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Analysis of Livelihood Diversification Strategy of Rural Household: A Case study of Ambo District, Oomiya Regional State, Ethiopia

Sahilu Dirribsa and Bekele Tassew*

Department of Cooperatives & Institute of Cooperatives & Development Studies, Ambo University, Oomiya Regional State, Ethiopia

Corresponding author

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A B S T R A C T

Livelihood diversification is the norm in developing countries. Very few people or households derive all their income from a single source. Diversification has increasingly turned towards non- farm and off-farm activities as a source of income and employment. Households engage in diverse livelihood strategies away from purely crop and livestock production towards farm, non-farm and off-farm activities that are undertaken to broaden and generate additional income for survival and cope with this harsh and difficult environment. This paper is an attempt to analyse the determinants of livelihood diversification strategies of rural households. Multi stage sampling procedure was employed and 140 respondents were selected from three peasant associations of Ambo District. Descriptive statistics, and multinomial logitstic regression model were used to analyse the set objectives. The respondents use agriculture alone, agriculture and nonfarm, and agriculture, off farm and nonfarm as choices of livelihood diversification strategies. Multinomial logistic regression result shows that out of the 17 hypothesized variables, 9 were found to be significantly influenced livelihood strategies at less than 10% probability levels. These variables include agro-ecology, sex, education, farmland size, family size, livestock ownership, participation in social institution, membership to cooperatives, contact to extension agent , source of credit, and age. Accordingly, the model result indicated that the age, agro-ecology and nearest market distance influenced positively and significantly the choice of agriculture + nonfarm, while the ownership of livestock in TLU and total farm size negatively and significantly affected the diversification of livelihood into nonfarm, off-farm and combining nonfarm and off-farm activities. Further, the variable education had positively and significantly influenced the household choices of agriculture + nonfarm, and farm + nonfarm & off-farm activities, Similarly, contact with extension agent had negative and significant influence on the household decision of selecting diversified livelihood strategies into farm + off-farm activities, while agricultural training had negative and significant influence on livelihood strategies choice of agriculture, nonfarm and off farm activities. Capacity building, making farmers to engage in off farm and nonfarm activities, technology intervention, and promoting economic and social institutional support by the government are recommended.

Introduction

Rural households in Sub-Saharan African countries (SSAC) usually have to cope with both poverty and income variability. Like others, Ethiopia is most grounded in poverty due to periodic drought and extremely variable environment making agriculture a risky economic activity (NDMC, 2005). In addition, like other sub-Saharan Africa countries, the nation is characterized by a complex, diverse and risk-prone agricultural production environment (Devereux, et. al 2002). Natural disaster (drought) forced people into alternative livelihood such as the collection and sale of firewood and grasses (Goodrich, 2001). Ensuring households' access to food poses a formidable challenge in view of the fact that chronic food insecure households are predominantly located in drought-prone, moisture deficit, peripheral areas such as pastoral and agro-pastoral areas.

Many researchers in the field of rural development tend to agree that the number of poor people in rural areas of Ethiopia exceeds the capacity of agriculture to provide sustainable livelihood opportunities. Even with a decline of fertility rates, and a slowing down of population growth, this situation is believed not to change significantly. Whilst there is a potential for out-migration, urban centers cannot be assumed to be capable of providing adequate livelihood opportunities for all those unable to make a living in agriculture. This indicates a potentially important role for rural non-farm activities in reducing poverty in rural areas.

It has become increasingly difficult to expand agricultural employment in Ethiopia. Because of rapid population growth, the average farm size has declined to less than one hectare (Mulat, 2001:20). Sub-economic holdings, landlessness, soil degradation, low level of technology utilization and increasingly unreliable and erratic rainfall have resulted in widespread poverty and vulnerability. Even if farms are not physically subdivided, intergenerational land sharing occurs that reduces the effective land area for individual households.

Only diversification into non-farm activities, fostered by farm-led economic growth thus seems to make sense. Hence, over the past decades, farm household diversification into supplementary activities has slowly crept on the agendas for research on and development of rural livelihoods. Several studies conclude that involvement in supplementary activities is positively related to farm productivity and contributes to poverty alleviation.Support to non-agricultural activities is also seen as a way of deflecting from land tenure quagmires"(Bryceson,1999:47).

Household sengage in diverse livelihood strategies away from purely crop and livestock production towards farm, non-farm and off-farm activities that are undertaken to broaden and generate additional income for survival and cope with this harsh and difficult environment. Despite this, the struggle to reduce poverty at the household level in the rural areas of Ethiopia has remained as a challenging goal. To intervene the problem, there needs to disentangle the interwoven factors which influence poverty and to understand the livelihood strategies of the rural house-holds have got paramount importance to development practitioners and policy makers to find the way out.

