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RESEARCH ARTICLE

DETERMINANTS OF RURAL HOUSEHOLD POVERTY STATUS: THE CASE OF WOLISO DISTRICT OF SOUTH WEST SHOA ZONE, OROMIA REGIONAL STATE, ETHIOPIA

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CC - Contingency Coefficient,
DA - Development Agent,
MDG - Millennium Development Goal,
VIF - Variance Inflation Factor.

ABSTRACT

Poverty in Ethiopia is widespread and deep-rooted and constitutes the priority development challenge in the country. Whether rural or urban, poverty is multifaceted and widespread in the country. Poverty reduction is one of the most important goals of development efforts. People in the rural areas of Ethiopia are exposed to poverty which needs area focused and context specific researches to examine and investigate factors causing poverty at community and grass root level. Therefore, any strategy or plan that attempts to reduce or alleviate poverty in the district requires an in-depth area-focused research. Accordingly, this study was conducted with the main aim of identifying determinants of poverty in the area. The Woliso district under study has 37 Kebeles and 5 Kebeles were selected using simple random sampling. From the sampled Kebeles, using probability proportional to size sampling method 140 households were selected. Both primary and secondary data were collected for the study. The primary data were collected from households through structured interview schedule. The secondary data were collected on agro climatic conditions, social services, availability of production and marketing facilities and population statistics. The t-test and χ^2 - test were employed to test continuous and discrete variables respectively. The binary logistic regression model has been employed to identify the determinants of rural poverty in the study area. Family size and Age were positively related with poverty where as educational status, extension visit, livestock holding and access to credit were found to have negative influence on poverty. Based on the results of the study, the following recommendations were made: expansion of family planning education and improving access to family planning programme supported by demonstration at grass root level are amongst areas deserving prime attention. Training on how to use it and encouraging them to save money deserve prime attention. Development Agents should provide fair and equal service for the poor and non-poor at least through group method and field visit to achieve all inclusive development.

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INTRODUCTION

Poverty is an intractable challenge for most African countries. It is not only spreading fast, but also becoming severe in many locations. In response, governments and development partners have renewed their interests and recommitted themselves to poverty reduction. Most countries with support of development partners have formulated poverty reduction strategy papers (PRSPs) and have embarked on far reaching programmes for economic growth and poverty reduction. A number of these countries have also committed themselves to the realization of Millennium Development Goals (MDGs), the first of which calls for substantial-poverty reduction. Poverty in Ethiopia is widespread and deep-rooted and constitutes the priority development challenge in the country. About 90 percent of the population would fall under poverty line if the international poverty line of two dollar a day per person is used.

Poverty in the country is mainly a rural phenomenon and is a reflection of the underdeveloped nature of the agriculture sector. Typically, agriculture is characterized by small holder and subsistence farming which is highly dependent on rainfall. The urban livelihood is also highly dependent on the rural. Therefore, analysis of its determinants could help to design the intervention directions and inform policy options for tackling poverty in the study area.

Statement of the Problem

Although governments and international organizations are scaling up programs for the reduction of poverty, they have difficulties in reaching the poorest. The extreme poor suffer from many handicaps which have a mutually reinforcing impact, and often lead to social exclusion (World Bank, 2006). Studies after studies have suggested that poverty is not simply an economic problem but rather a complex social problem with various manifestations. Alternative approaches have emerged as a result of the realization that poverty

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measurement outcomes cannot be accurate by looking simply at people's income or consumptive capacities. Poverty reduction is one of the most important goals of development efforts. A pro-poor development strategy not only focuses on economic growth, but it also needs to take distributional impacts into account (Arne *et al.* 2002). In all economies of contemporary developing world such as Ethiopia, now a days the serious objectives and priorities of public decision makers are to fight against poverty to improve the conditions of life of the people (World Bank, 2002). About 290 million people, who constitute about 46% of the total population of Africa region, live on less than one US\$ per day per adult. Incomes, assets, and access to essential services are unequally distributed. This research paper further explains, a significant proportion of the population does not have access to safe water and has limited or no access to social services, such as education and health. Whether rural or urban, poverty is multifaceted and widespread in the country in which its dimensions are interlocked, as the courses of poverty also have national and international dimensions.

