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Income Diversification Sources, Constraints, and Measurements: Evidence from Agarfa District, South-eastern Ethiopia

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Abstract

Agriculture is considered a driving force to reduce poverty and food insecurity. However, the agricultural sector has been unable to meet the growing food need of the rural population and it has been influenced by various risks. Although income diversification strategies supplement farmers' farm production, the extent of households' income diversification sources and their associated factors are not yet empirically identified in Agarfa District. Thus, this study aimed to measure income diversification strategies and identify factors responsible for the choice of income diversification strategies among rural households in the district. The study drew a sample of 150 households using the stratified random sampling technique from three kebeles of the district. Quantitative data were collected by interviews while qualitative data were collected by focus group discussions and key informant interviews. Descriptive and inferential statistics were applied to characterize households' income diversification strategies. Results show that agriculture has a leading contribution to the total income of households (88.89%) followed by non-farm (10.12%) and off-farm activities (0.99%). Furthermore, the results reveal that the mean diversity indexes increase from households engaged in housemaid activities (36.67) to households engaged in crop production (38320.00). The study, therefore, concludes that the agricultural sector alone cannot improve households' income, ensure food security, and alleviate poverty in the study area. Thus, rural development policies and strategies should focus on promoting income-generating activities besides agricultural activities in rural areas to improve the overall wellbeing of the rural communities.

Keywords:
Herfindal index, income, non-farm activities, off-farm activities, diversification

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INTRODUCTION

Income diversification through on-farm, non-farm, and off-farm activities is one of the key strategies that enable smallholder farmers to minimize the risk of their financial and food insecurity. According to Haggblade et al. (2010), local non-farm income constituted between 30 to 45 percent of rural household incomes in developing countries including Ethiopia. Demeke and Zeller (2012) report that 42.8 percent of households are exclusively involved in their own farm production whereas 57.2 percent have at least one member who is engaged in a variety of wage work, self-employment, or a combination of the two. Several authors have examined the role of households' income diversification. For instance, in a study of rural Nigeria, Babatunde and Qaim (2010) found that off-farm income had a positive effect on food and nutrition security. Karttunen (2009) suggests two purposes for non-farm activities – it is a means of survival for the poor people, but a deliberate investment in anticipation of better returns for the wealthier people. Finally, diversifying income sources is necessary to create employment for new entrants into the labor force and supplement the income of landless and almost landless families, thereby increasing agricultural production and productivity, so it is an important means of ensuring food security (Mulat, 2001).

Ethiopia's economy is mostly based on agricultural products (Shitarek, 2012). Majorities of rural households in the country make a living through income generated from agriculture. Agriculture is considered a basic instrument for promoting growth and sustainable development, reducing poverty, and achieving food security in developing countries like Ethiopia. However, the agricultural sector has been unable to meet the growing food need of the rural population. This sector is also influenced by various types of risks such as variability in soil fertility, crop and livestock diseases, unpredictable rainfall, and other weather-related events that lead to low productivity and low output, which in turn trap farmers in the vicious cycle of poverty. To reverse these situations, rural households are involved in a wide range of income-generating activities apart from farm production. A considerable body of research shows that rural households in developing countries try to maximize their food consumption and income sources through agricultural diversification and non-agricultural income diversification (Ito & Kurosaki, 2006; Davis et al., 2010).

Drawing from the World Bank's Living Standards Measurement Study – Integrated Surveys on Agriculture (LSMS-ISA) for Ethiopia, about 27 percent of rural households are engaged in non-farm entrepreneurship and derive 50 percent or more of their income from non-farm enterprises. Although this literature focused on the proportion of households engaged in non-farm activities, it did not address why rural households are not engaged in various income-generating activities (Nagler & Naude, 2014). The need to increase household income and reduce the risk of agricultural production has led rural households to increasingly diversify their income sources. Various sources, constraints, and extent of income diversification among the rural households have not yet clearly and adequately been examined and measured in the study area. In other words, there is no empirical work available that specifically examines the variety and extent of household income diversification strategies. Given the limitation of past research, this study will examine the sources and level of household income diversification strategies. Thus, increasing and strengthening the sources of income, such as off-farm and non-farm activities, have become an important component of households' income diversification strategies. This study, therefore, aimed (a) to identify the major income sources that rural households have practiced to diversify their income-generating activities and (b) to assess the extent of income diversification strategies of rural households in the study area.

Concepts and definitions

Income diversification refers to an increase in the number of sources of income or the balance among the different sources. It means that the total income of a household accrues to more than one source on the one hand and no single source is much dominant compared to the other sources on the other hand (Joshi et al., 2004). The Free Online Dictionary (2008) defines income as money received by a person or organization because of effort (work) or from return on investments. Diversification means the addition of livelihood sources of income other than those of farm-related ones. According to Brugère et al. (2008), diversification is defined as the process by which rural households construct a diverse portfolio of income-generating occupations in their struggle for survival and the improvement of their living standards.

Haggblade et al. (2010) defined non-farm diversification as seeking business or employment opportunities other than traditional crop production and livestock rearing. Even non-farm diversification is related to agriculture as it includes processing and trading agricultural produce. Furthermore, non-farm activities include service provision, shopkeeping, and manufacturing. In the study conducted by Beyene (2008), the term off-farm activity refers to all activities away from one's own property, regardless of sectoral or functional classification, which can be either wage employment or self-employment activity. Thus, off-farm is defined as time devoted to off one's own farm work, which consists of time allocated to wage employment activities (both in farm and non-farm sectors) as well as non-farm self-employment activities. Non-farm self-employment comprises non-wage activities, such as trading, transport services (vehicles or motorcycles), weaving, handicrafts, making pottery, and so on. Income diversification is the process by which households widen their income base by adopting new income-generating activities. For rural households, this includes agricultural diversification (producing a wider variety of crops or livestock or their products), diversification from subsistence into commercial activities, and diversification from agriculture into non-farm activities (Samson et al., 2010).

Alternative income-generating activities of farm households in rural areas

One of the most established characteristics of rural households in developing countries is that they obtain their incomes from many different sources. Following Davis et al. (2010), income sources are allocated into five basic categories: (1) agriculture, (2) informal employment, (3) formal employment, (4) self-employment, and (5) remittances. The five categories of income are aggregated into higher-level groupings depending on the type of analysis. Therefore, in this study, three types of income categories were discussed: on-farm, non-farm, and off-farm income. Farm income is obtained from agricultural production converted to monetary value including crop value, income from the sale of animal products, and income earned from the sale of livestock. Sabates-Wheeler et al. (2008) aggregate non-farm income as a range of activities that span from regular salaried work to self-employed activities, such as trading. Moreover, income earned from renting land and oxen (rent income), as well as remittances, are taken as non-farm income. Off-farm income includes agricultural wage labor.

Importance of the rural non-farm activities

In Ethiopia, even if agriculture is the dominant sector where many farm households make a living, rural non-farm and off-farm activities play a significant role in employment creation, income generation, and the enhancement of farm production activities (Beyene, 2008). It is assumed that farm activities remain important in rural households as they provide the main source of employment and income in rural areas of developing countries (Fernandez-Cornejo et al., 2007). Kilic et al. (2009) reviewed empirical evidence on

rural non-farm employment in a number of developing countries. They came across the literature stating that rural non-farm employment income accounted for 50 percent and 35 percent of the total income in Latin America and Africa, respectively. According to Pfeiffer et al. (2009), non-farm income is important to satisfy consumption requirements when agricultural production cannot provide food security. It can, however, be used to finance farm activities, too. One of the major reasons for a rural household to diversify into the rural non-farm economy is to minimize the risk of farm activities. The agricultural investment effect of non-farm/off-farm income diversification is particularly important for poor farm households because the lack of liquidity and poor access to credit are the most pressing constraints to improving agricultural productivity among farm households in developing countries (Deininger et al., 2007; Haggblade et al., 2007). Apart from providing flows of cash income that can be used to purchase farm inputs and hire labor for agricultural production, evidence of a steady off-farm income has been used as collateral for agricultural loans, given the inadequacy of land, in certain settings (Hertz, 2009).

Measurement of income diversification

The extent of households' income diversification in the literature is commonly quantified. The most common measure of income diversification used in several studies is income using the vector of income shares associated with different income sources (Barrett et al., 2001; Lay &Schuler, 2008; Idowu et al., 2011). Other studies use an alternative measure of the extent of diversification, including the Herfindahl Hirshman index, which is equal to the sum of the shares across each possible income source. The index measures the number of income sources or the level of income diversification. Value of one indicates complete dependence on a single income source while a value of 1/k represents perfectly equal earnings across income sources, where there are k different income source categories analyzed (Barrett et al., 2001). This index measures the degree of concentration of household income into various sources, so it measures the level of income diversification.

Empirical literature reviews

According to Demurger et al. (2010), various factors affect the income diversification strategies of households. The findings of various studies conducted in Ethiopia indicate that human capital-related variables, education status of the household head, availability and utilization of credit and remittance, and infrastructure-related variables like proximity to market influence the income diversification of households (Beyene, 2008; Demissie & Legesse, 2013; Lemi, 2006; Sisay, 2010). Alobo (2012) investigated the factors of income diversification using data on rural farm households from two Sub-Saharan African countries: Senegal and Kenya. Specifically, the study revealed that completing secondary education, completing university education, access to market for farm products, farm size, availability of irrigation, and access to farm capital (availability of animal plows) are important in determining the level of income diversification strategies.

METODOLOGY

Study area

The study was conducted in Agarfa District, Bale Zone, southeastern Ethiopia. The district is located at 453 km in the southeast direction from Addis Ababa, the capital city of Ethiopia. It is bordered by Shirka District of Arsi Zone in the north, West Arsi Zone in the southwest, Dinsho District in the south, Sinana District in the southeast, and Gasera District in the northeast. The lowest and highest altitude of the district is extended from 1250 m and 3500 m above sea level, respectively. The maximum and minimum temperatures are 25°C and 10°C, respectively. The annual average rainfall is 800 mm whereas 400 mm and 1200 mm are the minimum and maximum annual rainfall recorded

in the district, respectively. Wheat, barley, red pepper, and maize are the major crops produced in the locality. Farmers of the area rear cattle, goats, sheep, horses, and donkeys as an alternative source of income. Furthermore, petty trade, services, poultry, and honey bee production are income sources of the area (Agarfa District Agriculture and Rural Development Office (ADARDO), 2014).

Sample size and sampling techniques

The study involved multistage sampling. In the first stage, Agarfa District was selected purposively because households of the district were highly engaged in various income diversification strategies compared to the remaining districts of the zone. In the second stage, the kebeles of the district were stratified into three strata including near, medium, and far based on the criteria of their distance from the district's town. Five, nine, and seven kebeles were included in the near, medium, and far distance strata, respectively. Accordingly, one kebele was selected from each stratum, amounting to three kebeles, using the simple randomization technique. In the third stage, the sampling frame (complete village household lists) was obtained from each kebele's administrative office. Then, members of each kebele were stratified into two groups as male-headed households and female-headed households based on gender in order to glimpse female-headed households' participation in off-farm and non-farm activities since they invest much of their time in domestic roles. In the fourth stage, the probability proportional to sample size methods was applied to sample the households from each stratum according to the number of households in the sampled kebeles. Finally, the simple randomization technique, using a lottery method, was used to select 150 households consisting of 125 male-headed and 25 female-headed households.

Data collection

Quantitative data were collected from the sample households using an interview schedule. Checklists were used to collect qualitative data from focus group discussions and key informant interviews. The data focused on information pertaining to major income sources of households, the factors that influence households' engagement in off-farm and non-farm income-generating activities, and other income sources. Before data collection, the interview schedule was pre-tested on non-sample households for consistency and clarity and to check the vagueness of the terms used. On the basis of the results of the pre-test, necessary modifications or adjustments were made to make it clear and meaningful before the execution of the survey. Enumerators who have knowledge about the area and are acquainted with the local culture and language were recruited and trained on techniques of data collection and interviewing. One year was the recall time for the collected data. Relevant and necessary secondary sources of information for the study were collected from different published and unpublished literature.

Data analysis

Quantitative type of data was analyzed using descriptive statistics such as percentage, frequency, mean, standard deviation, minimum, and maximum. Moreover, a narrative type of analysis was used to analyze the qualitative type of data collected using focus group discussions and key informant interviews to supplement the quantitative data. The data analysis was conducted using Statistical Package for Social Sciences (SPSS).

RESULTS AND DISCUSSION

Characterization of households according to their income diversification strategies

Diversification means expanding and strengthening the share of income from non-agricultural activities or income transfers. In the study area, various income-generating non-farm and off-farm activities were identified among the members of the rural farm households. Due to the long list of these activities, they were categorized into three

groups: on-farm (agriculture), non-farm, and off-farm activities. Accordingly, the most common income diversification strategies in the study area were farming, farm and non-farm, farm and off-farm, and a combination of farm, non-farm, and off-farm activities. Out of the total sampled households, households engaged in farm only, farm and non-farm, farm and off-farm, and a combination of farm, non-farm, and off-farm were 75(50%), 48(32%), 16(10.7%), and 11(7.3%), respectively. In terms of income share from these income diversification strategies, the finding showed that on-farm, non-farm, and off-farm income contributed 88.89 percent, 10.12 percent, and 0.99 percent to the total income of households, respectively.

Farm income sources include crop production, livestock production, and sales of animal products practiced in the study area. Non-farm activities refer to non-agricultural activities in which households work as casual laborers in activities outside agriculture. Moreover, non-farm income aggregates a range of activities that span from regular salaried work to self-employed. Accordingly, non-farm income sources such as self-employment, formal employment/pension, urban-to-rural remittances arising from both within national boundaries and international cross-border, renting out land, house and draft animals were identified in the study area. Off-farm activities, in this study, refer to the sale of labor for agricultural and non-agricultural activities in which households engaged outside their own farmlands. Accordingly, wage work, housemaid, and cattle herder were identified as a major source of off-farm income in the study area.

In each income source category, a number of specific income sources were identified. Self-employment includes shopkeeping, petty trade (grain, livestock, coffee, spices, salt, *etc*.), food processing for sale (local drink like *areqe, tela*), fuelwood and/or charcoal sale, rural crafts (pottery, bamboo work, carpentry, blacksmiths, weaving), fruits sales, and services (repair of shoes, barber, grain milling, tailor, traditional healing, *etc*.). Furthermore, tree planting, sales of grass and crop residues, and sharecropping were income-generating activities in the study area. As indicated in Table 1, the proportions of households that received remittance were 29.3 percent. The results further showed that the proportion of households engaged in wage work, fruit sales, rent out house, petty trading, and cattle herder were 14, 9.3, 8.7, 8, and 4 percent, respectively. These income diversification sources are quite revealing and informative. Sample households were mostly farmers who were engaged in farming during the rainy seasons and believed that they were engaged in these income diversification sources mostly in the dry seasons. These results indicated that despite the fact that rural incomes in the study area were diversified, agriculture remained the key source of income. This indicates that non-farm activities in the district play an important complementary or supplementary role in agricultural income.

Households' income variations and diversification based on number of income sources

The main reason for the comparison of income variations between the years 2012/2013 and 2013/2014 was to identify whether the number of income sources of the households was decreased, increased, or remained constant, thereby seeing the trend of income diversification. The results indicated that there were variations in the number of income sources obtained in 2013/2014 compared with that in 2012/13. Accordingly, 64.7% of the sample households (97 households) responded that there was an income source variation between the two indicated years while 35.3% (53 households) responded that their number of income sources was neither increased nor decreased. The result also indicated that the mean number of income sources for the sample households was 1.7 with a standard deviation of 0.58. Similarly, the mean income sources for

households engaged in farm only, farm and non-farm, farm and off-farm, and a combination of farm, non-farm, and off-farm activities were 1.62, 1.89, 1.33, and 1.80, respectively. This indicates that households engaged in farm and non-farm activities diversify income sources to a greater extent than those engaged in other choices of income diversification strategies (Table 2).

Table 1

Household's Income Diversification Sources

Diversification sources	Frequency	Percentage
Farm income sources		
Crop production	148	98.7
Live animal	113	75.3
Animal products sale	59	39.3
Sharecropping	57	38.0
Tree planting	28	18.7
Sales of grass and crop residues	25	16.7
Non-farm income sources		
Remittance	44	29.3
Fruit sales	14	9.3
Rent out house or room	13	8.7
Petty trade	12	8.0
Shopkeeping	2	1.3
Rural crafts	2	1.3
Rent out land	2	1.3
Services	1	0.7
Rent out draft animals	1	0.7
Off-farm income sources		
Wage work	21	14.0
Cattle herder	6	4.0
Housemaid	2	1.3

Table 2

Households' Income Source Variations Between the Years 2012/13 and 2013/14

Income source variations		Income diversification strategies					
		Farm only (N= 75)	Farm and non-farm (N=48)	Farm and off-farm (N=16)	Farm, non-farm and off-farm (N=11)	Total (N=150)	χ^2
Yes	N	47	32	10	8	97	
	%	62.7	66.7	62.5	72.7	64.7	
No	N	28	16	6	3	53	
	%	37.3	33.3	37.5	27.3	35.3	0.56
Households' mean number of income sources							F test
Mean		1.62	1.89	1.33	1.8	1.7	
SD		0.59	0.58	0.516	0.447	0.58	1.68

Measurement of income diversification

With respect to measuring households' income source diversification, the three methods used were income diversification based on the share of non-agricultural income from the total income of the households, income diversification based on the number of income sources that the households engaged in, and calculating income diversity indices. This section focuses on calculating diversity indices. Ersado (2003) used diversity index to calculate income diversification D which accounts for relative income of different sources. This method takes into account the variations in the income shares, which is the inverse of market concentration index known as the Herfindahl-Hirschman index. Idowu et al. (2011) used the Herfindahl index to measure income diversification. Mathematically, the diversity index (inverse of market concentration index) can be formulated as:

$$S_k = \frac{Y_k}{Y} \quad (1)$$

while

$$Y = \sum_{K=1}^{12} Y_k \quad (2)$$

By combining these equations, we have

$$D = \frac{1}{\sum_{k=1}^{12} S_{k^2}} \quad (3)$$

where,

D= diversity index

Y_k= total income from source *n*

Y= total household income from all sources; and

S_k= the share of income source *k*.

The above index measures the degree of concentration (scatteredness) of household income into various sources. It thus measures the level of income diversification. In this study, a diversification index was used to calculate income source diversity for each household based on the identified income sources, and the statistics are summarized using the mean, standard deviation, and maximum income obtained in Ethiopian birr (ETB). The results revealed that the mean diversity indexes were increased from households engaged in housemaid to households engaged in crop production. This implies that households engaged in crop production activities have relatively better-diversified income both in the number of sources and distribution of the amount of income generated from the sources than those engaged in housemaid (Table 3).

Table 3

Summary Statistics of Herfindahl Index to Measure Income Diversification by Income Source

Sources of income	Mean (in ETB)	Standard Deviation	Max. annual income (in ETB)
Crop production	38320.00	45758.52	260,000
Remittance	5377.30	5422.29	30,000
Livestock production	5150.60	4797.52	22,600
Self employment like petty trade	2927.00	18155.29	210,000
Livestock products sale	541.19	2097.14	22,500
Daily wage work	369.33	1143.69	7,600
Rent out land	173.33	1500.54	14,000
Rent out house	169.80	621.39	3,600
Formal employment	120.00	1469.69	18,000
Cattle herder	85.67	609.28	7,000
Rent out animals	47.33	423.11	4,500
Housemaid	36.67	410.01	5,000

Problems hindering rural households' income diversification

The analysis of data collected from focus group discussions and key informant interviews showed that various problems hindered households of the study area to diversify their income apart from agriculture. These included the absence of chicken vaccination to engage in poultry production, lack of skill training, distance from the market center, inaccessibility of market information, unavailability and late supply of improved agricultural inputs particularly seed and fertilizer, limited or no opportunities to engage in various income-generating activities, lack of roads and transportation services, lack of motor pump although water sources are available in the study area, and so on. Table 4 presents the problems ranked by the sample households during the interview schedule.

Transportation-related problems: According to sample households' responses, the transport network is very poor in the study area. Most of the households used draft animals to transport their agricultural produce from their residence to nearest the market centers.

Table 4
Major Problems That Influence Income Diversification Strategies

Major constraints	**Percentage**
Market center is far from households residential	25.3
Shortage of household labor	20
Lack of initial capital to start non-farm activities	17.3
Health problems of household member	11.3
Lack of market information	7.3
Fear of losing land if involving in activities outside agriculture	5.3
Lack of skill-based training	4.7
Lack of transportation	4.7
Inadequate demand	4
Total	100
Disaster-related problems	**Percentage**
Drought	45.3
Crop loss due to pest and/or disease	33.3
Floods	12.7
Sudden price change of food grains	6
Health problems of animals	2.7
Total	100

Table 5
Status of Road and Mode of Transportation Used by Sample Households

Road status	**Frequency**	**Percentage**
Poor	85	56.7
Good	65	43.3
Total	150	100
Mode of transportation used from farmers' home to market centers		
Using both donkey and carts	71	47.3
Using donkey alone	56	37.3
Using carts alone	22	14.7
Head/back load	1	0.7
Total	150	100

Financial problem (lack of formal credit utilization): The availability of agricultural credit to subsistence farmers who have little or no capital or savings to invest in farming and non-farming is an important component of small farm development programs. In line with this, an attempt was made to identify the number of households that had benefited from credit. The study showed that 40.7 percent of the sample households (61 households) had received credit while 59.3 percent (89 households) preferred not to use credit services due to various reasons, such as high interest rate and far distance of credit institutions from their residence. Fear of loan repayment time is also another reason hindering households from using credit services. The results obtained from the focus group discussions and key informant interviews indicated that the time of loan repayment was inappropriate. Credit institutions often convince households to repay the loan during crop harvest. However, this time is not convenient for farmers since the price of commodities is cheap. Out of the credit users, the majority of households used it to purchase improved agricultural inputs while some of them used it to fulfill the education needs and clothes to their children. Some also used it to start non-farm activities or spent it on healthcare expenses. Therefore, formal credit utilization has a positive influence on income diversification. The main governmental sources of credit service providers in the study area included the bureau of agricultural cooperatives, which delivers credit in-kind like fertilizer and improved crop seeds. The non-governmental source was Oromia Credit and Saving Share Company, which delivers credit in cash (Table 6).

Table 6
Reasons for Not Taking Credit Services from Formal Credit Institutions

Reasons	Frequency	Percentage
Too high interest rate	38	25.3
Using own assets	24	16
Absence of interest free credit services	8	5.3
Inappropriate loan repayment time (harvest time when price of commodities are cheap)	7	4.7
The far distance of credit institutions from household residence	5	3.3
Lack of interest	5	3.3
Unavailability of credit institutions	2	1.3
Total	**89**	**59.3**

CONCLUSIONS

Agriculture is the primary source of income for rural households in the study area. However, rural households have been forced to look for alternative income-generating activities other than agriculture. Some rural households in the study area were engaged in diverse income-generating activities away from purely crop and livestock production towards non-farm and off-farm activities while others were engaged in farming only. The study sought to investigate the extent to which rural households of the study area diversified into non-farm and off-farm sources and what factors influenced their engagement in various income sources. Accordingly, the finding showed that on-farm, non-farm, and off-farm incomes contributed 88.89 percent, 10.12 percent, and 0.99 percent to the total income of households, respectively. The results further showed that different factors influenced the household's choice of income

diversification strategies. Therefore, it is concluded that the agricultural sector alone cannot improve rural livelihoods, ensure food and nutritional security, and reduce poverty in the study area. This means that intersectoral issues such as non-farm and off-farm linkages need to be addressed as well.

Recommendations

The findings of the study showed that off-farm and non-farm incomes contributed 11% of the total income of households. In this regard, interventions that can expand the opportunity of off-farm and non-farm activities need to be designed to generate employment opportunities and attract rural households to diversify their income sources. Therefore, the rural development strategy should not only emphasize increasing agricultural production but attention should also be given to promoting such activities in the rural areas.

Infrastructure development is a backbone for any development. On the contrary, the infrastructure development of the study area, particularly the road system, is poor. This negatively affects the tendency of income diversification among small-scale rural farmers. Therefore, government policies should pay more attention to road construction and maintenance to reduce the entry barriers and facilitate easier access to non-farm activities.

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CONFLICT OF INTEREST

The authors have not declared any conflict of interest.

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