On the contrary, rural people on their side partake in a number of strategies including agricultural intensification, migration, and livelihood diversification, which enable them to attain a sustainable livelihood. Various empirical studies show that different livelihood diversification strategies

exist in the sub-Saharan countries even though the forms and people's participation level may vary. According to Scoones (1998), the combination of livelihood, resources (different livelihood asset) are resulting in the ability of people to follow the combination of livelihood strategies. Consistent with the earlier statement, in many rural parts of the country, the recurrent drought along with the environmental degradation is becoming a serious threat to the livelihood of the poor. However, some households successfully respond to these events, and exhibit livelihood systems that are able to resilient (Validivia et al., 2005) while others do not. Ambo District is characterized by producing different kinds of crops which has low economic return and are highly dependent on the rain fed agricultural production system which is highly vulnerable to draught in the absence of sustainable rain fall. Furthermore, the productive agrarian capital which is basically land is becoming scarce mainly due to the high population pressure.

Farm households, as their income grows, increase their expenditure share on non-food items, thereby accelerating demand for non-farm goods and services such as housing, clothing, schooling, health, etc. To meet this growing demand, rural households increasingly diversify into rural non-farm goods and services. Increasingly, productive modern agriculture also requires inputs and services, such as seeds, fertilizer, credit, pumps, processing facilities, which in turn create a growing demand for non-farm firms that can provide these services.

Likewise, Ambo District, which is found in the central highlands of Ethiopia, has a serious shortage of farmlands and every possible pieces of land is put into cultivation. According to CSA (2010) District's crude density is 127 persons/km^2, whereas the agricultural density is 202 person/km^2. Increasing population density coupled with the lack of alternative employment opportunities led to progressive land pressure and subsequent shrinking of individual landholdings. Thus, arable land has to be used intensively, leaving practically no space for fallowing; and practice of crop rotation was rare leading to massive soil erosion and land degradation.
Agricultural land scarce or landless people facing a loss of livelihoods characterized by food insecurity, low living standard, do not access to public services (extension services, credit, farm inputs and technologies) and unable to uplift her/himself from the abject land of poverty (Anteneh, 2004).

For example, according to Masefield (2001:37), over half of the population of Ethiopia was chronically food insecure and a significant percentage of the landless and/or agricultural land scarce farmers among others. In order to survive under resource scarcity, farmers often embark onto inappropriate natural resource exploitations and pursue alternative livelihood strategies as the agricultural land scarce peasants are not passive who voluntarily live under poverty. Instead, they pursue different livelihoods diversification strategies in order to survive in the milieu of agricultural land scarcity. These can be manifested in the form of boosting family income, creating employment, enhance natural resource managements (NRM), reducing poverty, and ensuring food security. Alternatively, the livelihood strategies might have adverse long-term impacts on sustainable utilization of natural resources.

Although agriculture or natural resource based activities remain the dominant source of livelihoods, various studies indicate that rural households have been increasingly diversifying their livelihoods and activities in rural sub-Saharan Africa (Bryceson 2002a, 2006; De Haan and Zoomers 2005).

Despite increasing diversification of livelihood sources, agriculture continues to play a vital role through its contribution to growth, employment and livelihoods in most of sub-Saharan African countries though food security remains at stake.

The community capacity to withstand external shocks and internal stresses and threats in order to maintain their livelihoods without the expense of natural resource degradation, keeping the pace of livelihoods of future generation, leading to additional benefits, establishing institutional and social cohesion can be called sustainable rural livelihoods (DFID, 2000; FAO, 2003). There are ample evidences, consider Chambers and Conway (1992), Scoones (1998), and Ellis and Freeman (2005), for example, that livelihoods are multiple, diverse, adaptive, flexible, complex, risk prone and cross-sectional. Thus, the ability of a household to follow different livelihood strategies is closely tied to access to key assets (capitals). In other words, access to one asset due to the dearth of others leads to a shift in livelihood pursuits and this asset is becoming critical for a particular livelihood strategy.

This is also a widespread proposition in rural and agricultural development literatures. As Masefield (2001:41) noted, researches in Ethiopia seem to confirm that peasants with smaller landholding tend to use less inputs, a finding which is inconsistent with the general theory of that intensification increases on small farms to survive under land shortage‘ Nevertheless, this strategy faces numerous questions like: where are the sources of improved and appropriate technology? Can the resource poor farmers afford it? The second option could be engaging in activities requiring less land. This seems sound but it demands more capitals, which farmers often lack. The third option is land-use planning. This needs to be initiated to advice the smallholders to allocate their scarce agricultural land only to the most profitable enterprises provided that they have sufficient knowledge of production possibilities available to them.

The strategies should to be closely analyzed putting the people at the centre of the problem and using a holistic approach that address the perceptions, challenges and opportunities, and the assets of the people themselves. Rural people are mainly engaged in agricultural activities in almost all agriculture-based economies like Ethiopia. Given an uneven distribution of the agricultural land resources, smallholder farmers devised their own livelihood strategies, which are diverse and complex in nature.

Therefore, it is valuable to identify and assess the potentials, challenges, and opportunities available at the disposal of Ambo District communities putting them at the centre of their problem largely from communities ‘own perceptions and with closer look at experts ‘outlooks and recommendations. It is also too simplistic to take the suggestions for heterogeneous households in varies contexts. This is mainly due to the peculiarities and the heterogeneities of livelihood strategies so far practiced in different contexts by communities.