Apart from spatial variations, temporal variation in poverty situation is also worth considering. Bearing in mind poverty reduction is a long-term process and is not amenable to significant improvements in a short time; temporal variations of factors that can cause poverty situations also urge poverty diagnosis to be a continuous process in Ethiopia (MoFED, 2002). People in the rural areas of Ethiopia are exposed to poverty which needs area focused and context specific researches to examine and investigate factors causing poverty at community and grass root level. Therefore, any strategy or plan that attempts to reduce or alleviate poverty in the district requires an in-depth area-focused research. Accordingly, this study was conducted with the main aims of identifying determinants of poverty in the area. For the purpose of this study, poverty is defined in absolute term, as the extent to which household's consumption expenditure (food and non-food expenditure) per Adult Equivalent/annum which meets its subsistence requirement.

MATERIALS AND METHODS

The study was conducted in Woliso District of South West Shoa zone which is 114 kms away from Addis Ababa, towards the south west. Woliso district was purposively selected. On the second stage 37 kebeles of the district were divided in to two (Dega, 7 kebeles and Woinadega, 30 kebeles). Then using simple random sampling technique 5 kebeles were sampled (4 kebeles from Woinadega and 1 kebele from Dega). A total of 140 Households were selected from each sampled kebeles using probability proportional to size sampling method. Both primary and secondary data were used for the study. Primary data were collected from households through structured interview schedule. Secondary data were collected on agro-climatic conditions of the study area, the availabilities of production and marketing facilities, population statistics etc. Such data were collected from reports of District Agricultural Development Office.

Dependent variable of the study

The dependent variable of this study was household poverty status, which is a dichotomous variable representing the status

of rural households and was represented in the model 1 for poor and 0 for non poor household. The information to categorize households into two groups was obtained by comparing the total household consumption expenditure per Adult Equivalent per annum to the minimum level of expenses required to ensure survival per Adult Equivalent per annum. This minimum level of expenses required per Adult Equivalent was computed based on the amount of calorie requirement (2200Kcal/Adult Equivalent/day) plus minimum expenses needed for non-food items.

Independent variables of the study

Once the poor has been identified, the analytical procedure and its requirements are known, the next step is to identify factors that are correlated with poverty and that can be used for targeting interventions. Such important variables were as follows:

Family size (FS): This variable refers to the size of household members who live together under the same roof converted to Adult Equivalent. The expectation was that as the family size increases the probability of the household to fall in to poverty increases.

Dependency ratio (DR): This is the ratio of children under age 15 and old age of above 64 to active age group in a family converted to Adult Equivalent. The existence of large number of children under age 15 and old age above of 64 in the family can affect the well-being of the household.

Age of the household head (AGE): This is continuous explanatory variable designating age of the households head. The influence of household head's age on poverty is somewhat controversial in the literature. Some studies revealed that the likelihood of being immersed in to poverty is inversely related to age.

Educational status of household head (EDUST): This variable refers to the level of formal and non-formal education, measured in terms of ability to read and write and enrolment in primary, secondary schools or above. It is often assumed that educated individuals are better able to process information and search for appropriate technologies to alleviate their production constraints.

Sex of the household head (SEX): Male-headed households are in a better position to pull labor force than the female headed ones. Female-headed households, due to lack of labor in the family, tend to rent out their land to male headed households on the basis of crop sharing or other terms of agreement.

Marital status of the household head (MARST): It is the situation whereby the household head is currently married or not. Marriage is established with a view of helping each other and married people pool their resources and also reduce cost that would have been spent separately.

Livestock holding (LH): Livestock holding refers to the total number of livestock holding of the household per Adult Equivalent measured in tropical livestock units (TLU). In all farming systems, livestock are the most important store of

wealth. Studies by Hilina (2005) found that households with more livestock holding can have good access to animal diet (meat, milk and milk by products) more draft power and manure for crop production.

Land Size (LANDSISE): This variable represents the total cultivated land owned by a household in hectare. Total cultivated land owned by households is important resource for increasing agricultural production (food production). As cultivated land size increases, provided other associated production factors remain constant, the likelihood that the holder gets more output increases. Thus, it was hypothesized that households who have larger cultivated land are more likely to be non-poor than those smaller area.

