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Review Article

Determinants of Household Rural Poverty in Tenta Woreda, South Wollo Ethiopia

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ABSTRACT

Poverty in Ethiopia is multidimensional caused by a set of factors ranging from those related to past macroeconomic policies and socio-political history of the country. This study examines rural poverty and its determinant at household level. Primary data were collected by using structured questionnaires, interview and focus group discussion. Secondary data also used from different published and unpublished materials. The results are based on the data collected from three selected peasant associations about 196 rural household were taken by simple random sampling. The researcher used foster greer-thorbecke, binary logistic regression model, descriptive statistics and cost basic needs to find out the determinants of rural poverty at household level. The result of the analysis indicates that poverty status is strongly associated with almost all variables. Household head sex, household family size, and land holding size, oxen and other livestock, small ruminant holding size are significantly important determinants of rural poverty in the study area *i.e.* households headed by females and big size of the family experience more poverty in the study area. On the other hand, variables such as land, oxen, livestock and small ruminant holding size negatively related with poverty so that households with larger number of land, oxen, livestock and small ruminant are better off than those with smaller number. It is recommended that integrated agricultural research and extension program, family planning, reducing gender based labor division, land distribution and promotion of effecting resettlement program would have indispensable role to reduce poverty in the area.

Keywords: Rural poverty; Determinants; Household; Tenta; Family planning

INTRODUCTION

One of the most significant problems today is the uneven distribution of wealth and resulting impoverishment of certain areas of the world. Accordingly, Shah pointed out that a few get wealthy while the majority struggle in the global context as a result of the enormous external influence, behind the internal reasons, of global decisions, policies and practices by the leaders of rich countries and other global actors in the name of globalization that makes the governments of poor nations and their people often powerless.

At the current situations, there is a wide gap of wealth between the poor and rich countries of the world. For example, out of the world GDP of $ 75.5 trillion for the year 2016, about 48.44% was accounted by the major advanced economies (G7) and European Union. In contrast, 13% (954 million) people of less developed countries shares USD 952 in the same year from the above total GDP that means these regions has less than 9% GDP of the world average. Besides this inequality, the world poverty reveal a higher number of people live in poverty than previously known. For instance, world bank revealed the 1.2 billion people live on or below the measure of the new poverty line of $ 1.25, nearly half of the world population (over 3 billion) live on less than $ 2.5 a day, and at least 80% of humanity lives on less than $ 10 a day [1].

The poorest people have less access to nutrition, health, education, sanitation and water as well have little representation or voice in public and political debates/decisions. Thus, 22,000

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children (UNICEF) die each day due to poverty; about 28% of all children of primary school age in the developing world were out of school, 1.1 billion in developing countries had not adequate access to water and 2.6 billion lack basic sanitation, 640 million out of 1.9 billion children (1 in 3) were without adequate shelter, 270 million (1 in 7) with no access to safe water, 2.5 billion people were forced to rely on biomass fuel wood, charcoal and animal dung to meet their energy needs for cooking [2].

According to Begna and Paul, poverty in most parts of the world remains mainly a rural phenomenon where agriculture is the dominant stay of livelihood. The large and persistent gap between the share of agriculture in GDP and employment suggests that poverty is concentrated in the agricultural and rural areas, *i.e.*, many of the rural poor are likely to remain poor while the non-agricultural growth accelerates. This is evidenced by the fact that rural areas account for three in every four people living on less than $ 1.0 a day [3].

Regionally, poverty is more concentrated and shifting towards South Asia and Sub-Saharan Africa with 80% of people in these regions still surviving on less than US$1.25 a day, but it is more severe and worse in Sub-Saharan Africa (47% of the population) than South Asia (with 33%). In 2010, the HDI of Sub-Saharan Africa with the value of 0.460 stood the lowest as compared to South Asia and the world average of 0.697. According to the world bank estimate based on current trends, more than 0.6 billion people would live in extreme poverty in 2015 while 90% of them would be in South Asia (with 216 million) and Sub-Saharan Africa (340 million which accounts more than 56% of the world) [4].

LITERATURE REVIEW

Ethiopia, being one of the least developed countries of Sub-Saharan Africa, has a population of approximately 107.53 million, up from 2015's estimate of 98.9 million with a mosaic of ethnic group and the area of 1,104,300 million km^2, with complex land features, diverse climate and a wide variety of fauna and flora. About 80.08% of the population is rural and the economy is highly dependent on agriculture which has long history with relatively better success than its today's performance. In line with this, Ethiopia had been self-sufficient in food production and was categorized as a net exporter of food grain till the late 1950's. But from the 1960's onwards the food gap ever widened and Ethiopia becomes a net importer [5].

By understanding this challenge the current government implemented the ADLI strategy to be self-sufficient in food production and to ensure food security in long run. According to Hussen, the government of Ethiopia gives more attention to reduce poverty through increasing productivity in the agriculture sector by adopting ADLI with the objective to match population growth and productivity as well as offer technical and institutional support to farmers. In line with this, Ethiopia stepped-up on a structural adjustment programs during the 1990's which have changed to Ethiopian Sustainable Development and Poverty Reduction Program (SDPRP) with the aim to follow the UN millennium development goals by creating more market oriented and less state-dependent agriculture. Despite of the above strategic efforts, food insecurity as well as pervasive and structural poverty are appalling in the country due to land degradation, erratic conditions, depletion of natural resources, shortage of land and other household assets, limited opportunity for livelihood diversification, limited capacity of the government to introduce new farming technologies through adequately organized extension services and inability of agricultural production to pace with the rapid population growth [6].

Different studies that have been carried out in different parts of Ethiopia shows the spatial variation of poverty in the country and argued Wollo as one of the most impoverished areas. By taking these into account, the researcher was focused in Tenta Woreda, which is part of Wollo and has been repeatedly exposed to recurrent drought and livelihood crisis, to investigate the level and determinants of rural poverty at the household level [7].

The study is survey research design. Both quantitative and qualitative approaches were used symbiotically to cancel the limitations of a single one, understand social phenomena and to strengthen the finding and relevance of the study. Both primary (quantitative and qualitative) and secondary data (published and unpublished sources) was gathered using questionnaire (closed and open ended questions) in English and Amharic version languages tested by pilot study and then administered by trained data collectors. In-depth interview was administered through semi-structured schedule from Woreda level authorities and focus group discussion. Samples were selected by considering agro-climatic zones of peasant associations to account spatial variation and stratifying 31 peasant associations (rural kebeles) from sampling frame into three categories. Then, a sample of one peasant association from each agro-climatic zones selected using simple random sampling technique (Tables 1 and 2). Lastly, the total sample is determined by using the following formulae [8].

z^2pq

n=E2

Where; n is the number of samples

p is assumed incidence of chronic poverty by taking value for Wollo (15% or 0.15%)

q is 1-p, *i.e.*, 0.85

E is the allowable error (0.05)

z is the Z-score of 95% confidence (1.96)

Table 1: Sample households in each peasant associations.

