kcal

Source own survey computation of 2020

The result from the descriptive statistic of dummy variables as shown in the table 6 by using analysis for chi-square of dummy variables with household food security status in the study respondent was found statistical significance. Among the five variables, three of them were found significance level such as sex of the household head at 10% significance level, saving habit of the household head at 5% significance level, membership to cooperative at 5% of significance level with the household food security improvement for food-secure household rather than the food-insecure household.

Table 6 Descriptive result for dummy variables on comparison between food secured and insecure households

Explanatory variables	parameters	Food secure	Food insecure	N	value	Sig
Sex	Male	41(34.4%)	36 (30.25 %)	119	2.801	0.094*
	female	29(24.6%)	13(10.75%)			
saving	Yes	39(32.77%)	26(21.86%)	119	3.826	0.050**
	No	10(8.4%)	44(36.97%)			
Credit	Yes	17(14.3%)	9(7.6%)	119	.591	0.442
	No	53(44.5%)	40(33.6%)			
Cooperative	Yes	25(21%)	9(7.6%)	119	4.250	0.039**
	No	45(37.8%)	40(33.6%)			
PSNP	Yes	24(20.2%)	19(15.95%)	119	.252	0.616
	No	46((38.65%)	30(25.2%)			

Source: Own survey result (2020)

3.6. Coping mechanism adopted by the study households during a food shortage

According to the FGD and KII provided information of the Study area mainly climate change-related disaster affected such as drought, high Mortality, and morbidity of livestock that occurred in the study area specially in 2016 and 2017 G.C which caused livelihood crisis of leading food insecurity problems in most area of the Somali region and particularly in the study area. Most of these people lost their livestock due to a lack of animal hay followed by animal and human diseases. For those factors, rural people of the area fall under bare for food consumption because majority of the people in the Somali region depends on their livelihood in livestock whether directly or indirectly rural and urban respectively. Due to this challenges people of the study area adapted many kinds of coping mechanisms in order to survive their family life. Conversely among respondents 19.3% of them the usage of the past saving as a coping mechanism and 55.5% of them involved selling of livestock as a coping mechanism where 1.7% of them used the selling of firewood and charcoal as a coping mechanism.

Table 7 coping mechanisms that you engage during a food shortage

Coping mechanism	Frequency	Percent
usage of past savings	23	19.3
selling of livestock	66	55.5
sell of firewood and charcoal	2	1.7
borrowing food	24	20.2
Migrating	4	3.4
Total	119	100.0

Source: Own survey result (2020)

3.7. Econometric Analysis: for the impact of livelihood diversification on household food security

After descriptive statistical analysis, the Probit logistic regression was employed to identify the impact of livelihood diversification on household food security. Before analyzing the model goodness of fit and how the independent variables explain the dependent variable was measured which range between 0-1 of real numbers. In this study by adjusted Pseudo R² and Cox & Snell R square tests of 0.1359 and 0.185 was obtained respectively. From this, information it can conclude that the independent variables to the dependent variable were good fit because the significance value of a given test is greater than 0.05 significance level, then the model was adequately fit the data operating.

In order to check the relationship of twelve independent variables with the dependent variables were hypothesized to have an impact on household food security status in the study household were included in the model testing. Between food security and insecurity were done to find out the impact of the diversification on the model values which the outcome variable is food security. Therefore, the independent variables that affect the dependent variable, helps us to identify the demission of variables that impact the household security status.

As shown in Table 8, four variables were found statistically significance which impacted household food security such as are sex of household head, education level of the household head, extension contact and livestock holding (TLU).

The reaming eight variables were not statistically significant to impacts household food security status. In light of the above-summarized model results, possible explanations for each significant independent variable is given consecutively as follows

Sex of HH Head: as prior expectation sex of household head was found statistically significant at 5% and has a negative influenced household food security. Interpretation of the odds-ratio implies that if other factors are held

constant, the odds-ratio depicted by increasing Being a female-headed household, the probability to impact household food security status decline by a factor of 1.72. The possible reason is that the female head household did not get an equal chance for portfolio livelihood development opportunities such as education, training employment both labor and skill which have an impact on household food security as compared with male head households due to cultural and natural factors. This finding is consistent with the finding of (Jemal, 2014).

