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Analysis of Rural Poverty at Household Level in Silte Wereda, Southern Ethiopia

Engdawork Yirga Asfaw

Department of Development Economics, Ethiopia Civil Service University, Addis Ababa, Ethiopia

Email address:
engdayirga@gmail.com

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Abstract: Poverty is getting a serious social problem in the world and drawing attention of the international community for global solution. It remains challenging particularly in Developing Countries. Ethiopia is among the countries which, striving toward alleviating the problem for many years; however the problem has still persisted and caused many suffering. This study was carried out in Silte Wereda of South Nations Nationalities Regional State (SNNPRS); specifically, the study aim at measuring the magnitude and identifying determinants of poverty in the Wereda. Thus, to meet these objectives, primary data was collected by structured interview from 365 selected sample household. Thus applied descriptive statistics and econometric (logit) model in order to identify the poor and non-poor; analyze the incidence, depth and severity of poverty; and associating livelihood capital with rural poverty have been made. In setting poverty line, Cost Benefit Necessity approach was employed. This has been done by using basket of food items actually consumed by the households and converted to calorie. Based on this, the total poverty line was estimated to Birr 4,380.00 adult equivalent per year, out of this Birr 2,989.50 for food poverty line and Birr 1,390.50 for non-food. The Foster-Greer-Thorbecke (FGT) Poverty Index result shows 41.1% of the sample households have lived under the poverty line, the total consumption required to lift up the poor households to the poverty line is 11.3%, and poverty severity is 4.3%. The binary logit regression econometric model result indicated that out of the twelve variables which included in the model, seven explanatory variables were found significant up to less than 5% probability level. Accordingly, off-farm and non-farm income, educational level, access to credit and contact of agricultural extension worker, ownership of livestock and cultivated land were found as theoretical expectation statistically significant and had negatively association and family size positively associating with the status of poverty of rural households in surveyed area. Thus, promoting education, family planning, diversification credit accessibility, linkage between rural and urban, strengthens research extension-farmer linkage and productivity of land suppose to be policy intervention for targeting rural poverty.

Keywords: Binary Logit, Livelihood Capitals, Rural Poverty, Silte Wereda

1. Introduction

The current poverty profile reveals that the global poor are predominantly rural, young, poorly educated, mostly employed in the agricultural sector, and live in larger households with more children. That is 80% of the worldwide poor live in rural areas; 64% work in agriculture; 44% are 14 years old or younger; and 39% have no formal education at all. The data also confirm wide regional variations in the distribution of the poor across these characteristics [4].

The magnitude of extreme poverty was greatest in East Asia in 1990, today Sub-Saharan Africa and South Asia account for about 80% of the global poor. Extreme poverty in Sub-Saharan Africa was around 47%. Almost three-fifths of the world's extreme poor are concentrated in just five countries: Bangladesh, China, the Democratic Republic of Congo, India, and Nigeria. Adding another five countries (Ethiopia, Indonesia, Madagascar, Pakistan, and Tanzania) would comprise just over 70% of the extreme poor [18].

Ethiopia is one of the Sub-Saharan Africa countries, which has achieved substantial progress in economic, social, and human development over the past decade. The growth was rapid; however, it is the 11th poorest country in the world by income per person. In addition, it has a rural, agricultural-based labor force and poor households are even more likely

to live in rural areas and engage in agriculture. Households in the bottom 40% have more members and have larger proportions of unpaid workers, children and dependents [4]. Moreover, out of the total population of 102.9 million people 9.7 million (9%) of them are food insecure. Therefore, the challenge is to sustain the progress [8].

Thus, Ethiopia is still among the low-income countries in the world with GDP per capita of $1608 in PPP (Purchasing Power Parity) terms in 2017 and ranked 164 out of 187 countries, 29.6% of its population below poverty line (USD $ 1.90) [19]. Its economic growth has been on an upward trajectory over the past decade or so. The Government in GTP II particularly underlines the importance of sustainable and green economy and creating a skilled and competitive workforce to accelerate and sustain economic growth of the country in an endeavor to realize Ethiopia's Vision of becoming a lower middle-income nation by 2025 [15].