Statement of the problem

In Ethiopia, undiversified livelihood options and complete dependency on agricultural production is also the main problems, which exacerbate Land degradation and 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, (2004), 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).

Livelihood diversification is the norm in developing countries. Very few people or households derive all their income from a single source. Diversification has increasingly turned towards non- farm and off-farm activities as a source of income and employment (Haggblade 2007).

The primary categories of livelihood diversification are farm, off-farm, and non-farm income sources (Saith, 1992 cited in Ellis, 1998). Ellis (1998) explained the farm, off-farm and non-farm diversification. According to Ellis, farm income includes livestock as well as crop income and comprises both consumption-in-kind of own farm output and cash income from output sold. Off-farm income typically refers to wage or exchange labour on other farms (i.e. within agriculture). It also includes labour payments in kind, such as the harvest share systems and other non-wage labour contracts that remain prevalent in many parts of the developing world. Non-farm income refers to non-agricultural income sources. The same author further classifies non-farm income in to five categories. These are (i) non-farm rural wage employment, (ii) non-farm rural self-employment, (iii) property income (rents, etc.), (iv) urban-to-rural remittances arising from within national boundaries, and (v) international remittances arising from cross-border and overseas migration.

Different literatures note the reason for livelihood diversification. Here it is worth to mention Ellis, (2000) work. He categorizes the reason for livelihood diversification in to two broad categories which are necessity or choice. He further elaborates Necessity as involuntary and desperation reasons for diversifying. Choice on the other hand, refers to voluntary and proactive reasons for diversification for instance, seeking out seasonal wage earning opportunities, travelling to find work in remote locations, educating children to improve their prospects of obtaining non-farm jobs, saving money to invest in non-farm businesses such as trading and etc.

Rural people on their side partake in a number of strategies, including agricultural intensification, and livelihood diversification, which enable them to attain food security goal, however, still unable to escape food insecurity. The rural poor struggle to ensure food security status by participating in diversification activities. However, the contribution to be made by livelihood diversification to rural livelihoods has often been ignored by policy makers who have chosen to focus their activities on agriculture (Carswell, 2000). Thus, a thorough understanding of alternative livelihood strategies of rural households and communities is indispensable in any attempt to bring improvement. This is important not to commit a limited resource available for rural development based on untested assumption about the rural poor and its livelihood strategies (Tesfaye, 2003).

The extent to which farm households are able to feed themselves often depends on off/non-farm income as well as their own

agricultural production. Many households to purchase grain use off/non farm income and the concept of 'subsistence' farmers needs to be understood in this context of diversified income sources (Chapman and Tripp, 2004 as cited in Daniel, 2009). Limited off-farm economic activities characterize livelihood insecurity. These conditions are exacerbated by climactic variability. Over successive poor harvests, households' asset base is steadily depleted to the extent that they have nothing left to cope with another shock (CARE, 2001).

Smallholder households and those vulnerable due to limited agricultural inputs are most often victims of low agricultural production and the production is unable to satisfy the food needs of these people. Therefore, these households are often forced to complement and supplement their income from different nonfarm and off farm income generating activities such as selling of fuel wood, charcoal, trading, handcrafting and engagement in wage labor (Yared 2002). Even though, the greater contribution of diverse livelihood portfolios in ensuring household food Supply by generating income that agriculture cannot provide and the inability of agriculture alone as a sole source of broad household demands, there is limited studies that have been conducted in relation to the contribution of livelihood diversification strategy in Ethiopia broadly and in Ambo district particularly. As consequence, there is a wide knowledge gap on the livelihood diversification of rural households in Ethiopia. Therefore this study would contribute to the literature for the better understanding of livelihood diversification strategy and options among rural households of Ethiopia, the case of Ambo district.(problems in the study area land scarcity, land degradation, population pressure, lack of resources like irrigation, depend only rain etc. the main problem of the area.

However, governmental organization and NGOs with permanent and pilot project in Ambo district had been spending many resources from year to year but they were not able to bring a feasible change on the livelihood diversification strategy of the rural community. This was may be because lack of information on what exactly constitutes the livelihooddiversification strategy of different socio-economic groups and the reason behind household livelihood strategies choices and natural factors such as land degradation and others. The lack of such information and wrong approach in turn was constraining effective decisions on the type and nature of interventions and the target beneficiaries.

In line with this, different households adopt different livelihood diversification strategies according to their particular asset and asset status their perceptive towards specific livelihood strategies. But, there was no empirical research which has been conducted concerning this issue in the study area. Therefore, this study focused on assessing existing livelihood diversification strategy choices and identifying the factors of rural livelihood diversification strategies are not the task that to be left to tomorrow. In addition, the research is important and helpful to explain why people are choose existing livelihood diversification strategies and staying as a poor over time. Finally, it is possible to generate information for policy makers and executive officials for an intervention that can facilitate, achieve, and bring nationally and locally the study area household to middle-income generating community. It is useful for advancement of rural communities and design policies and strategies, which can foster poverty alleviating process.