Education level of HH Head: As prior expectation education level of the household head is found statistically significant at 10% and positively influenced with household food security. the results of the odds-ratio depicts as education level of HH head increase by one year, the probability of household food security increased by a factor of 1.266, holding other variables constant. This suggests that spending in many years for formal education promotes the wisdom for the likely involvement of households to secure food needs. Increasing the level of education has an impact the income earning capacity and efficiently managing the household's food resources earnings. The result coincides with the findings of (Oni and Fashogbon (2013) and (Michael, 2015).

Table 8 The Probit regression results for the impact of household food security status

Food security status dummy (1 for food secure and 0 otherwise)							
Food security	Coef.	Odds	Std. Err.	z	P>z	[95% Conf.	Interval]
SEX	-.5413517	1.72	.2721378	-1.99	0.047**	-1.074732	-.0079715
AGE	.0019196	1.12	.011484	0.17	0.86	-.0205886	.0244278
EDUC	.2359443	1.266	.1276998	1.85	0.065**	-.0143427	.4862314
DR	.0554527	1.06	.086939	0.64	0.524	-.1149446	.22585
TLU	.0160344	1.02	.0064428	2.49	0.013***	.0034067	.0286622
MKTD	-.0630579	1.065	.1011489	-0.62	0.533	-.2613061	.1351904
TRANS	.1806244	1.2	.160661	1.12	0.261	-.1342653	.4955141
SAVING	-.1143979	1.12	.3234566	-0.35	0.724	-.7483612	.5195655
EXTNTN	-.1992734	1.22	.1178244	-1.69	0.091**	-.430205	.0316583
CREDIT	-.3680763	1.44	.3080268	-1.19	0.232	-.9717977	.2356451
COOP	-.5357984	1.7	.3286411	-1.63	0.103	-1.179923	.1083263
PSNP	.3777259	1.46	.2914635	1.30	0.195	-.193532	.9489838
cons	.6240376	1.87	1.208797	0.52	0.606	-1.745161	2.993236
Prob > chi2		= 0.0251		Number of obs		= 119	
Log likelihood		= -69.668837		Pseudo R2		= 0.1359	
				Cox & Snell R Square = 0.185			

Source: own survey results (2020)

Livestock holding: livestock holding (in TLU) is another variable which is found to have a positive and significantly impacted on household food security at 1% significance level. The odds-ratio results revealed that by keeping all other variables constant, as livestock holding increase by one unit TLU, the probability of household food security increase by a factor of 1.02. The livestock holding of the household was measured in terms of livestock units. Most households in rural communities in study area accumulate their wealth in terms of livestock which has an implication for other livelihood activities. Because as households who have a large number of livestock, they become in a better position to be more food secure than households who own few. Results from this study support with FGD discussant a households with relatively have large livestock sizes in (TLU) were found to be less vulnerable to food security especially during off rainfall and drought occurrence because they used an implication for involving other livelihood options. Whereby, smallholder households are more vulnerable during off seasonal livelihood opportunities as compared more livestock holders. For instance, Animals were used so many purposes like source of food and income, labor work, trading and transportation. The result is consistent with the research finding of (Shishay and Mequanent, 2014) and (Tibebu and Sisay 2017).

Extension contact: continuous variables measured the frequency of extension contact to the households in one year. The probit regression result revealed that extension contact is found statistically significant at 5% and negatively influences on household food security. The odds -ration result depicts that, by increasing uninformed one additional time of extension contact per month, the probability of household food security decline by a factor of 1.22, holding other variables constant. Therefore, extension contact had no significant contribution to the achievement of household food security, which is contrary to the expectation due to household who have no extension contact does not get a chance to attend uninformed training, field demonstrations, and other consultation advice provided by a government organization. Likewise according to KII stated by increasing extension contact for a consultation giving without service providing the interest of farmers' participation also decline. However, extension service has a high influence on household food earnings and resource management of the households who got regular extension contact. Extension contact plays a great role in raising awareness and source of information about new agricultural technology. Highly extension contact provides the farmer with timely information that strengthens the household decision-making process of reducing risk and uncertainty

about climate-related livelihood crisis and enables households to take timely right decisions on the available resources. In addition to offering information and distributing awareness, extension service also includes advice, training, demonstrations, new technology transfer, and somehow timely distribution of inputs.