The survey data of food poverty is slightly higher than total poverty in all regions just similar to the national poverty measure. However, there is disparity among the regions and the occurrence of severe economic shocks such as drought and inflation over recent years, a marked regional poverty reduction is recorded across all regional states in the country. The data revealed that SNNPR state also there decline in poverty incidence both rural and urban areas. Rural poverty headcount index declined from 51.7% in 1999/00 to 21.9% in 2015/16. Despite the decline of poverty incidence in both rural and urban areas, rural poverty incidence is still almost twice as high as the urban poverty that warrants further attention [13].

The cause of poverty in rural Ethiopia is highly correlated with the size and composition of households, the educational level of household head, the degree and extent of dependency within the household, asset ownership (particularly ownership of oxen in rural areas), the occupation of household heads, rapid population growth, major health problems, lack of infrastructure and extreme environmental degradation. Particularly, many rural populations in Ethiopia live around the poverty line, moving in and out of poverty and food insecurity. On average the income of the rural poor far from the poverty line [13]. Thus identifying what characteristics are correlated with rural poverty, can yield critical insights for policy makers.

The SNNPR state is also one of the Regions that the population characteristics are rural. Its people rely on agriculture, and also the prevalence of rural poverty is higher. However, the rate has declined still the large population continue to live below the poverty line. This situation is same in the Weredas of Siltie Zone. Therefore, it is quite difficult to create poverty free wereda particularly rural poverty within a short period of time from its complexity and the incapacity of the existing institutions as well as the commitment of the concerned bodies. Thus, it is important further understanding about the cause of poverty and identifies the major determinants in the wereda. This will help in advance for targeting interventions to reduce poverty in throughout all localities at least to respond their demand of basic need.

2. Research Methodology

2.1. Sample Size Determination

This study employed cross-sectional survey to assess the determinant of rural poverty of the Wereda. The size of sample was determined by applying the simplified formula. Thus, deciding to apply the formula mentioned below by 95% confidence level and precision level of and 95% precision level (e±5%) [10].

$$n = \frac{N}{1+N(e)^2} \quad (1)$$

Where: N=population (from identified), n=size of the sample, e=precision level, Based on the above formula, the sample size of the study is;

$$n = \frac{4125}{1+4125(0.5)^2} = 364.64 \approx 365$$

2.2. Specification of Econometric Model

To examine the determinants, this study used econometric model. However, there are some alternatives econometric models popularly used for binary response, the logit and probit models are the most commonly used binary response models [12]. The probit model can substitute logistic regression model. Despite their quite comparable formulations, their chief difference lies in that the later has a slightly flatter tails than the cumulative normal distribution that is the probit curve approaches the axes more quickly than the logistic curve [11]. In so many cases, logistic regression is preferred to the probit due to its link to other models, such as linear models, and its simpler interpretability as the logarithm of the odds ratio and its eminence effort to retrospectively collected data analysis.

Furthermore, logit and probit models produce similar parameter estimates, however a binary logistic regression model is the appropriate and preferred probability model recommended mostly from mathematical point of view, as it is extremely flexible for interpreting binary response dependent variables [7].

To this end, binary logit model (Binary Logistic Regression model) used for analysis for this study to observe relationship of household's poverty status and its determinants. Because, the dependent variable is main interest that a household classify as poor or non-poor, a binary logit model certainly will help to observe the influence of the variable on household poverty.

Thus, a household is deemed living in poverty (y=1) if it is total consumption per adult equivalent per year is less than the poverty line or non-poor (y=0) if its consumption shortfall is greater than or equal to zero.

$$Y_i^* = \beta_0 + \sum_{i=1}^{n} \beta_i X_i + \varepsilon_i \quad (2)$$

The cumulative distribution of ε_i is logistic, a logit model

is employed. In this case, the probability of being poor (a household being below poverty line) given by [10]:

$$(Y_i = 1) = \frac{\exp(\beta_i X_i)}{1+exp(\beta_i X_i)} or \frac{e^{yi}}{1+ e^{yi}} \quad (3)$$

Similarly, the probability of a household being non-poor (above poverty line) (1-P) will evaluate by:

$$P(Y_i = 0) = \frac{1}{1+\exp(\beta_i X_i)} or \frac{1}{1+ e^{yi}} \quad (4)$$

3. Analysis and Interpretation

3.1. Descriptive Analysis

A household is living in poverty if the daily per capita household food energy intake falls below 2,200 kcal. Based on this assumption, the poverty line is estimated. First, identifying the poorest 50% as a reference household deemed to be poor; second, identifies the food items commonly consumed by the reference household to constitute the food bundle. In this case, a total of 15 food items are chosen; thirdly, their quantity is determined the bundle supplies predetermined level of minimum calorie requirement; having selected the bundle of goods, and then valued it using a median price (2017) for each food item in the basket based on local price data. Thus, the estimated food poverty line that provides the minimum food requirement is found to be Birr 2989.50AE/year or Birr 8.1904 adult equivalent per day [6].