The main objective of this study to analyze the livelihood diversification strategies adapted by rural households in the study area. And to examine determinants of livelihood diversification strategy of rural households in the study area.

Summary of Variables and their definitions

Table 1: Dependent Variable choices

Dependent variable	Definition and unit of measurement
Y1=1 = AG	Agriculture alone
Y3=2 = AG + NF	Agriculture and nonfarm combination
Y4=3 = AG + OFF + NF	Agriculture, off farm and non farm

Table.2 Summary of explanatory variables identified for the multinomial logit model

SN	Variable name	Variable code	Definition and unit of measurement	Expected sign
1	Age	AHH	Age of household head in years given in continuous variables (1, 2, 3, …)	Negative
2	Education level of household head	ELHH	It is a categorical variable and refers to the number of years of formal schooling the household head attended	Positive
3	Total family size	TFS	Total number of household members takes the value of (1, 2, 3, …) **.**It is a continuous variable.	Positive
4	Dependency ratio	DR	It is a continuous variable measured in percent a No of children below 15 years and aged persons above 65 years of age in a HH given in values as 0,1, 2, 3, …	Negative
5	Sex and Marital status of HHH		Sex is a dummy variable assigned one if a head is male and two otherwise.	Negativ
6	Land	TLHS	land size owned by the household in hectares local unit take the value of (1, 2, 3, …)	Positive
7	Total livestock possession	TLU	It is a continuous variable and measured by Tropical Livestock Unit (TLU Size of livestock owend by HHHs	Positive
9	Distance of the farmer house from nearest marketing centers	(DISTFNMAR**)**	It is a continuous variable designating HHs proximity to the nearest market center measured in kilometer.	Positive
10	Access to credit	CR	A dummy variable, which takes 1 if a household access 2 other wise	Positive
11	Access to extension	ES	A dummy variable, It refers to extension agent contact with farmers which takes 1 if a household access 2 otherwise	Positive
12	Membership to cooperative	(MMTCOOP)	A dummy variable, which takes 1 if a household participate in cooperative 2 other wise	Positive
13	Access to irrigation	AIR	A dummy variable, which takes 1 if a household access 2 otherwise	Positive
14	Agro-ecology		Agro-ecologies of the households which takes a value of 1 if households are from highland, 2 from midland and 3 from lowland)	Negative

Research Design and Methodology

Research Methods

The study employed in both qualitative and quantitative form of research methods combined in a creative and logical manner to fully capture pertinent information to address the research questions. The mixed approach of this kind can potentially overcome the pitfalls of using single research method and help to take their complementarities.

Description of the study area

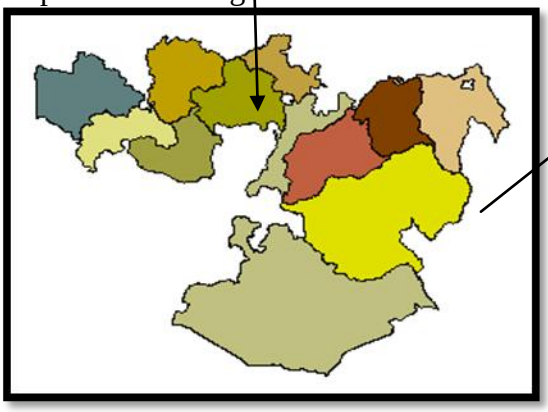
Ambo district is located in Western Shoa Administrative Zone of Oromia Regional state at about 114 km West of Addis Ababa. The capital town of the district, Ambo, is located at 08o35.589'North and 40o19.114'east. The District shares boundary with Dandi District in the East, Wanchi District of South west Shoa Zone in the South, Ilfeta District in the North and TokeKutaye District in the West. The Ambo District is situated between 7052'10 and 8042'30 north and between 40023'57 and 4109'14 east. The large mass of the District is below 1700 masl which extend down to below 800 in the low lands of the District. The altitude ranges from as low as 1380masl up to 3030 masl. Ambo district is characterized mostly by flat and to some extent by undulating land features.

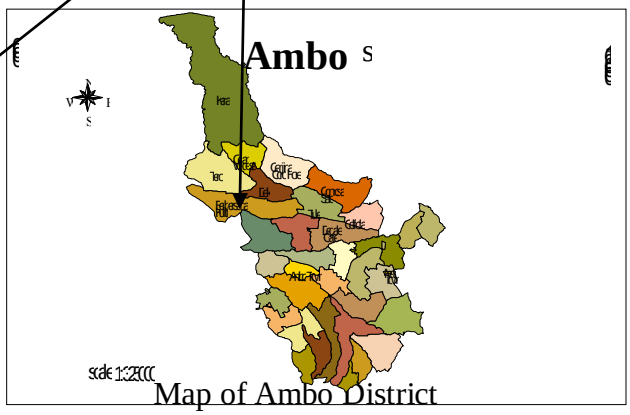
Figure.2 map of the study area

Map of Oromia regional state

Map of Ethiopia

Map of Oromia regional state





Map of west Shoa zone

Map of Ambo District

Source: Ambo DistrictAdministration Office, 2014

Study Design

This particular research was conducted in Ambo District of Oromia region. The reason why the researcher selected Ambo District is that, first, the researcher resides in the District expected to get all-important information. In addition to this the researcher has been working in the District at different positions for many years this could lead the researcher to identify the District purposively and the District has different livelihood activities among the west Shoa but the livelihood of the small scale farmers still challenging by deferent contexts like population pressure, land degradation, vulnerable to deferent natural and manmade disasters on secondly, in terms of the research on livelihood, there is no research undertaken in the study area about the livelihood diversification strategy and options.