4. Conclusion and Recommendation

4.1. Conclusion

The basic economic activities for the vast majority of the population in study area laid animal-based agriculture activity. The descriptive statistic results showed that 54.6% (N=65) sample households were found to be food secure and 45.4% (N=54) of them was found food insecure. Since on the perspective of food security statuses of the two groups of the diversified and not diversified 20.4% from diversified households were insecure and 79.6% from not diversified households were food insecure. Whereby 83.1% of households from those diversified their livelihood were food secured whereas 16.9 households from those undiversified their livelihood were food secured. It can conclude that participating different livelihood activities has an implication for households' food security.

Even-though remarkable food security has being founded in the study area however, still around half of the people in the study community were suffering food insecurity problems. Furthermore, sex of household head and extension contact negatively impact household food security due to gender Variety of cultural related taboo and extension service opportunity limitation of the study area. It can intentionally conclude that livelihood diversification play great significance role for improving the household's food security status as a whole.

4.2. Recommendation

- Livelihood diversification has a positive impact on food security, therefore, livelihood options in the study area should be broadened not only by the Ethiopian government and non-governmental institutions but also due attention should be given livelihood diversification since the area is well known by its food insecure and diversification implies households food security.
- Donor organizations should intervene in development activities than enlightening dependency for households. The district leader should have to emphasize infrastructural development of the area such as to allocate transportation facility, extension contact training, and electricity since it affects the household's contribution in different income generating activities which implies household food security.
- Farther research should be done the area of food security, agricultural production and effect of prosopis juliflora on crop land and other grazing land.

References

- Abdisalan Abdullahi (2017). "Food Security Situation in Ethiopia: A Review Study. . *International Journal of Health Economics and Policy*"., Vol. 2, No. 3, 2017, pp. 86-96. DOI: 10.11648/j.hep.20170203.11.
- Catley. (2016). "USAID/Ethiopia Agriculture Knowledge, Learning, Documentation and Policy Project". *implemented by the Feinstein International Center, Friedman School of Nutrition Science and Policy, Tufts University.*, No. 663-13-000006.
- Claudia Carberry,. (2019). *How to Calculate Food Calorie*. Co-authored by Claudia Carberry, RD.
- Clement, Mensah. (2014). The impact of livelihood diversification on food security amongst farm households in northern ghana: a case study of bole district. *Faculty of Economic and Management Sciences, University of the Western Cape.*, Student No. 3280431.
- Dilruba, Khatuna; Bidhan, Roy, Chandra. (2016). Rural Livelihood Diversification in West Bengal: Nature and Extent. *Agricultural Economics Research Review*, Vol. 29 (No.2) July-December 2016 pp 183-190.
- Dilruba, Khatuna; Bidhan, Roy, Chandra. (2016). Rural Livelihood Diversification in West Bengal: Nature and Extent. *Agricultural Economics Research Review*, Vol. 29 (No.2) July-December 2016 pp 183-190.
- Emanuel, E. (2011). Rural Livelihood Diversification and Agricultural household welfare in Ghana. . *J. Develop. Agric. Econ.*, 3(7):325-334.
- FAO, IFAD, UNICEF, WFP and WHO. (2018). *The state of FOOD SECURITY AND NUTRITION IN THE WORLD*. Rome, 2018: Food and Agriculture Organization of the United Nations.
- FAO. (2017a). *Ethiopia Drought Response Plan and Priorities*. Food and Agriculture Organization of the United Nations.
- Geremew, Korke Kessie, Sangho, Kim, Fellizar, Francisco P Jr, Benjamin, Ho. (2017). Determinant factors of livelihood diversification: Evidence from Ethiopia. *Journal of Cogent Social Sciences*, Volume 3, 2017 - Issue 1.
- Hanazaki, N; Berkes, F; Seixas, C.S; Peroni, N. (2012). Livelihood diversity, food security and resilience among the Caiçara of coastal Brazil,. *Human Ecology*, 41: 153–164.
- HDRP. (2018). Humanitarian Disaster Resilience Plan.
- Jemal Abafita. (2014). Determinants of Household Food Security in Rural Ethiopia: an Empirical Analysis."