The non-food poverty line determined using a simple linear regression developed by the World Bank to compute total poverty line [16]. This has been done by regress the share of total expenditure which was belong to food of each household on a constant and the log of the ratio of consumption expenditures to the food poverty line as stated in the literature.

Thus, the total poverty line of the surveyed Wereda is 4,380.00 Birr per yearper adult equivalent. It is the sum of food poverty and non-food poverty line. The non-food poverty line was estimated Birr 1,390.50 and food poverty line was estimated Birr 2,989.50 This showed that the share of per adult food and non-food expenditure to the food poverty line were 68.25%food expenditure and31.75% non-food expenditure. Generally, the above-calculated total poverty line demarcated the poor households from their non-poor.

Based on the above-calculatedtotal poverty line, out of the total sample households 150 (41.1%) considered as poor (live on less than 4,380.00 Birr consumption per adult equivalent) and 215 (58.9%) non-poor, who live on above the consumption of 4,380.00 Birr.

Table 1. *Poverty Status by Households.*

Poverty Status	No	Percent	Valid Percent	Cumulative Percent
Non poor	215	58.9	58.9	58.9
Poor	150	41.1	41.1	100.0
Total	365	100.0	100.0	

Source: Researcher Computation based on Survey Data (2018)

Poverty Measure

Head count index (P_o):

$$P_o = \frac{Np}{N} = \frac{150}{365} = 0.411 \text{ (41.1\%)}$$

This poverty index shows that about 41.1% of the sample rural households have lived below the poverty line.

The Poverty Gap Index or Depth of Poverty (P_1):

$$P_1 = \frac{1}{N}\sum_{n=1}^{N}\left(\frac{\text{Gi}}{\text{Z}}\right) = \frac{1}{365}(41.245) = 0.113 \text{ (11.3\%)}$$

this means the total consumption needed to bring the poor households to the poverty line is 11.3%

Squared poverty gap (Poverty severity) Index (P_2):

$$P_2 = \frac{1}{N}\sum_{n=1}^{N}(\frac{\text{Gi}}{\text{Z}})^2 = \frac{1}{365}(15.695) = 0.043(4.3\%)$$

Table 2. *PovertyIndices of Sample Households.*

Poverty index	Index value
Poverty head count index (P_0)	0.411
Poverty gap/depth index (P_1)	0.113
Poverty severity index (P_2)	0.043

Source: Researcher Computation based on Survey Data (2018)

3.2. Econometric Results of the Determinants of Rural Poverty

Although poverty is multidimensional and broader in its scope than is thought, this paper was confined to the basic food and non-food needs of rural households determining them to be either poor or non-poor in the dichotomy of poverty status. Prior to parameter estimation of logit model, different tests were made. These are multicollinearity, goodness-of-fit - test: and prediction rate.

Table 3. *Summary of Estimation Results of the Model.*

Explanatory Variable	Coef (β).	Std. Err	P> /z/	Odd ratio	Marginal effect (dy/dx)
AGE	-0.08	0.07	0.215	0.919	-0.00125
GENDER	-16.70	14.37	0.245	0.000	-0.24883
EDULVL	-1.13	0.37	0.002*	0.321	-0.01689
FAMSZ	1.10	0.48	0.021**	3.022	0.01647
DPRATIO	0.30	0.97	0.756	1.355	0.00447
FRQEXCNTCT	-2.74	1.01	0.007*	0.064	-0.04080
CLNDH	-15.68	5.98	0.009*	0.000	-0.23363
TLU	-0.61	0.25	0.016**	0.543	-0.00910

Explanatory Variable	Coef (β).	Std. Err	P> /z/	Odd ratio	Marginal effect (dy/dx)
DMRKT	-0.35	0.14	0.808	0.964	-0.00052
ACAGRINPT	-0.40	0.44	0.362	0.667	-0.00603
NONFINCM	0.00	0.00	0.015**	0.998	-0.00004
ACCRDT	-2.67	1.30	0.040**	0.689	-0.03986
MMSHP	-0.71	1.32	0.590	0.504	0.01055
Constant	43.58	21.17	0.040**	9.00e+20	-