Methods of data collection

Data Sources

To conduct this research both primary and secondary sources were used. Secondary data was gathered from different journals, articles, books, GO, NGO reports working in the area, and rural and agricultural development offices of the District that was done by using standard secondary data collection sheets. The major source of data of the study was primary sources and information on the thematic issues like socioeconomic profiles of the respondents, causes of agricultural land scarcity, land degradation, people pressure, the alternative livelihood diversification strategies in the situation of the farmland scarcity, the dynamisms of the livelihood assets and their significance, the outcomes (the desirability and vulnerability) of the alternative livelihoods so far pursued, and the implications of the livelihood diversification strategies. These problems need to be assessed whether they are affecting livelihood diversification strategies in the study area because the area is more characterized by these rather than others areas of the district.

Sampling technique

Ambo District was selected purposely to assess rural household livelihood diversification strategies of three PAs. This study used both qualitative and quantitative data that was collected from both natural and social characteristics of the rural livelihoods system.

Multi-stage sampling technique was employed. At the first stage, the study area was selected purposively with the justification that there is no attempt has been made to study livelihood diversification strategies. At the second stage, three Peaseant Associations (PAs) were selected from three kebeles (village) of the Ambo district ie., one PA from each kebele. At the third stage, a total sample size of 140 respondents were selected by using Kothari (2004) formula, and proportion to population size (PPS).

$$n=\frac{z^2xNpq}{(N-1)\,e^2+Z^2pq}$$

Where n= required sample size=140

N=Population 2068
Z= Confidence interval at 95% which is 1.96
e= 8%
P= 0.5
q= 0.5
Z=95% confidence interval under normal curve 1.95.

The samples of respondent are taken from each PAs on the basis of the formula given by Kothari (2004).

e= acceptable error term (0.08), P and q are estimates of the proportion of population to be sampled and N=total population

Which is 3.8416x2038X0.5X0.5=
1986.1072 = 140
2067X0.0064+3.8416X0.5X0.5
14.1892

Accordingly, 140 respondents were selected out of the total 2038 from Ya'ii Caboo(756), Habebe Doyyo (784), Karra (498) kebeles using proportion to population size (PPS).

The following is the detail about the sample respondents from each kebele:

Ya'ii Cabo 756/2038*140 = 52
Abebe Doyyo 784/2038*140 =54
Karraa498/2038*140 =34

Total =140

Table.3 Sample Respondents and Techniques of Data Collection

No.	Sections	Population (Frequency)	Techniques of data collection
1	Households	112	Survey Questionnaires
2	Development Agents (DAs)	6	Key Informant Interview
4	Kebelle Administrators	3	
5	Community leaders	9	
6	Kebelle managers	3	
7	Wereda Agriculture office	1	

Method of Data Analysis

A combination of qualitative and quantitative methods was employed for data analysis. Analysis was done through Statistical Package for Social Sciences (SPSS) version 20.Quantitative data was coded and analyzed by using different statistical techniques such as, percentage and frequencies. Chi-Square test of association was done to see whether there was a statistically significant association between livelihood strategy and different predictors. All the test results with p-value less than 0.05 were considered to be statistically significant.

Multinomial Logistic Regression Analysis

Multinomial logistic regression was (Green, 2003) used to identify determinants of household's choice of livelihood diversification strategies. In this case, multinomial logit regression model was used to see the statistical relationship between dependent variable, and the independent variables.

The dependent variable which has polytomous outcome can be modeled by multinomial-logistic distribution. The response variable Ycan take on any of *m*qualitative values, which, for convenience, we number 1,2,3, …. , m(using the numbers only as category labels). In this case, livelihood diversification strategy, household can choose or prefer agriculture alone (1), agriculture and nonfarm (2), and agriculture, off farm and nonfarm(3).

The dependent variable with J outcomes, the j^{th} livelihood diversification strategy that the

i^{th}household chooses j^{th} livelihood strategy than the reference livelihood strategy. The probability that a household with characteristics X chooses livelihood strategy j, π_{ij} is modelled as:

$$\pi ij = \frac{e^{(\alpha_j + \beta_{1j} x_{i1} + \ldots + \beta_{kj} x_{ik})}}{1 + \sum_{l=2}^{m} e^{(\alpha_j + \beta_{1l} x_{i1} + \ldots + \beta_{kl} x_{ik})}}$$

j=2,…,m

Where: $\pi_{i1} = 1 - \sum_{j=2}^{m} \pi_{ij}$

$\sum_{j=0}^{J} \pi_{ij} = 1$

X_j = Predictors of response variable

α_j and β_j = Covariate effects specific to j^{th} response category with the first category as the reference.