Peasant association	Agro-climate	Total households	Sample households
Meserebi	Dega	1213	76
Cheleme	Woina dega	915	58
Shola Weha	Kola	980	62
Total		3108	196

Table 2: The list of independent variables.

No	Explanatory variables	Variable type
1	Age of the household head	Continuous
2	Educational status	Dummy
3	Sex of the household head	Dummy
4	Household size	Continuous
5	Age dependency ratio	Continuous
6	Farm land size of household	Continuous
7	Oxen holding	Continuous
8	Livestock holding (TLU)	Continuous
9	Small ruminant ownership	Continuous
10	Bee ownership	Dummy
11	Engagement in off/non-farm activities	Dummy
12	Utilization modern agricultural input	Dummy
13	Saving habit	Dummy
14	Credit access Dummy	Dummy

Here, the magnitude of chronic poverty of Wollo which is 15% or 0.15% used as the p value to determine the minimum sample size since there is no other study in the particular study area on poverty. Accordingly, the number of the sample households was 196 proportionally out of the total 3108 households of the three peasant association (Table 3).

Table 3: Household demographic characteristics.

Characteristics of HHs	Frequency	Percentage
Sex		
Male	138	70.41
Female	58	29.59
Total	196	100
Education		

Illiterate	124	63.27
Elementary	51	26.52 48
Primary	21	10.71
Total	196	100
HHs size		
01-03	22	11.23
04-06	93	47.45
07-09	65	33.16
10-12	16	8.16
Age category		
<25	6	3.06
26-35	22	11.23
36-45	73	37.25
46-55	62	31.63
56-65	23	11.73
>65	10	5.1
Total	196	100
Marital status		
Married	140	71.43
Divorced	35	17.85
Widowed	15	7.65
Unmarried	6	3.06
Total	196	100

In addition eight key informants (six agricultural development agents and two head WARDO and Woreda administrator) and seven focus group discussion participant (male household head who conducts and do not conducted none/off-farm activity and a woman household heads from each agro-climatic zone) were chosen purposively [9].

The researcher used both quantitative and qualitative methods of data analysis. The researcher analyzed extent and magnitude of rural poverty by using CBN method was which is preferred over the others as it offers a monetary value of a poverty line that accounts both for the food and non-food components. The researcher also measured the level of rural poverty (incidence, depth and severity) by using Foster-Greer Thorbecke (FGT) mathematical model of poverty. The researcher also compared the magnitude of rural poverty with reference to two alternative poverty lines. One is the international standard of US $ 1.25 per day per person as estimated by the WB, the second poverty line is poverty lines consisting of 25% less than and more than the standard poverty line of the Woreda to identify severe and moderate poverty respectively [10].

The researcher also used logistic regression model like linear probability model to examine the determinants of rural poverty due to possibility of very large prediction errors and certainty-prone prediction of outcomes as it has powerful predictive power; is less restrictive and less sensitive to outliers; easy to correct a bias; and has no formal requirement for multivariate normality, homoscedasticity, or linearity of the independent variables. Finally, the result of the analysis was presented by

using different statistical diagrams such as tables, graphs and pie-charts; and then discussed in terms of paragraph [11].

Model specification

Logistic regression model was employed, with the dependent variable being the dichotomous variable of whether the household is poor (1) or non-poor (0) to analyze the determinants of rural household poverty. It can be used to predict a response variable on the basis of continuous, dichotomous or a mix of any of predictor variables to determine the percent of variance in the response variable explained by the predictor variables; to assess interaction effects; and to understand the impact of covariate control variables. It is also a flexible model. To this effect, this study adopted and employed binary logistic regression model (Logit model) for more than one independent variable as described here under [12].

Prob (event) = eZ ⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯ (1) $1 + eZ$

Or equivalently, Prob (event) = 1 ⋯⋯⋯⋯⋯⋯ (2) $1 + e\text{-}Z$

Where, e is the base of the natural logarithms, approximately 2.718

Z is the linear combination of independent variables written as

$Z = Bo+B1X1+B2X2+...+BpXp$ ⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯ (3)

Where, Bo and B1 are coefficients to be estimated from data.

X is the independent variable.

Dependent variable (y) and Explanatory variables (X_i)

Rural household poverty was the dependent variable which was dichotomous and designated by a value of zero for the poor households and one for the non-poor households. The lists of explanatory variables-which include both categorical and continuous.

RESULTS

Respondents background

The demographic characteristics of the Woreda includes 70.41% male headed and 29.59% female headed household with average family size minimum 1 and maximum 12 children. From the same table, 63.27% of the respondent cannot read and write and the rest respondents 36.73% are literate.

Extent and magnitude of poverty

With regard to extent and magnitude of poverty (computing the three indices of poverty *i.e.* incidence, depth and severity), about 66.1% of the households live in absolute food poverty [13]. The incidence was found to be significantly higher than 42% for kersa kondaltity Woreda in Oromia region and 63% for Zeghe Peninsula. The food poverty gap of the Woreda was found to be 35.39%. Accordingly, the average consumption shortfall required to bring the poor to the food poverty line was found to be 35.39% of the food poverty line [14]. The gap was also found to be higher compared to 27.6 and 31.52% for Zeghe peninsula and Kara Kondaltity Woreda respectively. Food poverty severity was found to be 17.25% which is significantly higher than that of 14.73% for Zeghe Peninsula and 11.54% for Kers Kondaltity Woreda (Table 4).

Table 4: Extent and magnitude of food poverty.

Poverty	Incidence	Depth	Severity
Food poverty	0.661	0.3539	0.1725

The extent and magnitude of total poverty

The total poverty incidence of the Woreda was found to be 67.3%, which is higher than those of Zeghe Peninsula, 40.5% for Kersa Kondaltity Woreda respectively. Poverty gap of the Woreda was found to be 37.43% which is significantly higher than 27.18% of Kersa Kondaltity Woreda, 12.2% of the national average and 32.8% of Zeghe Peninsula. Poverty severity index of Tenta Woreda was found to be 22.39%, which exceeded significantly 4.6% of the national average, 18.7% of Zeghe Peninsula and 9.89% of Kersa Kondaltity Woreda (Table 5).

Table 5: The extent and magnitude of total poverty.

Poverty	Incidence	Depth	Severity
Total poverty	0.673	0.3743	0.2239

Households' demographic characteristics and poverty

The study examines the existence of any systematic relationships between certain important demographic characters such as sex, age, educational level of household heads, dependency ratio and household size and household poverty.

Age and poverty: In this study, it was hypothesized that families with younger household heads were assumed to be poorer than families headed by elders. This is because of the fact that older households heads presumed to have accumulated more assets, better farmland holding and more than those young. As shown in Table 6, out of the total 196 household heads 37.25% and 31.63% household heads were found to be between the age

category of 36-45 and 46-55 respectively. The mean age for the entire sample size was 45.80 years with standard deviation of 10.955. Besides, the age of the household heads was examined among the three PAs based on agro-climate and *chi-square* test was run to see the association [15]. The *chi-square* result shows that there is no significant association of the age of the household heads among the three agro-climatic zones with the x^2 value of 13.229 and p value of 0.211.

Table 6: Household heads' age and poverty.

Age category	Total		Poor		Non-poor	
	Frequency	%	Frequency	%	Frequency	%
≤25	6	3.06	5	1	1.56	3.79
26-35	22	11.23	15	11	7	10.94
36-45	73	37.25	48	36.36	25	39.06
46-55	62	31.63	42	31.82	20	31.25
56-65	23	11.73	14	10.61	9	14.06
≥66	10	5.1	8	6.06	2	3.13
Total	196	100	132	100	64	100
Mean			45.55	46. 31		
SD			11.417	10.001		
Test of significance						
T-test result (5% significance level)						
Value		**Sig. level**	**Df**			
-0.459		0.647	194			
Min=18		Max=75				

Accordingly, the cross-tabulation of age and poverty shows that 3.79%, 11.36%, 36.36% out of the total 132 (100%) poor category whereas 1.56%, 10.94%, 39.06% out of the total 64 (100%) non-poor households were found to be within the age category of ≤25, 26-35, 36-45 respectively. This indicates that there is not much difference of poverty status (poor and non-poor) of households in different age groups. Hence, t-test was run to test the relationship between the age of the poor and non-poor and the result shows that the mean age of the poor and non-poor households was found to be 45.55 and 46.31 with the standard deviation of 11.417 and 10.001. This age variation does show statistically insignificant relationship between the two groups with the t value of -0.459 and p value of 0.647.

This is consistent with the data obtained through interview and FGD about the incidence of poverty in relation to household age in their areas through open ended question. The key informants and FGD participants affirms that poverty situation does not vary with age of household heads' age due to the activeness of heads in lower age to participate in different activities (high labor productivity) with small family size although they have low assets; high productivity and better assets than the lower ages but large family size in medium age; and relatively higher accumulation of wealth, low family size and better work experience but low labor productivity in higher age.

Educational status and poverty: The study cross tabulated and examined the educational status of household heads among the three PAs on the basis of agro-climate by using *chi-square* test in order to show the association. The result shows that there is no association of literacy status among the three PAs with the *chi* value of 2.378 and p value of 0.305 [16]. Based on the disaggregation, the illiterates constitute 63.64% and 36.36% of the poor and non-poor while the literates (ranging from only read and write to second cycle primary education) constitute the remaining 36.36% and 37.50% of the poor and non-poor households, in order. *Chi-square* test was run to test whether households with illiterate heads are more prone to poverty than literate heads. The result showed that there is no significant statistical difference between the literacy status of the poor and non-poor households with the *chi* value 0.024 and p value of 0.877. This tells that educational status and poverty do not have relationship in the study area (Table 7).

Table 7: Household heads' educational level and poverty.

Educational level	Total		Poor		Non-poor	
	Frequency	%	Frequency	%	Frequency	%
Illiterate (can't read and write)	124	63.27	84	63.64	40	62.5
Elementary (1-4)	51	26.02	33	25	17	26.56
Primary (5-8)	21	10.71	15	11.36	6	9.37
Total	196	100	132	100	64	100
Test of significance						
X^2-test result (5% significance level)						
Value		**Sig. level**	**Df**			
0.024		0.877	1			

The key informants and focus group discussion participants also made clear that the more educated household heads, although they are small in number, passed their time in education rather than accumulating farming assets like livestock and small ruminants although they try to implement better way of production. Besides this, household heads grant less farm assets like farmland for the educated newly separated members to establish a new household than the non-educated.

Household head's gender and poverty: In this study, female-headed households' accounts for 29.59% while the male-headed households account 70.41%. The cross tabulation of sex and PAs by using *chi-square* test demonstrated that there is no significant contingency of household heads' sex among the three PAs with the *chi* value of 1.290 and p value of 0.525. The disaggregation also shows that the female-headed households found to account over one-third (35.61%) of the total poor, only less than a quarter (17.19%) of the total 64 non poor sample households. On the other hand, the male-headed poor households account for 64.39% of the total 132 poor households and 70.41% of the total 64 non poor households. Hence, the test by *chi-square* shows that there is significant systematic contingency relation between sex of the household head and their poverty status with the x^2 value of 7.018 and p value of 0.008 (Table 8).

Table 8: Household heads' sex and poverty.

Age category	Total		Poor		Non-poor	
	Frequency	%	Frequency	%	Frequency	%
Male	138	70.41	85	64.39	53	82.81
Female	58	29.59	47	35.61	11	17.19
Total	196	100	132	100	64	100
Test of significance						
X^2-test result (5% significance level)						
Value			**Sig. level**	**Df**		
7.018			0.008	1		

The interview and discussion with the focus group contend that there is variation of the poverty status of households on the basis of household heads' sex. The tradition of the Woreda discourages women's productivity in different ways. For instance, women expected not to be able to plow farmland as a result women plowing is strictly forbidden by the norm. They are also deprived in productive agricultural resources like land. Accordingly, women could only have access to land through marriage in the Woreda's culture unlike giving land for the new established male household; and even a widow's land still

belonged to the husband. Women, most often, do not obtain farmland from their ex-husbands at the time of divorce.

Household size and poverty

About 47.45% household heads were found to be within the family size category of 4-6 with the mean family size for the total households of 6.14 and the standard deviation of 2.533. The average family size of the study area was significantly higher than that of the regional and national average. *Chi-square* test was run to see if there is significant difference in family size among the three sample PAs and the result showed that there is no systematic contingency difference with *chi* value of 8.934 and p value of 0.177. The disaggregation also indicates that more than four-fifth (92.19%) of the total non-poor households was found to have six and less members. Contrarily, more than two-third (41.32%) of the total poor households were found to have seven and more members of a family. The t-test, which was run to test the hypothesis that households with small family size tend to be better off than those with large family size, shows that there is significant statistical difference between the household size of the poor and non-poor (t=4.953 and p=0.000) (Table 9).

Table 9: Household's family size and poverty.

Category	Total		Poor		Non-poor	
	Frequency	%	Frequency	%	Frequency	%
01-03	22	11.23	16	12.12	6	9.38
04-06	93	47.45	40	30.3	53	82.81
07-09	65	33.16	61	46.22	4	6.25
10-12	16	8.16	15 5	11.36	1	1.56
Total	196	100	132	100	64	100
Mean	6.14		6.73	4.92		
SD	2.533		2.749	1.384		
Test of significance						
X^2-test result (5% significance level)						
Value			**Sig. level**	**Df**		
4.953			0	194		
Min=1			Max=12			

The focus group discussion participants and key informants also contend that most of the households in the study area give birth to children not only in search of their labor but also due to their perception children are gift of god and assets by themselves. However, households with large family size were highly prone to poverty due to lack of other productive assets mainly land. In addition, frequent birth has a negative impact on the economic productivity of mothers by prohibiting them from conducting agricultural and other activities in home on the one hand and it leads them to cost money for medication on the other hand. This in turn affects the wellbeing of the whole members of the household. Consequently, poverty status of households is aggravated by large family size.

Age dependency burden and poverty: The study used the year categories of ≤15, 15-64 and 65 ≤ as the age of young, adult and old respectively. Dependency burden of the Woreda was calculated by the non-working population in the young and old age groups, on the working age population. The result indicates that 27.55%, 64.29% and 8.16% out of the total 196 households were found to be in the dependency burden categories of 0-75, 75.1-150 and 150.1-225. In this study, the minimum and maximum age dependency of households was found to be 0.00 and 200.00.

Generally the age dependency ratio of the Woreda was indicates 98.4293 economically inactive persons per 100 exceeding national dependency ratio. On the basis of the disaggregation, the dependency burden categories of 0-75 constituted 21.21% out of 132 total poor and 40.62% out of 64 total non-poor households respectively. The result showed that there is no statistically significant difference between the age dependency burdens of the two groups with the t value of 0.831 and p value of 0.407. On average, the mean age dependency burden was found to be higher for poor households than the non-poor ones, *i.e.* 100.42 and 94.3191 with the standard deviation of 44.54161 and 55.05658 respectively. This might be due to lower contribution of labor than the other assets on the poverty status of households (Table 10).

Table 10: Household's age dependency burden and poverty.

Age category	Total		Poor		Non-poor	
	Frequency	%	Frequency	%	Frequency	%
0-75	54	27.55	28	21.21	26	40.62
75.1-150	126	64.29	94	71.21	32	50
150.1-225	16	8.16	10	7.58	6	9.38
Total	196	100	132	100	64	100
Mean			100.42	94.3191		
SD			44.54161	55.05658		
Test of significance						
x^2-test result (5% significance level)						
Value			**Sig. level**	**Df**		
0.831			0.407	194		
Min=0			Max=225			

The response of key informants and focus group discussants was consistent with the survey result and they justify this as due to the participation of youngsters and elders in farming activities like looking after cattle, sheep and goats; harvesting crops; and undertaking other domestic activities like cooking wot (curry). They also added that the influence of age of household members on the poverty status of the household is little because most of households in the area have adequate labor needed to conduct activities on their resource.

Households' productive asset ownership characteristics and poverty

Households' asset possession affects the farmers' economic performance which in turn affects the poverty status of households. Farmers' productive assets ownership affected not only the quantity and quality of food available but also other non-food consumption. It is likely that this was because the levels of agricultural outputs were determined by the adequate and timely availability of productive resources such as land and livestock.

Households' landholding size and poverty: The land holding size of households was analyzed. About 4.59% and 5.61% were found to have landless and 1.51 hectares-2.00 hectares of land with the minimum, maximum, mean and standard deviation of 0.00, 2.00, 0.43169 and 0.5995 respectively. This indicates that about 95.41% of households had their own land although more than four-fifth (84.70%) of the households were having one and less hectares of land. About 27 households (13.78%) were found not cultivating for different reasons, which include shortage of plowing oxen, other agricultural inputs like seed, and labor accounting for 100%, 7.41% and 14.82% respectively (by allowing multiple responses). Accordingly 77.78% of non-cultivators (by allowing multiple responses) preferred and decided to share-cropping. Not much less than half (46.94%) of the farming households cultivates half a hectare and less. Thus, the study examined land holding size of the sample households in the three peasant associations on the basis of agro-climate, but the result shows that there is no significant difference among these three PAs with the *chi* value of 4.305 and p value of 0.829.

As it is evidenced from many empirical research findings, access to land is one of the critical factors determining poverty. The participants in the focus group discussion also indicated that land size was the most important factors of agricultural production and wealth disparities between households. Based on the disaggregation, about 6.82%, 51.51% of the total poor households were found to be categorized in landless, below 0.50 hectares of land with the mean and standard deviation 0.4678 and 0.32310 respectively. On the other way about 26.56% and 14.06% of the 64 total non-poor households were found to be categorized 1.01-1.50 and 1.51 hectares-2.00 hectares of land with the mean and standard deviation of 0.9375 and 0.48795 respectively. The study also demonstrates that 6.82% of the total sample poor households did not have farmland while none of the non-poor households were landless. However, the land holding size of the majority of the sample households is severely diminished due to population density. This shows that the percentage of poor becomes lower and lower than the corresponding for the non-poor households when the size of farm land increases. To test whether households with smaller farmland are more vulnerable to poverty or not t-test was run and the result indicates that the average farmland holding for

poor was found to be 0.4223 ha with the standard deviation of 0.27824 and the corresponding for non-poor households is 0.9648 ha with the standard deviation of.46314. This difference in farm size between poor and non-poor households is found to be statistically significant with the value of t -10.200 and p value of 0.000 (Table 11).

Table 11: Households' land holding size and poverty.

Land category	Total		Poor		Non-poor	
	Frequency	%	Frequency	%	Frequency	%
Landless	9	4.59	9	6.82	0	0
Below 0.50	83	42.35	68	51.51	15	23.44
0.51-1.00	74	37.76	51	38.64	23	35.94
1.01-1.50	19	9.69	2	1.51	17	26.56
1.51-2.00	11	5.61	2	1.52	9	14.06
1.01-1.50	19	9.69	2	1.51	17	26.56
Total	196	100	132	100	64	100
Mean	0.5995		0.4223		0.9648	
SD	0.43169		0.27824		0.46314	
Test of significance						
x^2-test result (5% significance level)						
Value			**Df**			
-10.2			194			
Min=0			Max=2			

The study examined the landless households how they make attempts to maintain their livelihood. Of the total 9 landless sample households, about 55.56% (allowing multiple responses) were engaged in share-cropping as a means of sustaining their life. According to the focus group discussion participants, however, these attempts could not make the livelihood of such households better. This could be due two reasons. Firstly, the farm land they share-cropped was small as a result of land shortage in the study area. In line with this, 16.67% of them cultivate 0.25 hectare of land with the average of 0.50 hectare. Secondly, the farmers who shared-crop land should share the crop produced with the owner of the land that leaves both parties with meager amount of output. On the other hand, 10.71% (21 households) of the total households that have cultivable land were found to cultivate 0.43 hectare more land on average than their own. Among them 28.57% households cultivate 0.25 hectare. The result from the focus group discussion participants and key informants made clear that landholding size has declined over the years in the community because of population pressure. Land has become scarce due to land division for newly emerged household from the already existing household as the population increases. Soil fertility has declined through time due to over-cultivation, soil erosion and deforestation; hence agricultural production became very low (Table 12).

Table 12: Household heads' oxen ownership and poverty.

Non-poor		Poor		Total		Oxen holding category
%	Frequency	%	Frequency	%	Frequency	
0	0	23.48	31	15.82	31	0
40.63	26	66.67	88	58.16	114	1

2	34	17.35	11	8.33	23	35.94
3	10	5.1	2	1.52	8	12.5
4	7	3.57	0	0	7	10.94
Total	196	100	132	100	64	100
Mean	1.22		0.88	1.94		
SD	0.9		0.606	0.99		
Test of significance						
x^2-test result (5% significance level)						
Value			**Sig. level**	**Df**		
-9.239			0	194		
Min=0			Max=4			

Household heads' oxen ownership and poverty: Like other areas of mixed farming system of rural Ethiopia, the study area is predominantly characterized by oxen-plowing for each agro-climatic zone. Thus, oxen ownership is an indispensable/essential productive asset in conducting crop production in the study area. A pair of oxen is critically needed for agricultural activities especially for plowing the farmland of a household. Despite of this table 4.10 depicts that there is shortage of oxen in the study area. Accordingly 15.82% and 3.57% out of the total 196 households were found to have 0 and 4 oxen respectively. The mean oxen ownership of the total households was found to be 1.22 with the standard deviation, minimum and maximum value of 0.90, 0.00 and 4.00, respectively. This shows that about one-fifth (20.9%) of the farming households are ox less and about three-fourth (73.98) of the households own less than a pair of oxen. This also shows that there is severe problem of shortage of oxen not only for plowing but also for clenching/clumping in order to conduct different agricultural activities like preparing the land for sowing teff. It is identified that 145 households (73.98% of respondents) have encountered draught power problem. The problem is common in the three sample PAs without significant variation on the basis of agro-climate.

Chi-square test was run to test the existence of association of oxen ownership size among the three PAs and the result affirms that there is no statistically significant association with the *chi* value of 9.601 and p value of 0.294. Therefore, the study made also an attempt to see the different measures taken by households who own nil or only one ox to prepare their lands for crop cultivation. Accordingly 69.06% out of the total 145 households with nil or a single ox identified during the survey time used "mekenajo" (share of one's ox with another's). The rest 43.45%, 35.17% and 11.72% (with allowing of multiple responses) used labor-oxen exchange, their relatives' oxen and oxen hiring respectively to overcome the problem. The focus group discussion participants indicated that labor-oxen exchange arrangement took place in terms of two days' work on the farm of the ox owner for one day's ox labor on the farm of person without ox. They also indicated that the daily hiring, which mainly used during sowing season, price is from 50 Birr to 70 Birr per a pair of oxen per day. To test the hypothesis that poor households have smaller oxen holding than the non-poor households, t-test was run. The result of the test shows that the mean oxen ownership of the poor and non-poor households was found to be 0.88 and 1.94 with the standard deviation of 0.606 and 0.990 respectively. This difference in mean oxen holding between the non-poor and poor households is statistically significant with the t value of -9.239 and p value of 0.000 (Table 13).

Table 13: Household heads' animal ownership and poverty.

Animals (TLU)	Total		Poor		Non-poor	
	Frequency	%	Frequency	%	Frequency	%
0	12	6.13	11	8.33	1	1.56
0.01-1.00	19	9.69	17	12.88	2	3.13
1.01-2.00	70	35.72	65	49.24	5	7.81

2.01-3.00	60	30.61	29	21.97	31	48.44
3.01-4.00	22	11.22	7	5.31	15	23.44
4.01-5.00	13	6.63	3	2.27	10	15.62
Total	196	100	132	100	64	100
Mean	2.0946		1.6582	2.9946		
SD	1.212		1.03566	1.04622		
Test of significance						
x^2-test result (5% significance level)						
Value			**Sig. level**	**Df**		
-8.443			0	194		
Min=0.00			Max=4.92			

The key informants and focus group discussant justified the significant difference between the oxen ownership size of the poor and non-poor households about the indispensable role of oxen to conduct crop production. Accordingly households who own a pair of oxen or more conduct repeated plowing and prepare their farmland in a good manner and get better yield too. On the other hand, households who own less than two oxen do not undertake repeated plowing and good preparation of their farmland so that they get less. As a result, these households are better off than households who own less or nil.

Livestock holding size and poverty: The focus group discussion participants and key informants contend that livestock have several uses such as a source of cash required in meeting various needs, food (such as meat, milk, butter, egg, etc.), fuel dung, organic fertilizer, hedge/security against possible future risks due to crop failure and proud. Livestock, particularly cattle are mainly reared for the purpose of plowing as well as for milk and milk products while equines play a vital role in meeting the transportation needs of the rural households. Among equines, donkeys are critical for the transportation of their products while mules and horses are for the transportation of human beings themselves. Sometimes, horses also serve as plowing animals by some households who lack oxen in Dega areas.

The *Chi square* result shows that there is contingency association among the three PAs with the *chi*-value of 26.817 and p value of 0.003. According to the disaggregation 2.27% out of the total 132 poor households and 1.56% out of the total 64 non-poor households were found to be in the animal ownership category of 3.01-4.00 and 4.01-5.00. This depicts that more than two-third (70.45%) of the total 132 poor were found to have 2.00 and less TLU while more than four-fifth (87.50%) of the total 64 non-poor were found to have greater than 2.00 TLU. This implies that the poor are characterized by smaller number of animal ownership in TLU than the non-poor as it is the backbone of the farm economy in the study area. This shows that the probability of being poor among the households decreases when their livestock possession increases. As it can be evidenced from many studies concerning household poverty, livestock possession negatively affects poverty. It was hypothesized that poor households have smaller livestock possession than the non-poor households. To test this, t-test was run and the result indicates that the average livestock holding for poor households was found to be 1.6582 TLU with the standard deviation of 1.03566 and that of the non-poor households was found to be 2.9946 TLU with the standard deviation of 1.04622. This mean livestock holding in TLU difference is found to be statistically significant with the t value of -8.443 and p value 0.000. The key informants and focus group discussant affirmed that cattle play a very important role in the study area because they provide traction power for different farm activities in addition to their role as a store of value. Hence, not only oxen but also other livestock holding show the wealth status of a farm household and are mostly negatively related to poverty (Table 14).

Table 14: Household heads' small ruminant (goat/sheep) ownership and poverty.

Remnants	**Total**		**Poor**		**Non-poor**	
	Frequency	%	**Frequency**	%	**Frequency**	%
0	32	16.33	25	22.73	2	3.13

01-May	36	18.37	30	18.94	11	17.19
06-Oct	68	34.69	57	43.18	11	17.19
Nov-15	45	22.96	19	14.39	26	40.62
16-20	11	5.61	1	0.76	10	15.62
21-15	4	2.04	0	0	4	6.25
Total	196	100	132	100	64	100
Mean	7.39		5.14	12.02		
SD	5.819		4.263	5.892		

Test of significance		
x^2-test result (5% significance level)		
Value	**Sig. level**	**Df**
t=-8.443	0	194
Min=0	Max=4.92	

Small ruminant holding size and poverty: Small ruminants especially goats and sheep play a crucial role in storing asset as well as generating cash income for immediate need. The focus group discussion participants affirmed that households in the study area keep sheep and goats for the reason that they serve as a source of cash to purchase food grain at time of crop failure or low yield and also to settle debts. There is a variation of small ruminant holding size and found that 34.69% and 2.04% out of the total 196 households, 43.18% and 0% out of the total 132 poor households, 17.19% and 6.25% out of the total 64 non-poor households were found to be in the small ruminant holding category of 6-10 and 21-25 respectively. The average small ruminants (sheep and/or goat) holding for the entire sample size was found to be 7.39 with standard deviation of 5.819. The minimum small ruminant holding is zero while the maximum is 25. The also demonstrates that households with 10 and less small ruminants constitute more than four-fifth (84.85%) of the poor but only about one-third (37.51%) of the non-poor. On the other hand, households with greater than ten small ruminants constitute about half (48.4%) of the non-poor but only less than one-third (30.61%) of the poor.

The *chi-square* test result shows that association of small ruminant holding among the three PAs was found to be statistically significant with a value of 30.06 and P-value of 0.001. This variation could be due to variations in local sub agro-ecological conditions that the extensive savanna and cool temperature of Meserbi kebele favors sheep production unlike the dry and extensively cultivated fields of shola Weha kebele. The number of non-poor households increased invariably with increasing in the number of small ruminant possession. T-test was also run to test the hypothesis and the result shows that there is statistically significant difference in the mean number of small ruminant (sheep and/or goats) possession per household between the poor and non-poor households with the t value of -9.298 and p value of 0.000. The mean number of small ruminants for the poor households was 5.14 (with the standard deviation of 4.263) which are higher than the corresponding of 12.02 (with the standard deviation of 5.892) for the non-poor households.

The key informants and focus group discussion participants also assured that there is a variation of small ruminant (sheep and goats) ownership size in the study area among households, *i.e.*, some households do not have even one while some others have twenties or more. Hence, households who had no sheep or goat are highly vulnerable to poverty since they lack such assets to generate income for security during crop failure or low production as well as to pay credits of cash money and agricultural inputs (Table 15).

Table 15: Household heads' beehive ownership and poverty.

Beehive holding category	Total		Poor		Non-poor	
	Frequency	%	Frequency	%	Frequency	%
Owners	12	6.12	9	14.06	3	2.27

Non-owners	184	93.88	129	87.73	55	85.94
	Test of significance					
	x^2-test result (5% significance level)					
Value			**Sig. level**	**Df**		
10.424			0.001	1		

Bee keeping and poverty: Despite of the potential of the Woreda, the practice of bee keeping was found to be too low. About 93.88% of the households were found to have not beehives while only the remaining 6.12 percent of the households have beehives. About 77.17% of the total 184 bee hives less households reported that lack of bees hindered them from having beehives. Here, t-test was run to test the hypothesis and the result shows that there is statistically significant association between poverty and beehive ownership with the *chi* value of 10.424 and p value of 0.001 (Table 16).

Table 16: Household heads' non/off-farm participation and poverty.

Category	Total		Poor		Non-poor	
	Frequency	%	**Frequency**	%	**Frequency**	%
Participants	75	38.27	63	47.73	12	18.75
Non-participants	121	61.73	69	56.27	52	81.25
Total	196	100	132	100	64	100
Test of significance						
x2-test result (5% significance level)						
Value			**Sig. level**	**Df**		
X^2=15.321			0	1		

Household heads' engagement in non/off-farm activities and poverty: The study found out that other ways of getting income are off/non-farm activities conducted by the households to supplement meager farm incomes. The result of the study shows that about 61.73% of the farmers are engaged in off/non-farm income generating activities. Off/non-farm employment activities in the study area mainly consist of agricultural wage labor, selling of firewood and grass, weaving, selling charcoal, carpentry, blacksmithing, mesob sifet, tannery, retailing, basketry, livestock trading, money lending with arata, tailoring, selling local liquor and the like. *Chi-square* test was used to examine the existence of statistical difference between poverty and engagement in off/nonfarm income generating activities. The result of the *chi-square* test shows that there is statistically significant systematic relation between poverty and off/non-farm activities with the *chi* value of 15.321 and p value of 0.00.

The key informants and FGD participants also contend that off/non-farm activities are commonly practiced by the poorest households to compensate their deprivation in agricultural productive assets as a copping mechanism while the economically better farmers do not give emphasis. The study also found out the reasons for the absence of household members participating in off/nonfarm income generating activities among the non-participant households since only 38.27% of the sample households engage in these activities. Thus 75.21% and 2.48% of the total 121 non-participants responded as due to skill constraint and labor constraint respectively by allowing multiple responses (Table 17).

Table 17: Household heads' adoption of modern agricultural input and poverty.

Category	Total		Poor		Non-poor	
	Frequency	%	**Frequency**	%	**Frequency**	%
Adopters	78	39.8	54	40.91	24	37.5
Non-adopters	118	60.2	78	59.09	40	62.5
Total	196	100	132	100	64	100

Test of significance		
x^2-test result (5% significance level)		
Value	Sig. level	Df
X^2=0.209	0.647	1

Household heads' utilization of modern agricultural input and poverty: Regarding the relationship between improved agricultural inputs' adoption and poverty the total 78 adopters of improved agricultural inputs constituted 40.9% of the poor households and 37.5% of the non-poor households. On the other hand, the total 118 non adopters constituted 78 (59.1%) from the total 132 poor households and 40 (62.5%) from the total 64 non-poor households. This implies that the adopters constitute more number of poor than the non-poor. The *chi-square* test shows that there is no statistically significant systematic relationship between improved agricultural input adopters' poverty status with chi-value of 0.209 and p value of 0.647 (Table 18).

Table 18: Household heads' saving culture and poverty.

Category	Total		Poor		Non-poor	
	Frequency	%	Frequency	%	Frequency	%
Adopters	78	39.8	54	40.91	24	37.5
Non-Adopters	118	60.2	78	59.09	40	62.5
Total	196	100	132	100	64	100
Test of significance						
x^2-test result (5% significance level)						
Value			**Sig. level**	**Df**		
X^2=0.209			1	0.647		

The majority (60.2%) of the sample households does not use these modern agricultural inputs, *i.e.* only 39.8% of them use improved agricultural inputs. According to the result from the focus group discussion and interview, there were farmers who resoled the fertilizer they took by the enforcement of DAs and other peasant associations and Woreda authorities and/or colored the wall of their home when they lack buyer. For instance, a farmer who participated in the focus group discussion said that "I sold 50 kg of DAP fertilizer, which was bought by about 700 birr, with a deficit of 200 birr in fear of drying up of crops or declining of land productivity". The survey result also shows that 97.46%, (by allowing multiple responses) out of the total 118 non-users households' responded fear of risk as the reasons for why they do not use these modern agricultural inputs. Although the problem of pest, diseases and weeds have been reported by farmers to be occurred, none of the respondent farmers have pointed out that they use insecticides and pesticides. Other reasons include lack of financial resource and fear that they might get indebted in case of crop failure because mostly get inputs in credit, lack of adaptive capability of improved crop varieties for local weather conditions. For instance, an improved wheat variety which was sown in the area in 2009 E.C dried up before it gets matured. The key informants and focus group discussion participants affirm lack of sufficient awareness about the importance of such agricultural inputs as the reasons behind the low level of adoption of fertilizer and high yielding varieties could be. Technological inputs to the farmers to improve livestock production are non-existent despite the existence of high potential for the production of small ruminants especially sheep in Dega and Woyna Dega peasant associations. The other reason for the lack of statistically significant systematic relations between use of improved agricultural inputs and poverty might be due to the fact that households which use improved agricultural inputs take credit to purchase it and they have to pay back their debts just after crop harvest (Table 19).

Table 19: Household heads' use of credit and poverty.

Category	Total		Poor		Non-poor	
	Frequency	%	Frequency	%	Frequency	%
Users	87	44.39	59	44.7	28	43.75
Non-Users	109	65.61	73	65.3	36	66.25
Total	196	100	132	100	64	100
Test of significance						
x^2-test result (5% significance level)						
Value			**Sig. level**	**Df**		
X^2=.016			0.9	1		

Saving habit and poverty

About 92.35% of the households reported that they do not practice saving in any form. Accordingly 69.23% and 7.69% households out of the total 132 households had the habit of saving were found to practice saving in the form of purchasing livestock and saving in bank accounts.

Credit access and poverty

Lack of finance is among the factors hindering the poor from engaging in gainful activities. There are different formal credit sources in the study area like commercial bank of Ethiopia, ACSI, Wisdom world vision-Ethiopia and agricultural input vendors mainly fertilizer as well non-formal like relatives and friends within access to credit service was assessed and the result showed that there were no well-established credit services for farmers. The only financial institute that can provide credit to farmers in the study area is the Amhara Credit and Saving Institute (ACSI), which is found only in the capital of the Woreda. The farmers receive credits from ACSI to buy the necessary inputs for crop production. About 32% of irrigators and 34% of non-irrigators got credit service. The purpose of taking loan from ACSI varies between households. As the data obtained revealed 17% for purchase of agricultural input, 10%for purchase of livestock, 2% for purchase of equipment and 5%for purchase of house construction materials. This shows that there was no difference in credit service between irrigators and non- irrigators and therefore production activities for both types of households is constrained by lack access to credit service (Table 20).

Table 20: Logistic regression model result on the determinants of poverty.

Variables in the model	B	S.D	Wald	Df	Sig. exp (B)
X1	-0.143	-..076	3.562	1.059	0.867
X2	-0.709	1.344	0.492	1.598	0.279
X3	3.417	1.547	4.876	1.027*	30.471
X4	-0.893	0.343	6.773	1.009*	0.409
X5	-0.009	0.015	0.329	1.566	0.991
X6	3.949	0.611	41.77	1.000*	51.896
X7	5.49	1.563	12.345	1.000*	242.306
X8	2.511	0.758	10.96	1.001*	12.313
X9	0.647	0.179	13.058	1.000*	1.91
X10	3.488	1.822	3.66	1.056	32.717
X11	0.172	1.248	0.019	1.89	1.187

X12	-1.44	1.191	1.463	1.22	0.237
X13	2.688	4.478	0.36	1.548	14.708
X14	0.606	1.045	0.336	1.562	1.834
Constant	-8.514	3.992	4.548	1.033	0

*Significant at 99% confidence interval.

The result reveals that 44.39% of households have used credit while the rest 65.61% does not use. The users have got the credit access from different sources. Accordingly 31.03% users accessed credit from formal (CBE, ACSI and WV) and 29.89% of them got credit from their relative. On the other hand, households who found to have no access to rural credit services from formal credit institutions responded fear of risk of not paying back do not know what to do with the credit, fear of defaulters in the group and do not want to take credit at all as the major reasons. The study found out that 47.7% were credit users. On the other hand, the users and non-users constituted 43.75% and 66.25% out of the total 64 non poor households. To test whether households using credit service are less vulnerable to poverty than non-users *chi-square* was run and the result depicts that there is no statistically significant relation of poverty status between credit users and non-users (x^2=0.016 and P=0.900).

The reasons for lack of statistically significant systematic relations between credit use and poverty were due to inappropriate use and high interest rate of the credit they took. According to the key informants and focus group discussion participants, households who take credit in order to invest on productive assets like livestock reproduction and fattening purchase sustenance/consumption commodities and used for the purpose of healthcare services as a copping mechanism. The focus group discussion participants also added the high interest rate of the credit vendors as another factor. The interest rate asked by the private credit vendors is higher than the rate asked by ACSI.

Logistic regression result of the determinants of poverty

The dependent variable poverty status of households (y) was regressed against explanatory variables (x_i) so as to identify the major determinants of rural poverty. With regard to the predictive efficiency of the model, the fitted logistic model explains 96.4% households included in the model were correctly predicted. The model also correctly predicted the 97.7% of the poor households and 93.8% of the non-poor households respectively. With regard to the error rates committed in the classification table, the false positive rate (the number of errors where the dependent is predicted to be poor, but is in fact non-poor) is 2.3% while the false negative rate (the number of errors where the dependent is predicted to be non-poor but is in fact poor) is 6.2%.

The omnibus tests of models coefficients had a *chi-square* value of 213.930 on 14 degrees of freedom, which is highly significant at 0.000 levels indicating that the predictor variables presented in the model have a joint significant importance in predicting household poverty status. The cox and snell and nagel kerke r-square values of the model were 0.664 and 0.926 respectively. The hosmer-lemeshow test result also reported *chi-square* value of 2.201 with p-value of 0.974 on 8 Df. This p-value is greater than 0.05 levels showing that there is no difference between the observed and model predicted values and hence estimates of the model fit the data at an acceptable level.

Analysis of logistic regression results revealed that the coefficients for age and educational status of the household head, dependency ratio and bee ownership, modern agricultural input utilization, saving habit, credit access and involvement in non/off-farm activities were not found to be statistically significant at 0.05 levels. The coefficients for household size, size of cultivated land owned, number of oxen, other animals and small ruminants (sheep and goats) owned were found to be statistically significant and different from zero indicating changes in odds ratio.

DISCUSSION

The age of household head (due to accumulated farming experience) provides a household with wider chance of escaping poverty is not significant. The result is found to be consistent with the result of the focus group discussion and key informants as well as the findings of Bigste, et al., and MoFED but inconsistent with the findings of Ayalneh, et al., Bashaasha, Ayalneh and Korf and Sepahvand. Female headed households are more likely trapped in poverty due to their deprivation to many important productive resources. The result of logistic regression revealed that the coefficient for headship of the household was found to be positive and significant at 0.01 significance level and is a determinant of rural poverty. The odds ratio shows that female headed households are 30.471 times prone to poverty than their counterpart of male headed households. The result is found consistent with the findings of Bigsten, et al., and Bigsten, et al., and inconsistent with the findings of MoFED, Ayalneh Maru and Metalign.

Household size was found to be a significant determinant of rural poverty. Family size was found to be significant at 0.01 level of significance and has a negative logit coefficient and odds ratio of 0.232 implying that the probability of a household to be poor increases by a factor of 0.232 as family size increases by a unit. The result was consistent with the findings of Ayalneh and Korf,

Metalign, Maru, MoFED and Getaneh, but not with Ayalneh and Korf Dawit, et al., and Sepahvand. The model shows that education is not significant at 0.01 confidence interval. The result was consistent with the findings of Dawit, et al., and Maru but inconsistent with the result of Ayalneh, Dercon MoFED, Tassew.

Land holding size is found to be negative and significant impact on the probability of being poor at 0.01 level is significance. The household with the smaller the land holding is the greater the chance of falling into poverty. The probability of households from being poor reduced by a factor of 51.896 as land holding increases by one hectare. The descriptive statistics also revealed that the poor have either no land or have little. The contribution of landholding size was consistently and unanimously confirmed by the focus group discussion participants. The result was also consistent with the findings of Dawit, et al., Sepahvand, Metalign and Dercon, but not with Bigsten, et al., Bgsten, et al. and MoFED.

Oxen holding size found to be significant at 0.01 levels of significance in determining the poverty status of the households. The coefficient was found to be negative and the odds ratio was 242.306 which imply that a unit increase in oxen holding size decreases the probability of households from being poor by a factor of 242.306. The significant role of owning oxen in escaping poverty was consistently confirmed by the focus group discussions and key informants. The result was also found to be consistent with the findings of Bigsten, et al., Bigsten, et al., MoFED and Metalig. Regarding with livestock (other than ox, sheep and goats) holding size, it was expected that those households with more of such livestock as cattle and equines have better opportunity of smoothing their income overtime and hence of escaping out poverty. The coefficient for the variable was found to be negative and significant at 0.01 level with the odds ratio of 1.910 which indicates that owning these livestock was found to reduce poverty by a factor of 1.910. The key informants and focus group discussion participants also assured the model result. The result was consistent with the findings of Dercon and Krishnan, Dercon, Maru Metalign and Dawit, et al.

The coefficient of small ruminant holding size was found to be negative and significant at 0.01 level of significance. The odds ratio also indicates that a unit increase in the number of small ruminants decreases the probability of households to be poor by a factor of 1.910. The result also shows that its role beehive ownership was not significant in reduce poor and diversify their livelihood, generate extra income. The result was consistent with the finding of Metalign, but not consistent with the result from the key informants and focus group discussion participants as well as the finding of Maru. The use of modern agricultural inputs like fertilizer, high yielding varieties, pesticides, insecticides and herbicides is among others vital contributors to boost crop production. The coefficient for applying modern agricultural inputs was found to be positive and insignificant. The reason might be related to the fact that farmers who utilize modern agricultural inputs get indebted to the credit giving organizations and individuals because they get either the inputs or the money to buy such inputs in credit and they have to pay back the loan right after harvest when prices for crops fail. This situation forces them to sale large amount of their produce for cheaper prices and remains with small amounts of their produce, which makes them to be poor.

The coefficient for household's involvement in non/off-farm activities was found to be positive although not statistically significant. This indicates that engagement of households in non/off-farm activities has the role of pulling, instead of pushing out, households in poverty. The reason given by the key informants and focus group discussion participants for this is that non/off-farm activities were not be practiced as a way of accumulating more wealth, which are heavily constrained by lack of skill and working capital, as a coping mechanism. As a result, households tend to concentrate on low return activities that have low risk. The result was found to be consistent with the findings of MoFED and Bigsten, et al., but not with Getaneh and Maru, Ayalneh and Korf and Dawit, et al.

The model revealed that the coefficient for credit access was found to be positive although not significant. This was also affirmed by the focus group discussion participants and justified this as due to diversion of loan for unintended purpose and high interest rate. The coefficient of saving habit is negative although not statistically significant. The insignificant relation could be due to the small number of the households who practice saving. Accordingly, the focus group discussion participants affirmed that the poor do not have the habit of saving whereas the more well off or non-poor households practiced, but their number is very small. The result was consistent with the finding of Maru, but not with Metalign. In general, family size, sex, land holding size, oxen holding size, livestock holding size and small ruminant holding size found to significantly correlate with poverty and emerged as the determinants of poverty in the study area.

CONCLUSION

The study analyzed the data obtained through in-depth interview and FGD in order to confirm whether there is divergence and consistency between quantitative techniques of identifying the determinants of poverty at household level with the qualitative responses of the community members. As a result, 11 (out of the total 14) hypothesized variables in the study were consistently confirmed by the binary logistic model, in-depth interview and focus group discussion.

AVAILABILITY OF DATA AND MATERIAL

The data analyzed in the study is available from the corresponding author on reasonable request.

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ETHICAL APPROVAL

This is an observational study. The university research ethics committee has confirmed that no ethical approval is required.

AUTHOR CONTRIBUTIONS

All authors contributed to the study conception and design.

CONSENT TO PARTICIPATE

Informed consent was obtained from all individual participants included in the study.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

CONFLICT OF INTEREST

There are no conflicts of interest.

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