* 1% and ** 5% level of significance respectively

Sample size (N)	365
Log likelihood	-17.541417
Wald chi^2 (13)	48.31
Prob> chi^2	0.000
Based on 0.5 cut value:	
Total Correctly predicted	96.99%
Sensitivity	96.00%
Specificity	97.67%
Correctly predicted the poor group	97.22%
Correctly predicted the non-poor group	96.64%

Source: Model Output of STATA. 14 (2018)

Thus, as per the above STATA 14 output, explanation and justification about the fitness of the model the detail of the significance variables are explained as follow.

Education level of household head (EDULVL): This vital human capital having negative relationship with the poverty of rural people. The variable is significant to determine rural poverty at 1% probability level. The justification for this, education is an important dimension of poverty itself, when poverty is broadly defined to include shortage of capabilities and knowledge deprivation. In other words, education increases the level of awareness so that put interest on using new and improved agricultural technologies. They also have worked zealously to diversify their sources of income to escape poverty. The marginal effect of education level shows that each additional years of education, the probability of the household being poor decreases by 1.7%, keeping other variables constant. It is assuring that promoting adult education is very important for rural people. Education better equips households to deal with and to escape from risks prevailing around them to realize poverty-free household. The incidence, depth and severity of poverty are much higher among the population with no educational attainment/ illiterate. Because literate households have better skill, better access to information and ability to process information than illiterate households do [5]. The result is conformity with the study of Bogale [4] have emphasized that promoting the education level of rural households enables them to reduce the risks of being under poverty and the variable also was significant at 10% probability levels.

Household family size (FAMSIZ): Family size is identified as an important factor that affect rural people. As it expected, family size is found to be positive relation with rural poverty and is significantly at 5% level of significance. The larger the family size entails more dependent person and also higher burden on the family. The marginal effect, kept other variables remaining constant, the probability being poor increase by 1.64% if the family size increase by one adult equivalent. The indicated that the larger the family size tends to be falling in the state of poverty. The finding also conforms to the results of other researchers. Family size is positively and significantly associated with rural poverty at 5% significance level [17].

Frequency of agricultural extension worker contact (FRQEXCNTCT): Expectedly, the frequency of extension contacts made by rural households per month was negatively and significantly related with rural poverty at 1% probability level. This is due to the fact that household heads who are in close contact with agriculture development agents could receive extension advices, trainings and demonstrations on livelihood strategies and associated issues pertinent to them, and even the adoption of new agricultural technologies are promoted via extension advices or contacts received by households. The marginal effect shows that for each additional extension contact days made per month, the probability of a household being poor decreases by 4.0%, holding other variables constant. The result of the study is consistent with the findings of Apata [3] and Adugna [1] regarding the extension services to rural households. It is found to be negatively and significantly influence the likelihood of a rural household to be poor at 10% probability level. The rationale behind this is the extension advice and technology promotion contribute for achieving the strategy of poverty reduction.

Size of cultivated land holding of the households (CLNDH): As predicted, the cultivated land holding was found to be a highly significant determinant of rural poverty. The result shows that cultivated land holding is negatively associated with rural poverty. It is found to be significant at 1% level of significance. The hypothesis the farmer who has larger land would be less poor than small land size. It helps the farmer exploiting the benefit of diversified livelihood. Thus, role of land resources could not able to underestimate. Rather it has important role in food security in adequate production of different food crops and even cash crops to generate on farm income for the rural community. Hence, cultivated land holding is standing first

among others resources alleviate the incidence of poverty in rural area. Being other things kept constant, the marginal effect implies that the probability of rural households being poor decrease by 23.4% as the total cultivated farm size increase by one hectare. The result consistence with study findings of others who noted the cultivated land holding helps the rural people escape out of poverty and the variable was significant at 1% probability level [1, 9].

Number of livestock ownership in tropical livestock unit (TLU): As expected this economic variable was found to be significant at 5% probability level and having negative relationship with rural poverty. This implies large ownership of livestock has greater chance to hedge against risks of food insecurity. In addition; the households with large livestock holding could easily recover to their pre-risk state through replenishing their food stocks and even the livestock itself. These are immediate sources of on-farm income. The results of Mola & Legesse [14] study has justified that possession of livestock serves as a hedge against food insecurity, source of cash income, principal form of saving and investment. The marginal effect indicates that the probability of the householdbeing poor decreasesby 0.9% when the size of livestock holding increases by 1 TLU, keeping other variables constant. This result conforms to the findings of Semere [17] as well. Rural households endowed with large livestock enables them to earn more on-farm income from the sale of livestock and livestock products thereby fulfilling food and non-food needs for their family, and the variable was significant at 5% probability level.

Household Nonfarm/off-farm Income (NONOFFINCM): It is the amount of income which the farmer earned in the year. From the past experience and also the existing fact, the rural household escaping out of poverty is largely determined by their ability to create income from non-farm activities. This income, as expectedly found to be negatively associated with rural poverty at 5% level of significance. The rationale behind this is the rural people who are earning more income from non-farm as well as off –farm increase capacity to respond the demand of their basic need and escape out of poverty. Generally income determines purchasing power of the household with the prevailing price so that those households having higher income are less likely to become poor than low-income households. Therefore, this income generating activities determines the poverty status of the rural household negatively. As a result, it is expected to have a negative impact upon poverty. The marginal effect reveal that the rural households earned one more unit of income other than farm activities the probability of the rural household being poor decease by 0.04%, keeping other variable remaining constant. The study finding conforms to other that under scored the merit of off-farm income to reduce poverty at 1% significance level [2].

Access to credit service (ACCRDT): The result of the study show that this variable negatively related with and highly significance at 5% significance level. The negative relationship implies that rural households access to credit service have less chance to be poor than those who have no access. The reason for this credit service gives the rural people allow to participating and involving in income generating activities so that having an opportunity to escape out of poverty. The marginal effect of this variable shows that the probability of being poor decrease by 4% holding other variable constant. The study result agreed with other researchers that credit facilitates to lift rural households out of chronic poverty in South-Western Nigeria due to the ease with which they can use the fund to invest in various income generating activities and the variable was found to be significant at 10% significance level [2, 3].

4. Conclusion and Policy Implication

4.1. Conclusion

The study was conducted in Silte Wereda of Siltie Zone in Regional State of South Nations Nationalities by focusing on rural households as unit of poverty analysis. The objective of this study was to measure the magnitude of rural poverty and to identify the determining factors of rural household poverty. Thus, setting the poverty line and identification of the poor and non-poor groups of households; measuring the incidence, depth, and severity of rural poverty and mean comparison between the poor and non-poor groups of rural households by associating livelihood capitals have been made.

A multi-stage sampling technique was used to select sample households. The first stage was stratification of the district Kebeles into three agro-ecological zones. In the second stage, a total of seven Kebeles was randomly selected based on the proportion of agro-ecological zones' area coverage. These are Ashutie, Yeteqere, Weliya Sidist, Dobo, Dacha, Boze and Senena. In the third stage, by simplified formula, number of sample was determined and it was 365 rural households. Out of the households, 365 households were randomly selected using systematic random sampling technique from the list. Primary data were collected from selected sample respondents by means of structured interview. The data collected were organized, analyzed, presented and discussed using descriptive statistics and econometric model analytical methods. Key findings of the study are therefore summarized hereunder.

To analyze the poverty status of sample rural households, first the absolute poverty line was computed using the Cost of Basic Necessities Approach (CBA) and it is found to be Birrfor 2989.50 per year per adult equivalent for food poverty line and Birr 1390.50 for non-food poverty line. The total poverty line estimated to be Birr 4,380.00 Birr per year per AE. Based on this absolute poverty line, the FGT poverty indices were estimated and the measure for poverty incidence, poverty gap and poverty severity were 41.1%, 11.3% and 4.3%, respectively.

Concerning theassociation of livelihood capitals of households and rural poverty is concerned, mean comparison carried out to ascertain whether significant mean difference exists between the poor and non-poor groups of rural households. Accordingly, the mean difference between the

poor and non-poor rural households were observed in terms of human capitals (education level and age of head and frequency of extension contact), natural capital (land holding), physical capitals (livestock holding, oxen holding and market distance) and annual food and non-food consumption expenditure, financial capitals of off-farm, non-farm income, remittance and credit utilization. Furthermore, there were also observed significance mean difference among non-poor and poor in natural capital (size of cultivated land).

The estimation result of binary logit model revealed th at out of the 13 explanatory variables included in binary logit model, sevenof them were significantly determine poverty status of rural households whereas the remaining were not significantly explaining rural household poverty. Accordingly, education level of the household head, frequency of extension contacts made per month and cultivated land holding were found to be significant at 1%. Whereas, family size of households, number of livestock holdingin TLU, off-farm/non-farm income and access to credit were found to be significant 5%. Others variablelike age, gender, distance to the marketand agricultural input utilization, membership of cooperative and dependency ratioare found to be insignificantly associated with the probability of rural households in study area.

To this end, poverty is best understood as a lack of household resource endowments, which means that households are deprived from accessing basic livelihood assets. Among these assets, human capital is one of the important assets that found tobe determined poverty status. Specifically, education level of household heads is significantly related with rural poverty; and contributed a lot being freed from poverty. The reason that household relatively with higher level of education can understand how to make living and lead decent life than illiterate household. The contact of the households and extension worker also found to be important determinants. These extension workers create access for transfer of new technologies to improve their livelihood strategies. Therefore, human development could be strategic area for rural poor in order to alleviate the property of rural poverty.

It can also be concluded that households with less endowments of physical and natural capital are prone to poverty. Specifically, cultivated land holding highly related to rural poverty. The larger the land holding helps the people of rural securing demand of food and non food item. Therefore, this calls for introducing the issue of increasing production per unit of land area (productivity) and intensification. Finally, considering the results, access to credit and non-farm income varies inversely with consumption based poverty status. Apart from this, family sizes also another important issue that determined poverty status in the study area. The reason thathouseholdswith large family is likely being poor; other things remain constant.

4.2. Policy Implications

One of the Sustainable Development Goals (SDG) is end poverty in all its forms everywhere. This goal is set after evaluation of the implementation of Millennium Development Goal (MDG). From this goal, we can understand that, poverty still persists worldwide and the problem is being global agenda. The situation is also visible in Ethiopia as well. The study result of the Wereda specifically, the head count ratio, depth and severity of poverty have indicated that poverty has been a problem. The marginal effect analysis of the exogenous variables revealed that, among others, cultivated land, education of households, advice of extension worker, livestock ownership in TLU, family size and income from non/off-farm activities and credit utilization are important determinants for study area. Thus, proper understanding of the characteristics and conditions of poverty constitutes an essential starting point. It is a key to the formulation of policies, designing appropriate strategies and practical steps that the government can take in order to reduce poverty and promote sustainable growth at macro and micro levels. Thus, based on the findings of this study, the followingpolicy implication was made.

1. Large family sizes are an important factor that makes worsen the situation of poverty. Thus creating awareness about family planning supposes to be given priority so that it helps to reduce the size the households. The decision making bodies must focus on family planning, education and health a strategy to do away with rural poverty. Hence, the government and all the concerned bodies, particularly operating at the local levels should give mega-attention about the implementation programs thoroughly.
2. Access credit helps rural people build up assets so that it smoothes income and consumption. However most rural poor did not have access to credit service. Thus, it is recommended that credit service should targeting the poor to helps them to fulfill the food and non food item; agricultural inputs and the basic needs provision should be accompanied by continuous follow up and technical support so as to utilize it for investment.
3. All stakeholders should give attention to improve households' non-agricultural income sources that helps the rural poor escaping out of poverty. This could be achieved by identifying the different possible types of off-farm/non-farm activities and support with the necessary knowledge and skills. The local government should encourage in facilitating non-farm and off-farm activities for rural households. However, the availability non-agricultural income alone is not a guarantee for better exploit the benefit of diversification unless rural-urban market linkages are strengthened.
4. Livestock plays an important role in contributing the rural household to get out of poverty. Its contribution to the household food energy requirement, plough, transport and total income is significant. Hence necessary effort should be made to improve the production and productivity of the sector. Technical advice and training regarding livestock should also offer to make them benefited more so that helping them to escape out of poverty.

5. Cultivated land holding: land is an important economic resource for the rural people. Many researches confirm that the farmer who have larger land holding reduces the incidence of poverty. However, in case of our own expanding any more land holding today is increasingly rare because of increasing demographic pressure on land and degradation of the existing land resource. In fact this calls for introducing the issue of increasing productivity of land and intensification. This would be good accompanied with policy interventions of investment in small-scale and large-scale irrigation technologies than depending merely on erratic rainfall thereby relieving livelihood risks emanating from shortage of rainfall.

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