Access to irrigation (IRRGLND): This variable refers to the total cultivated land under irrigation owned by household measured in hectare. With the availability and use of irrigation water (either for permanent or supplementary forms) households could substantially increase food production and household income. Therefore, households having access to and using irrigation water for cultivation of crops was hypothesized to be non-poor than those who do not have.

Involvement in non/off farm activities (NONFFINC): This represents the involvement of household head in non-farm or off farm activities other than the sale of farm products (crops, livestock and etc.). Agricultural production may be the rural household's only source, or even their most important source of income. In this regard, households engaged in off-farm activities are better endowed with additional income (Hilina, 2005). Hence, it was expected that the availability of non-farm or off-farm income is negatively related or associated with household poverty.

Access to credit (ACCCRE): Access to working capital is an important determinant of the ability of poor households to adopt new technologies and experiences, and production and thus incomes (MOFED, 2008). It is a continuous variable represented by the amount of money that a household received from formal credit institutions in the last two years. Those households who have access to credit may have better possibilities to invest in agricultural and non-agricultural activities to improve their income position. Moreover, households who have access to credit can minimize their financial constraints and buy inputs more readily. Hence, it was hypothesized that as the amount of credit a household received increases, there is a potential to reduce poverty.

Frequency of extension visit (ETN.VISIT): This refers to the number of contacts per year that the respondent makes with development agents. The effort to disseminate improved production practices is a factor of the frequency of contact between farmers and development agents. The better the information flow, more the technological (knowledge) transfer would be achieved. Therefore, it was hypothesized that the probability of being non-poor increases with the number of extension visit made by the development agent.

Distance from market center (DMC): This is a continuous explanatory variable designating households proximity to the market center measured in kilometer. Access to market may create opportunities of more income by providing non-farm

employment and access to input and transportation. It was therefore, expected that, households closer to market center are likely to be non-poor than those households who do not have proximity to nearest market center.

The binary logistic regression model was employed to examine an association of each factor with poverty. This model can be used to approximate the functional relationships between explanatory variables and the dependent variable. This model was used because the dependent variable is binary (0, 1). Similarly a linear probability model may generate predicted value outside 0 and 1 interval which violate the basic tenets of probability (Gujarati, 1999) and this problem can be solved by using probit and logit models. Even though the Logit and Probit models are comparable, Hilina (2005) reported that Logit model has the advantages that these predicted probabilities can be arrived at easily.

Therefore, in this study logistic regression model was fitted to estimate the strength of the relationships of each factor with poverty when the other variables are controlled. Accordingly, in this model, the dependent variable takes the value of 1 if the household belongs to below poverty line, i.e. poor with the probability of P_i , otherwise a value of 0, i.e. non-poor with the probability of $1-P_i$. To estimate this type of relationship, it requires the use of quantitative response models.

Specification of the model is as follows.

$$P_i = \frac{ne^{z_i}}{1+e^{z_i}} \quad \text{----- (1)}$$

Where $P_i=1$ if the probability that the household is poor; 0, otherwise.

$$Z_i = a_0 + \sum_{i=1}^n a_i + x_i + u_i \quad \text{----- (2)}$$

- n = the number of explanatory variables
- a_0 = intercept term
- a_i = the coefficient of explanatory variables
- u_i = disturbance term
- x_i = explanatory variables or the independent variables

The probability that the household belongs to non-poor will be $(1-p_i)$. That is

$$1-p_i = \frac{1}{1+e^{z_i}} \quad \text{----- (3)}$$

The odds ratio can be written as

$$\frac{p_i}{1-p_i} = e^{z_i} \quad \text{----- (4)}$$

In linear form by taking the natural logs of odds ratio

$$\ln\left(\frac{p_i}{1-p_i}\right) = \ln(e^{z_i}) = z_i \quad \text{----- (5)}$$

The model is estimated through iterative maximum likelihood procedure with the help of SPSS computer software. The coefficients of logit model present the change in the logs of the odds (poverty as a 0 or 1) associated with a unit change in the explanatory variables

Testing for Multicollinearity

Multicollinearity is a situation where explanatory variables are highly correlated. This creates estimation or prediction problem in Logit model. Gujarati (1999) defines multicollinearity as a situation where it becomes difficult to identify the separate effects of independent variables on the dependent variable because of the existing strong relationships among them. This can be done by using Variance Inflation Factor (VIF) for continuous and Contingency Coefficient (CC) for Discrete Variables. In other words the effect of one explanatory variable on the dependent variable does not affect or disturb the influence of the other explanatory variable on the same dependent variable when they are observed together against the dependent variable. The value of coefficient ranges from 0 to 1. If the value of coefficient is near zero this is to mean no relationships between the given variables but if it is above 0.75, it shows high degree of correlation between the variables. Since there is only one discrete variable, it was taken to the binary Logit analysis directly without testing for multicollinearity.

In addition VIF was used to test multicollinearity among continuous variables. If the VIF of a variable exceeds 10 i.e. if the value of R^2 exceeds 0.90, that variable is said to be highly collinear (Gujarati, 1999). The author further explains that multicollinearity of continuous variable also can be tested through 'Tolerance', that the tolerance is 1 if the explanatory variable is not correlated with the other explanatory variables in the regression, whereas it is zero if it is perfectly associated with others. The analysis result shows that the value of VIF for each explanatory variable is not greater than 10 or the Value of Tolerance (R^2) is not greater than 0.90. Therefore, there is no association among the variables. As a result seven continuous explanatory variables were taken to the binary Logit model for analysis.

FINDINGS AND DISCUSSION

Determinants of Rural Poverty in the Study Area

Definitions of explanatory variables used in the model

The t-test and χ^2 -test shows that, from the thirteen variables only eight of them are significantly different while compared between poor and non-poor. The eight variables which show significant difference are listed in the table below with their definition.

RESULTS OF THE BINARY LOGISTIC REGRESSION ANALYSIS

The multicollinearity test shows that there is no association among the variables. As a result seven continuous explanatory variables and one discrete variable were taken to the binary logit model for analysis.

The model results correctly guess (88.4%) for non-poor and (92.6%) for the poor with the overall percentage of 90% when the sampled households are 140. In the model seven continuous variables and one dummy variable were included. The model output shows that from 8 variables regressed 6 variables are significantly related to the state of poverty of the households at different probability levels.

Family size: The model result shows that family size is significantly associated with rural poverty. The coefficient for family size is positive at 1% level of significance. The hypothesis was that as the family size increases the probability of the household to have disguised unemployment increases which would, in turn, affect the well being of the household.

Table 1. Definition of explanatory variables used in the model

Variables	Definition
Family Size	Size of household members who live together under the same roof converted to Adult Equivalent (continuous).
Age	Age of the household head counted in years (continuous).
Sex	Whether the household is headed by male or female (Dummy).
Educational Status	The level of formal education of household head measured in terms of enrolment in primary, secondary schools or above (continuous).
Land Size	The total area owned by a household in hectare (continuous).
Extension Visit	The number of contacts/year that the household head makes with DAs (continuous).
Livestock Holding	The total number of livestock holding of the HH measured in TLU (continuous).
Access to Credit	The amount of money that a household received from formal credit institutions in the last two years (continuous).

Table 2. Binary Logistic Regression Results

Variables	B	S.E.	Wald	Df	Sig.	Exp(B)
Family Size	.469	.177	7.054	1	.008***	1.602
Age	.073	.029	6.386	1	.011**	1.076
Sex	-.379	1.337	.080	1	.777	.513
Educational Status	-.078	.083	4.898	1	.034**	.925
Land Size	-.277	.490	.320	1	.572	.760
Extension Visit	-.257	.155	2.747	1	.096*	.773
Livestock Holding	-.711	.172	17.173	1	.000***	.491
Access to Credit	-.001	.000	10.006	1	.002***	.999
CONSTANT	-.830	1.897	.192	1	.662	.441
-2log likelihood						76.502
Model Chi-square						110.200***

***, ** and * indicate significance at 1%, 5% and 10% probability level respectively.

Source: Model output

As expected, the increase in family size by one adult equivalent results in 1.602 increase in odds ratio indicating the probability of the households to fall into poverty increases by 1.602 units keeping other things constant. This is in line with MoFED (2007) which explains that, for a household with 8 to 11 family members, poverty headcount averaged 58.5% and for households with family members equal or greater than 12, poverty head count averaged 63.5%. In addition, MoFED (2002) compared poor households with the non-poor, and concluded that poor households in the rural areas have larger family size than their counterparts. The result by Lanjouw and Ravallion (1994) is also in line with the study that there is strong and negative relation between household size and consumption (or income per person).

Age of the household head: The model output shows that age of the household head is significant. In other words, the age of the sample household heads affect poverty status of the households. This might be due to the fact that as the age of the household head increases the probability of the household head to adopt new technology decreases, and the ability of the household head to work more to get additional income also decline. The coefficient for age is positive at 5% level of significance. As age of the household head increases, the value of odds ratio increases by 1.076 keeping other things constant. This shows that the probability of the households to fall in to poverty increases by 1.076 units with the increase of one unit of household head's age. Therefore, in the study area members of poorer household tend to have older household heads compared to the non-poor ones.

Educational status of household head: The relationship between poverty and education is particularly important because of the key role played by education in raising growth and poverty reduction. The regression result shows that education is significantly affecting poverty status of the household. The better educated have higher incomes and thus are much less likely to be poor (WB, 2006). The same source explains that with the higher levels of education, the likelihood of being poor falls considerably. In other words, poverty level among households consistently decline as their education level increases. The regression result also shows that the coefficient for education is negative and significant at 5% level of significance ($p < 0.05$) and as the educational level of the household head increases by one unit, the probability of the household to fall in to poverty decreases by 0.925 units keeping other things constant.

Frequency of extension visit: This refers to the number of contacts per year that the respondent makes with DAs. The model shows that the coefficient for the frequency of extension visit is negative. Therefore, as the frequency of extension service or visit between the household head and development agent increases by one unit, the probability of the household to get out of poverty increases by 0.773 units keeping other things constant. Therefore getting out of poverty is the effort of disseminating improved production practices which is a factor of the frequency of contact between farmers and development agents.

Livestock size: In the study area, household's rear livestock not only for the income they generate from livestock but also livestock are used as a sign of wealth.

In addition it is possible to say that livestock are the engine of economy in the study area because they are a source of income, they are used as traction power and the manure of livestock was used as fertilizer as well as for fuel. The model result shows that the coefficient for livestock size was negative and it is significant at 1% probability level. Therefore, it is possible to understand that, as the size of livestock increases by one tropical livestock unit the probability of the households to fall into poverty decreases by 0.491 units if other things are constant.

Access to credit: Access to credit is not only the availability of lending institutions in the society but also the willingness of the poor to borrow and use it, which then enhance the ability of the poor to use improved technologies. This is the reason why MoFED (2008) indicates that credit is an important determinant of the ability of poor to adopt new technologies. Receipt of credit for two seasons was considered for this study. Out of 140 sampled households, only 39 availed credit. Those households who have access to credit have better possibilities to invest in agricultural and non-agricultural activities to improve their income position. Hence, it was hypothesized that as the amount of credit a household received increases, there is a potential to reduce poverty. As expected the result of regression analysis shows that the coefficient of access to credit is negative and it is significant at 1% probability level, and it shows that the households access to credit decreases by one unit, the probability of falling into poverty by 0.999 units if other things are constant.

Conclusion

Different variables were regressed against poverty in the study area. There is a significant difference between the age of poor household heads and non poor household heads in the study area. Members of poor households tend to have older household heads compared to the non-poor. Therefore age of the household head is significant determinant of rural poverty in the study area.

Poor households have had larger family size than non-poor ones and they will be in a vicious circle of poverty if immediate measures are not taken to break this circle. In other words either all of these family members have to be used as source to generate income or family size should be decreased to reduce the size of dependency ratio which, in turn, reduces the poverty. Land size is insignificant and not determinant of the household's poverty status in the study area. This may be due to the production and productivity strategy initiated by the Ministry of Agricultural Development (MoAD) and followed by most of the farmers.

Even though the coefficient for livestock size was negative and significant at 1% probability level, increasing productivity of livestock rather than the size of livestock is good solution for the households to get out of poverty. This is because as livestock size increases by one tropical livestock unit the probability of household to fall into poverty decreases by 0.491 units. Therefore livestock size is significant determinant of household poverty status. