

Impact of Livelihood Diversification on Rural Households' Food Security in Fedis Weroda, Eastern Hararge Zone, Oromiya Regional State, Ethiopia

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Abstract

Most rural populations in Africa have been suffering from poverty and environmental degradation. African's diversify their livelihood strategies to mitigate risks. This study presents the impact of livelihood diversification on rural household food security. Moreover, the study identified livelihood activities employed by households, determine food security status of households and also identify determinants of livelihood diversification. The study employed a two stage random sampling procedure. 180 sample households were used for the study. Mean, percentage, frequencies, t-test chi-square test and an econometric model of PSM were used for analysis. The study found that in the study area households practice different activities in addition to agriculture. The most commons are pity trade (shops, large animal trading, chat retailing, charcoal sell and ground nut retailing) and local wage labor. The study also found that among the total households 61.2% were found to be food secure and 38.8% of them food insecure. Moreover, food secure and insecure households shows a significant mean difference with respect to age of the household head, education year of the household head, number of times the household received extension service in a year and participation in productive safety net program. The descriptive statistics for diversified and not diversified households shows that the two groups had a significant mean difference with respect to education year of the household head, number of times the household received extension service in a year, participation in productive safety net program and calorie intake by the household members in adult equivalent. The logistic regression model also shows that education year of the household head, membership to cooperatives, number of times the household received extension service in a year and participation in productive safety net program significantly affect diversification. Results from propensity score matching shows that livelihood diversification brought a positive impact on households' food security by showing that the mean difference in calorie intake is significant at less than 1% probability level. The study concluded that livelihood diversification can have a positive impact on rural households' food security. Therefore it is advisable to encourage rural households' participation in different activities in addition to agriculture.

Keywords: livelihood diversification, food security, propensity score matching

Background

Agriculture remains the main source of income for the majority of the rural population of developing countries. Nevertheless, a large proportion of rural households modify their economic activities in a variety of ways under different conditions (Ellis, 2000). Firstly, farm households may intensify or diversify their agricultural production. Secondly, they may also diversify their portfolio of economic activities outside agriculture either on or outside of the farm, or some members might migrate to other areas temporarily or permanently in search of better opportunities (Scoones, 1998). Bryceson (1996), calls this process "deagrarianisation", i.e., the diminishing role of agriculture in the household's income and livelihood strategies.

Various empirical studies showed that different livelihood strategies exist in sub-Saharan countries even though the forms and people's participation level may differ. As Barret et al. (2002), clearly explained households with similar capital asset endowments may demand different technologies because of different preferences, objectives, constraints and incentives, attached to certain livelihood activities. Livelihood diversification leads to livelihood outcome consisting of improved food security, increment in income, reduced

vulnerability to shocks, and sustainable use of natural resource base. From the point of view of reducing poverty and food insecurity in rural Ethiopia, it is extremely important to reduce vulnerability of the poor through diversification of the sources of their livelihoods. Diversification can play an important role in that regard.

In Ethiopia, undiversified livelihood options and complete dependency on agricultural production are the main problems which exacerbate food insecurity in rural area. The ability to diversify at all is often critical to the food security of the most vulnerable rural populations, (Ellis, 2004). In many rural areas, agriculture alone cannot provide sufficient livelihood opportunities. Rural people's livelihoods are derived from diverse sources and are not as overwhelmingly dependent on agriculture as previously assumed (Gordon and Catherine, 2001). According to Asmamaw, (2005), the limited opportunity for livelihood diversification, due to absence of supplementary income from other non-farm activities has made the Ethiopian rural poor more vulnerable. Given the inability of most Ethiopian smallholders to make a living from agriculture, because of resource constraints and recurrent shocks, increasing policy attention has turned to supporting alternative livelihood activities (Devereux et al, 2005). Similarly, Dessalegn (2003), as cited in Asmamaw (2005), argues that the decline in the size of cultivable land is envisaged to further exasperate the currently observed worse food insecurity situation unless non-farm activities are made to compensate for the livelihood stress prevalent in the rural areas.

The aim of rural livelihood diversification is to reduce risk which is related to agricultural activity and to supplement farm income. Although livelihoods are predominantly agriculture based, labor productivity is low and most Ethiopians are net cereal buyers. Because of the primary dependence on subsistence crop production in the country, harvest failure leads to household food deficits, which in the absence of off and non-farm income opportunities leads to asset depletion and, increasing levels of destitution at the household level (FDRE, 2002). However, if the condition doesn't allow the rural people to diversify their income it will be very difficult to the poor to diversify their income source so that the poor become more food insecure than the rich.

As the study area is known for its food insecurity, most studies focus on food security and related issues. Moreover, those earlier studies tried to show the level of food insecurity in the area and they are not comprehensive enough to give complete picture about the impact of livelihood diversification on food security. Hence, this study focus on the impact of livelihood diversification on rural households' food security ,the major livelihood activities employed by rural households and the determinants of livelihood diversification; therefore, results from such study focusing on the impact of livelihood diversification will inform future intervention aiming to reduce intensity of food insecurity and poverty.

Methods

The study uses a two-stage stage random sampling technique. In the first stage one kebele from the mid-land and two kebles from the low land were randomly selected through a simple random sampling method low land area covers 69% of the total this study used two kebeles from lowland.. Then, 180 representative sample respondents were randomly selected from the three kebeles. Both qualitative and quantitative data were collected from primary and secondary sources. The interview schedule was tested with 20 Households and it was done in non-sample kebele. Depending on the result of pre-test the questions were revised again. Primary data were collected through interview schedule and focus group discussion. Secondary data were collected from reports of different concerned organizations (office of agriculture, cooperative office, woreda administration office), published and unpublished reports, articles, and journals which are related to this study.

The qualitative data were analyzed through narration, summarization, and discussion. Whereas, the quantitative data were analyzed using simple descriptive statistics such as frequency, mean, standard deviation, test of significance such as t-test and chi-square test. The basic data analysis tools which were used for this were Statistical Package for Social Science (SPSS) and STATA software. To examine the impact of livelihood diversification on rural households' food security propensity score matching (PSM) method was used for this study. In this study, households' calorie acquisition/consumption per adult per day was used to identify the food secure and food insecure households. The calorie consumed by the household was compared with the minimum recommended calorie of 2200kcal per adult per day. If the consumption/acquisition is less than the recommended amount then, the household was categorized as food insecure and if greater than, as food secure. Data on the available food for consumption, from home production, purchase and /or gift/loan/wage in kind for the previous seven (7) days before the survey day by the household was collected.

To measure diversification Households whose share of income from non-basic economic activity greater than 50% are considered as diversified households and those whose income from primary economic activity is greater than 50% as non-diversified. For this study basic economic activity is agriculture so that households whose income share from agriculture greater than 50% was considered as not- diversified and those Households whose farm income share is less than 50% in the total income of the Households was considered as diversified.

Results

Livelihood Activities of Sample Households

In the study area like other rural areas of the country households engaged in different activities in addition to the basic agricultural activities. These activities are petty trade (shops, large animal trading, grain marketing, chat retailing, charcoal sell and ground nut retailing) and local wage labor. Accordingly 34.5% of respondents were found to be engaged in agriculture only i.e. they didn't participate in other activities but the rest of them participates in both agriculture (crop and livestock) and off and nonfarm activities.

Table 1 livelihood activities of households

Activities	Number	Percentage
Agriculture (crop&livestock)	62	34.5
Petty trade	45	25
Wage labour	47	26
Sale of fire wood	9	5
Wage labour & Sale of fire wood	7	4
Petty trade & Wage labour	10	5.5
total	180	100

Source own survey, 2012

Food security Status of Sample Households

From all respondent households, 110 (61.2) households were found to be food secure and 70 (38.8) of them food insecure. From the two groups 9 from diversified households were insecure and 61 from not diversified households were found to be in secured and also 82 households who diversify their livelihood were food secured and 28 from not diversified were secured. The mean Calorie intakes for the two groups were 2561 kcal for diversified with standard deviation of 353.25 kcal and 1939kcal for not diversified with standard deviation of 479.7 kcal. The mean difference was 622 kcal the result is significant at less than 1%.

Table 2 food security status of sample households

Households	Food insecure	Food secured	Total	χ^2
Diversified	9 (9.8%)	82 (90.2%)	91	65.12***
Not diversified	61 (68.5%)	28 (31.5)	89	
Total	70 (38.8%)	110 (61.2)	180	

Source own survey 2012

This study also tried to see the difference between food secured and insecure households in relation to the selected variables. So that, the result as presented in table 3 shows that there was a significant mean difference between food secured and food insecure households in education year of the household head, the number of times the household received extension service in a year and participation in productive safety net program.

Table 3 Descriptive result for continuous variables on comparison between food secured and insecure households

Explanatory variables	Total sample N=180		Food secured N=110		Food insecure N=70		Difference in mean	T
	STD	mean	mean	STD	mean	STD		
AGEHH	36.94	8.63	36.05	8.36	38.33	8.91	-2.27	-1.73*
EDUHH	2.12	2.52	2.68	2.52	1.26	2.28	1.42	3.83***
FAMADL	4.54	1.74	4.60	1.86	4.45	1.53	.15	.58
TOTLAND	.70	.456	.73	.43	.65	.49	.09	1.31
TOTLIVETLU	1.83	1.25	1.93	1.24	1.65	1.25	.28	1.50
MARKDIST	.99	.53	.96	.59	1.04	.44	-.08	-.98
ETENSION	49.53	29.16	53.58	34.88	43.17	14.75	10.41	2.36**

Source own survey, 2012

Table 4 Descriptive result for dummy variables on comparison between food secured and insecure households

Explanatory variables	Total sample N=180	Food secured N=110	Food insecure N=70	χ^2
SEX Male female	160 20	100 10	60 10	1.16
CREDITSERVICE	59	38	21	0.40
COOPERATIVE	58	35	23	0.02
PSNP	60	49	11	16.00***
AGROECO Midland Lowland	77 103	54 56	23 47	4.60*

Source own survey, 2012

Description of Sample Households Characteristics in relation to diversification

Combinations of different descriptive statistic were conducted for this study. Accordingly, the study used t test for the continuous variables and chi square for dummy variables. The descriptive results shows the presence of statistically significant mean differences between those who diversify their livelihood and not diversify. More particularly, the main differences between the two groups of households were observed with respect to education year of the household head, the number of times the household received extension in a year, participation in productive safety net program and calorie intake by the household members in adult equivalent. From the total households 11.1% (20) of them are female headed Households and 88.9 % (160) are male headed Households. For the diversified group 11 and for not diversified group 9 of them are female headed. Households with diversified income are younger and relatively smaller family size.

Table 5 Descriptive result for continuous variables on comparison between diversified and not diversified

Explanatory variables	Total Sample HHs N=180		Diversified HHs N=91 50.6%		Not-diversified HHs N=89 49.4%		Difference In mean	
	STD	Mean	mean	STD	Mean	STD	T	
AGEHH	36.93	8.62	35.79	8.16	38.11	8.96	-2.32	1.82*
EDUHH	2.12	2.52	3.47	2.28	.75	1.95	2.71	8.58***
FAMADL	4.54	1.73	4.42	1.71	4.66	1.75	-.24	-0.94
TOTLAND	.70	.45	.67	.44	.73	.469	-.06	-0.97
TOTLIVETLU	1.90	1.67	1.95	2.05	1.85	1.18	.09	-0.37
MARKDIST	.99	.53	.98	.57	1.00	.49	-.015	-0.20
ETENSION	49.53	29.16	55.47	34.77	43.46	20.48	12.01	2.82**
CALOREINTAK	2253.7	522.7	2561	353.25	1939	479.7	622.42	9.92***

Note: ***, **and* significant at 1%, 5% and 10%

Source own survey, (2012)

Table 6 Descriptive result for dummy variables on comparison between diversified and not diversified households

Explanatory variables	Total Sample HHs N=180	Diversified HHs N=91	Not-diversified HHs N=89	Chi square
SEX Male female	160 20	80 11	80 9	0.18
CREDITSERVICE	59	33	26	1.02
COOPERATIVE	58	26	32	1.12
PSNP	60	39	21	7.51***
AGROECO Midland Lowland	77 103	35 56	42 47	1.40

Note: ***, **and* significant at 1%, 5% and 10% Source own survey, (2012)

Logistic regression model result

The logistic regression result shows that diversification is significantly influenced by four variables. These variables are education year of the household head, membership to cooperative, participation in productive safety-net program and number of times the household received extension service in a year. The logistic regression result shows that diversification is significantly influenced by four variables. These variables are education year of the household head, membership to cooperative, participation in productive safety-net program and number of times the household received extension service in a year.

Table 7 Determinants for probability of diversification

DIVERSIFIC~N	Coef.	Std. Err.	z
AGE	-.0393255	.0239576	-1.64
SEX	-.4154768	.6583805	-0.63
EDULEVEL	.56128	.0904041	6.21***
FAMSIZEAE	.0333445	.1307049	0.26
TOTLAND	-.7180512	.4863919	-1.48
LIVESOCKHLD	.2652457	.1767623	1.50
MARKDIST	-.7135959	.4394922	-1.62
CREDITSERV~E	.363933	.5058369	0.72
COOPERATIVE	-1.45354	.5498541	-2.64*
PSNP	1.076681	.4554909	2.36***
EXTENSION	.018882	.0096831	1.95**
AGROECO	.275956	.51572	0.54
_cons	-.0274728	1.262063	-0.02
LR χ^2 (12)	81.27		
Prob> χ^2	0.000		
Pseudo R2	0.325		
Log likelihood	-84.11		

Source: Own estimation. ***,**and*significant at 1%,5% and 10% probability respectively

The impact of diversification on food security

This section of the study tries to disclose whether diversification brought a significant effect on households' food consumption comparing between diversified and not diversified households. The result which is presented in table 13 shows that, diversification brought statically significant effect in households' calorie intake. It has been found that diversification increase households food consumption of diversified households by 587.19 kcal on average

Table 8 the impact of diversification on food security

Diversified	Diversified	Not- diversified	Difference	S.E	T
Calorie Intake	2560.80	1973.6	587.19	178.27	3.29***

Discussion

As rural population in Ethiopia don't have enough land in order to feed their families they will diversify their income by engaging in to different non and off-farm activities. The result presented in table 1 showed that rural people in the study area engaged in pity trade and in wage labour activities. 34.5% of respondents were found to be engaged in agriculture only i.e. they didn't participate in other activities but the rest of them participates in both agriculture (crop and livestock) and off and nonfarm activities. This result is also supported by (Befekadu 2011), the study conducted in the same area which shows that 36.2% of households from the total sample households were drive their livelihoods from agriculture alone and the rest were from agriculture plus non and off-farm activities. The main reason of their engagement in off and non-farm activities was that of the low return from agriculture which is not enough to purchase food items for the family for the whole year. According to data from survey, surprisingly, among households who engaged in off and non-farm activities 96% of them responded that their main reason for their diversification was to purchase food item. This result is also supported by Focus Group Discussion (FGD) response and experts of the woreda agriculture and rural development office.

By comparing those households who diversify and not diversify their livelihood the result showed there was a significant difference in their food security status. As the previous discussion the main reason for their diversification is to purchase food items which means the income or product form agricultural activities is not enough to feed their families. Income from livelihood diversification has helped the households to supplement the food they produce from their own land, which is not sufficient to meet the annual food requirement for the vast majority of households (Bereket and Degefa, 2016). This result is in agreement with the findings of (Nasa, Atala et al., 2010), in their study they found that there is a strong positive association between livelihood

diversification and rural households' food security.

Diversification is significantly influenced by four variables. These variables are education year of the household head, membership to cooperative, participation in productive safety-net program and number of times the household received extension service in a year. Among these variables membership to cooperative negatively affect diversification of the household this was due to that cooperatives in the woreda encourage households to maximize their agricultural income rather than participating in non and off -farm activities, this result was also supported by focus group discussants. According to the focus group discussion; cooperatives are merely advising them to focus on agriculture than diversifying or participating in different activities which are different from agriculture. However, these advices were not seriously supported by practical training and input delivery.

The results show that households who had better schooling have a chance to diversify their income. This result is also supported by similar study which was conducted by (Siraj 2007 ; Khatun and Roy, 2012), that revealed the households with better education level were found in diversified groups.to the contrary some studies (Befekadu,2011 and Siraj,2007) found that education year of the household head negatively affect livelihood diversification. Households participant in productive safety-net program and got extension service have a chance to diversify their income. The distribution of propensity score for each household which included in the diversified and not diversified group was computed based on the above model.

Diversification brought statically significant effect in households' calorie intake. It has been found that diversification increase households food consumption of diversified households by 587.19 kcal on average. This result has been supported by (Omeoresh, Adewumi and Fadimula, 2010), Households having non and off-farm sources of income tend to easily become food secured than households that do not have access. The result of this study also supported by Nasa et.al 2010, the result shows that when comparing farmers on the basis of livelihood diversification in respect to food security, diversified farmers are relatively food secured than the undiversified farmers.

Conclusion

Generally from the finding of the study it is possible to understand that in the study area there exist diverse livelihood options. But the level of farmers' participation differs. Although different livelihood activities exist in the area agriculture takes the largest share. It can be concluded that rural households who are better educated, participant in productive safety net program and getting more extension services tend to engaged with off and non-farm activities. The negative relationship in the case of cooperative most probably might come from their mere focus on agricultural activities rather than encouraging farmers' engagement in off and non-farm activities as most of them are producer cooperatives. From the findings of the study it is possible to conclude that livelihood diversification can contribute to improvement of households' food security status.

Recommendations

- ❖ From the finding of the study livelihood diversification has a positive impact on food security therefore, livelihood options in the study area should be broaden not only this government and non-governmental institutions in the study area should give due attention for livelihood diversification since the area is well known by its food insecure and diversification has an implication for households food security.
- ❖ Cooperatives in the study area should focus not only on agriculture they should encourage households participation in different activities in addition to agriculture.
- ❖ The *woreda* should have to give emphasis for infrastructural development of the area since it affect households participation in different income generating activities and also has an implication for food security.

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References

1. Asmamaw Enquobahrie (2005). Understanding Poverty: The Ethiopian Context A Paper presented at The Gambia AAPAM Roundtable Conference, Banjul, The Gambia, April 19 - 23, 2004
2. Barrett, C. B., T. Reardon, P. Webb (2001). Non-farm Income Diversification and Household Livelihood Strategies in Rural Africa: Concepts, Dynamics, and Policy Implications. Food policy 26, 315-331.
3. Befekadu Wolede (2011). households Livelihood Strategies of Drought Prone Areas: The case of Fedis District, Eastren Hararge Zone of oromiya Region, Ethiopia. An M. Sc Thesis Presented to the School of Graduate Studies of Haramaya University.
4. Ellis, F. (2000). Rural Livelihoods and Diversity in Developing Countries, Oxford University

5. Farrington, J., T. Ramasut, J. Walker (2002). Sustainable Livelihoods Approaches in Urban Areas: General Lessons, with Illustrations from Indian Cases, ODI, London, UK.
6. FDRE (2002). Government of Ethiopia (GOE): Food Security Strategy, Addis Ababa, Ethiopia
7. Khatun and B.C. Roy (2012). Rural Livelihood Diversification in West Bengal: Determinants 65 and Constraints Agricultural Economics Research Review Vol. 25(No.1) January-June 2012 pp 115-124
8. Nasa'i, D. H., T.K. Atala, J.G. Akpoko, T.M. Kudi, & Habib Sani (2010). Analysis of Factors Influencing Livelihood Diversification Among Rural Farmers in Giwa Local Government Area of Kaduna state, Nigeria. I.J.S.N., VOL. 1(2), 2010: 161-165
9. Omotesho, M.O. Adewumi and K.S. Fadimula (2010). Department of Agricultural Economics and Farm Management, Faculty of Agriculture, University of Ilorin, Nigeria Press
10. Scoones, I. (1998). Sustainable Livelihoods, a Framework for Analysis, IDS working paper accessed, December 2008, number 72, Brighton.
11. Siraj Abdulahi (2007). Livelihood Diversification Among the Pastoralists: the case of adirre Woreda, Borana Zone of Oromiya. An M.Sc. Thesis presented to the School of Graduate Studies of Haramaya university, Haramaya