- Journal of Rural Development*,: 37(2): 129-157.
- Michael Amurtiya. (2015). Effect of Livelihood Income Activities on Food Security Status of Rural Farming Households in Yola South Local Government Area, Adadmawa State, Nigeria. MSc Thesis.
- Mohammed Adem, Esubalew Tadele, Habtamu Mossie and Mezegebu Ayenalem. (2018). Income diversification and food security situation in Ethiopia: A review study. *food science & technology | review article*, adem et al., cogent Food & Agriculture (2018), 4: 1513354.
- Mulugeta, Mahlet, Gebeyaw Tiruneh and Zewdie Aderaw Alemu. (2018). Magnitude and associated factors of household food insecurity in Fedis Woreda East Hararghe zone, Oromia region, Ethiopia. *Agriculture & Food Security*, (2018) 7:3 DOI 10.1186/s40066-017-0140-6.
- Najib, Umer; Mufedei, Mohammed; Husen, Yusuf. (2019). Building Resilient Ecosystem and Diversifying Livelihood to Enhance Food Security in Chiro Woreda, Oromia Regional State, Ethiopia. *Journal of Energy, Environmental & Chemical Engineering*, Vol. 4, No. 1, 2019, pp. 1-6. doi: 10.11648/j.jeece.20190401.11.
- Oni, O.A; Fashogbon, A.E. (2013). Food poverty and livelihoods issues in rural Nigeria. *African Journal of Agricultural and Resource Economics*,, 8 (2), 108-135.
- Paper to be presented to the Inter-Agency Group Meeting “Implementation of the Third
- Patel, K., Hom Gartaula, Derek Johnson and M. Karthikeyan. (2015). The interplay between household food security and wellbeing among small-scale farmers in the context of rapid agrarian change in India." *Agriculture and Food Security*4(16):1-16.
- Rogan, M. (2018). Food poverty, hunger and household production in rural eastern cape households. *rural eastern cape households*,, 35(1),90–104.
- Shishay, K. and Mequanent, Messay. (2014). Determinants of rural household food insecurity in Laelay Maichew Woreda Tigray, Ethiopia. *African Journal of Agriculture and Food Security*,, 2(1): 106-112.
- Tanya Boudreau, Jennifer Bush, Abdifatah Ismael. (2015). *Regional Overview and Summary of the Results of the 2015 Household Economy Analysis Baseline Update*. The Food Economy Groups.
- Thuo, C. M. (2011). The influence of enterprise diversification on household food security among small-scale sugarcane farmers: a case study of Muhoroni Division Nyando District, Kenya. *Journal of Agricultural Education and Extension*, 17(3): 223-238.
- Tibebu Aragie, Sisay Genanu. (2017). Level and Determinants of Food Security in North Wollo Zone (Amhara Region – Ethiopia). *Journal of Food Security*,, Vol. 5, No. 6, 232-247.
- Titay, Zeleke; Jemal, Yousuf; Lemma, Zemedu. (2017). Impact of Livelihood Diversification on Rural Households' Food Security in Fedis Weroda, Eastern Hararge Zone, Oromiya Regional State, Ethiopia. *Journal of Poverty, Investment and Development*, Vol.32, 2017.
- United Nations Decade for the Eradication of Poverty (2018 – 2027)".
- United Nations. (2018). Ethiopians progress towards eradicating poverty, Addis Ababa, Ethiopia:
- WFP. (2011). Ethiopia: Overview. ETHIOPIAEXTN/0, menuPK:295942~pagePK:141132~piPK:141105~theSitePK: K.: *World Food Program*, , :295930,00.html.
- World Food Summit . (1996). *Declaration on World Food Security*. Rome: Food and Agricultural Organization (FAO).