Thus, the fitted α and β can then be used to assess the log-odds of household choose each livelihood strategy, relative to the reference livelihood strategy. That is, it estimates that the chance that, instead of choosing agriculture alone, the household chooses the other livelihood strategies. The log-odds are computed as:

$$\log\left(\frac{\pi_{ij}}{\pi_{i1}}\right) = \alpha_j + \beta_{1j} x_{i1} + \ldots. + \beta_{kj} x_{ik},$$

j=2,…..,m

So, once we fit the model, we can predict the odds of a specific livelihood strategy, relative to the reference livelihood strategy. The regression coefficients affect the log-odds of choosing j livelihood strategy versus the reference category.

Results and Discussion

Descriptive Analysis

The livelihoods approach is concerned first and foremost with people. A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. It seeks to gain an accurate and realistic understanding of people's capabilities, assets (including both material and social resources) and how they endeavor to convert these into positive livelihood outcomes.

The approach is based on a belief that people require a range of assets to achieve positive livelihood outcomes; no single category of assets on its own is sufficient to yield all the numerous and varied livelihood outcomes that people seek.

The approach seeks to group households into categories with similar opportunities and constraint. This can be done by differentiating households with their asset and access endowment into wealth categories. As a result they have to seek ways of nurturing and combining what assets they do have in innovative ways to ensure survival (DFID, 2002).

Therefore, this study employed wealth categorization and the asset approach to livelihood diversification strategy analysis. Under this section the livelihood assets that affect the wealth status and livelihood diversification strategies pursued by rural households and its outcome are described.

Table.4 Livelihood strategies of the respondents

Livelihood diversification strategy	**Frequency**	**Percentage**
Agriculture alone	57	40.7
Agriculture+nonfarm	49	35.0
Agriculture+of farm+nonfarm	34	24.3
Total	140	100.0

Source: Own Survey 2014

As we observed from the above table, from 140 sample respondents 57 (40.7%) participate in Agriculture diversification strategy 49 (35%) respondents participate in both Agriculture and nonfarm diversification strategies followed by 34 (24.3%) respondents participate in Agriculture, Nonfarm and Off-farm diversification strategies. From this, we can conclude that, most of the rural household heads are engaged only in farming activities rather than diversifying different livelihood activities.

Multinomial Logistic Regression Analysis (Econometric model)

Table.5 Summary of Model Analysis

Parameter Estimates							95% CI for Exp(B)	
Livelihood diversification strategy	B	Std. Error	Wald	df	Sg.	Exp(B)	Lower boundary	Upper boundary
Agriculture and nonfarm								
Intercept	-3.069	1.817	2.851	1	.091			
FAMILY	-.173	.157	1.227	1	.268	.841	.619	1.143
LAND	.340	.134	6.478	1	.011	1.405	1.081	1.825
LIVESTOK	.202	.059	11.542	1	.001	1.224	1.089	1.375
DEPR	-.437	.245	3.191	1	.074	.646	.400	1.043
[Sex=male]	1.921	.729	6.945	1	.008	6.827	1.636	28.490
[EDUCAT=Illiterate]	.341	1.033	.109	1	.741	1.406	.186	10.651
[EDUCAT=grade 1-4]	-2.351	1.037	5.141	1	.023	.095	.012	.727
[EDUCAT=grade 5-8]	1.125	1.131	.988	1	.320	3.079	.335	28.278
[AGROECO=low land]	-2.128	.892	5.693	1	.017	.119	.021	.684
[AGROECO=middle land]	.426	.782	.296	1	.586	1.531	.330	7.091
[CoopM=coop member]	-2.390	.833	8.230	1	.004	.092	.018	.469
[CREADT=credit user]	2.559	1.267	4.079	1	.043	12.923	1.079	154.827
[MKTAVAL=have nearby market]	-.789	.723	1.191	1	.275	.454	.110	1.874
[AFANSOOR=involved in 2 social net work]	2.223	.758	8.596	1	.003	9.234	2.089	40.811
[SOOFCR=micro finance]	2.274	1.226	3.440	1	.064	9.718	.879	107.463
[SOOFCR=relatives&	1.697	1.058	2.573	1	.109	5.460	.686	43.446

friends]								
Agriculture, off farm and nonfarm Intercept	-2.597	2.186	1.411	1	.235			
FAMILY	-.249	.158	2.473	1	.116	.780	.572	1.063
LAND	.160	.139	1.331	1	.249	1.174	.894	1.542
LIVESTOK	.086	.065	1.745	1	.187	1.090	.959	1.238
DEPR	-.068	.248	.075	1	.784	.934	.575	1.519
[Sex=male]	3.776	1.256	9.037	1	.003	43.621	3.721	511.382
[EDUCAT=Illiterate]	-.120	1.060	.013	1	.910	.887	.111	7.086
[EDUCAT=grade 1-4]	-1.732	1.025	2.857	1	.091	.177	.024	1.318
[EDUCAT=grade 5-8]	1.050	1.178	.795	1	.373	2.858	.284	28.762
[AGROECO=low land]	-4.063	1.040	15.271	1	.000	.017	.002	.132
[AGROECO=middle land]	-.163	.824	.039	1	.843	.850	.169	4.270
[CoopM=coop member]	-.121	.812	.022	1	.882	.886	.181	4.352
[CREADT=credit user]	2.886	1.115	6.706	1	.010	17.925	2.017	159.284
[MKTAVAL=have nearby market]	-2.435	.803	9.202	1	.002	.088	.018	.422
[AFANSOOR=involved in 2 social net work]	1.582	.848	3.483	1	.062	4.864	.924	25.613
[SOOFCR=micro finance]	1.902	1.482	1.646	1	.199	6.697	.367	122.348
[SOOFCR=relatives& friends]	1.550	1.275	1.478	1	.224	4.714	.387	57.413

The reference category is *agriculture alone*

Parameter Estimates for the Final Model

As can be seen in the table 5, for the "agriculture and non-farm" versus "agriculture alone" independent variables: land, livestock, gender, cooperative membership status, credit use and social network affiliation were statistically significant. Therefore, variables were found to be significant factors in distinguishing household heads choice between engaging in agriculture and non-farm or agriculture alone.

The odds ratios (Exp(B)) greater than 1 indicate, the more likely for the event of interest. Since, independent variables land, livestock, gender, credit use and social network affiliation have Exp(B), odds ratio greater than 1, they influence household heads to engage in agriculture and non-farm than relay on only agriculture alone. The odds that a household head who have been using credit to be engaged in "agriculture and non-farm" than "agriculture alone" is 12.923 times more compared to the household head who do not use credit. Similarly, as a household head own one hectare extra land, the odds of engaging in "agriculture and non-farm" than "agriculture alone" increased by the factor of 1.405. In other word, having one hectare extra land increases the odds of engaging in agriculture and non-farm" than "agriculture alone" by 40.5% (|1.405 - 1|*100%=40.5%).

In the comparison of household heads who engaged in "agriculture, off farm and non-farm" versus "agriculture alone", it was found that the two groups were indistinguishable by the variables: gender,

credit use status and availability of nearby market.

The odds that a male household head engages in more diversified livelihood (agriculture, off farm and non-farm) than relying on "agriculture alone" is 43.621 times more compared to female household head. Similarly, the odds that a household head who have been using credit to be engaged in "agriculture, off farm and non-farm" than "agriculture alone" is 17.925 times more compared to the household head that do not use credit.

Table.6 Classification table

Classification				
	Predicted			
Observed	agriculture alone	Agriculture +non- farm	Agriculture + off farm+ nonfarm	Percent Correct
agriculture alone	47	7	3	82.5
Agriculture +nonfarm	7	35	7	71.4
Agriculture +off farm+ nonfarm	3	10	21	61.8
Overall Percentage	40.7	37.1	22.1	73.6

According to the classification table output shown in table 4.19 above, multinomial logistic regression model is adequate enough to correctly classify about 74% of the cases.

Model results

Under this section important variables, which were hypothesized to influence rural households' choice of livelihood strategies, were identified and analyzed using multinomial logit model. The analysis was made by s SPSS (Statistical Package for Social Science) software version 20.0. The model result is presented below.

Various goodness-of-fit measures were checked and the results validate that the model adequately fits the data as the significance level is reasonably greater than 0.1. The overall goodness-of-fit measured by significance of Chi-square statistic is very high *(χ^2 = 291.98 df = 1.36, Sig. = 1.000)*. From these figure, the Likelihood Ratio Test Statistics (LRTS) exceeds the Chi-square final value at less than 1% probability level. This means that the null hypothesis that all effects of the independent variables are zero can be rejected. The value of Pearson Chi-square test too shows the overall goodness-of-fit of the model at less than 1% probability level. The Pseudo R Square that measures the percentage of variation in the dependent variable explained by the model is good (Nagelkerke = 0.92).

To determine factors that affect livelihood diversification strategy of the rural household, categorical data analysis in which the dependent variable is qualitative is deemed appropriate (Adunga, 2008). When there are more than two alternatives among which the decision maker has to choose (i.e. unordered qualitative or polychromous variables), the appropriate econometric model would be either multinomial logit or multinomial logit regression models. The dependent variable

in this study is diversification strategy of livelihood is a polychromous variable. Consequently, a multinomial logit model is applied when the categorical dependent outcome has more than two levels (Alwang et al., 2005; Brown et al, 2006; Jansen et al., 2004). Multinomial logit model was selected not only because of its computational ease but also it exhibits a greater ability to envisage livelihood diversification strategy and picking up the differences among the livelihoods strategies of rural households (Chan, 2005; Jansen et al., 2004). Therefore, rural households used multinomial logit model in this study in order to identify factors affecting rural household's diversification strategies of livelihood.

Interpretation of Econometric Model Results

Sex of household head (SEX): Sex was hypothesized to affect rural household livelihood diversification strategy since men and women have differentiated social roles in the community. Significant by χ^2 value = 12.93 P value 0.002 and df =2. Gender affects diversification strategies, including the livelihood activities (all farm, non-farm and off-farm) due to culturally defined roles, social mobility limitations and differential ownership of access to assets (Galab *et al*, 2002). In the study, as expected sex of household head is found to negatively and significantly (< 0.05) influences diversification of livelihood activities. This result implies that by the virtue of being male-headed household is more likely gravitated to participate in agriculture and agriculture plus off-farm activities than female-headed households do.

Credit use (CREDIT): As expected, credit use is found to have a significant ($p<0.05$) positive impact on the likelihood of livelihood diversification strategy which include all dependent variables agriculture alone, AG + Non-farm and AG +Non-farm +Off-farm. The odds ratio of for agriculture plus non-farm indicates that keeping the influence of other factors constant, the decision to participate in agriculture increases by about 40.71.% .

This implies that the formal and informal credit facilities that avail for rural farmers are a very important asset in rural livelihoods not only to finance agricultural inputs activities, but also to protect loss of crucial livelihood assets such as cattle due to seasonal food shortage, illness or death (Tesfaye, 2003). The result is inconsistence with that of Holden *et al*., (2004); Brown *et al.*, (2006), Berhanu (2007), Khan (2007) and Adunga (2008). This implies that the incentive for accessing credit accelerates AG + Non-farm and AG +Non-farm +Off-farm l livelihood strategies production.

Conclusion

From the finding of the research, it is clear that the agricultural sector alone cannot be relied upon as the core activity for rural households as a means of improving livelihood, achieving and reducing poverty in the study area. Livelihood diversification is gaining/playing prominent role in rural households' income and food security. Even though, regarding the rural economy in Ethiopia, policy makers give almost full attention to agricultural sector. Nevertheless, there is a growing evidence that rural sector is much more than just farming.The result of this study indicated that low resources endowments was main characteristics of livelihood diversification strategies and this meager resource could not enable them to generate sufficient livelihood outcome. To overcome the situation, majority of poor households depend on other livelihood options rather than agriculture, which is not

worthy. Results suggest that different livelihood diversification strategies are influenced by different factors. The model result indicated that out of the 17 hypothesized variables in the model, 9 were found to be significantly influenced household's adoption of alternative livelihood strategies at less than 10% probability levels. These variables include agro-ecology, sex, education, farmland size, family size, livestock ownership, participation in social institution, membership to cooperatives, contact to extension agent , source of credit, age, and. Accordingly, the model result indicated that the age of household head, agro-ecology and nearest market distance influenced positively and significantly the choice of farming + non-farming, while the ownership of livestock in TLU and total farm size negatively and significantly affected the diversification of livelihood into non-farm, off-farm and combining non-farm and off-farm activities. Further, the variable education had positively and significantly influenced the household choices of farm +nonfarm, farm + off-farm and farm + nonfarm & off-farm activities, Similarly, contact with extension agent had negative and significant influence on the household decision of selecting diversified livelihood strategies into farm + off-farm activities, while agricultural training had negative and significant influence on livelihood strategies choice of farm plus nonfarm and off farm activities.

Recommendations

Based on the findings of the study, the following recommendations are possible areas of intervention, which might help to adopt best alternative livelihood diversification strategies in Ambo District or the study area particularly and in general as a whole.

- The important roles of education and training in diversification of livelihood strategies suggests to give due attention in promoting farmers' education through strengthening and establishing both formal and informal type of education, developing farmers' training centers, expanding technical and vocational schools.
- The negative and significant influence of the variable sex on household livelihood strategies choice considers government and other responsible bodies to design necessary strategies to create awareness among the community to participate women equally with man in all development activities.
- The significant and positive effect of age on adoption of non-farm activities calls policies instruments to build capacity of rural farm households in the area of non-farm activities in order to enhance their skill to exploit the opportunity sustainably. ·
- The significant role of livestock ownership in livelihood diversification suggests to design development strategy for livestock sector through improving livestock marketing, access to credit and overall management of livestock production that aimed at improving rural household welfare and increases supply.
- The negative and significant impact of farmland size on livelihood diversification suggests concerned bodies to develop appropriate strategies and policies especially for land resource-poor farmers. It also concerns promoting and creating positive environment for the emerging livelihood alternatives like non-farm and off-farm activities.
- The presence of very small size of land calls for giving emphasis in agricultural

intensification to enhance the productivity of the land so that generate adequate income and food.

The agro-ecological influence on diversifying livelihood strategies has great implication for government to design context specific intervention and technologies, which can improve the livelihood of rural household.

The strong positive association of total annual cash income on livelihood strategies of the household calls for policy measures to pave the way in order to solve financial problems through developing and strengthening financial institution, creating credit access and promoting better income generating options.

The strong negative association of source of credit use with the diversification of livelihood strategies into farm + off-farm activities considers promoting micro finance institutions coupled with appropriate credit services.

The positive and significant influence of households' participation in social institutions on the choice of livelihood diversification strategies points the direction to create access to information and other necessary services like credit for people in the same community. This also considers government and other responsible bodies in building capacity through education and training to participate actively in social activities and leadership.

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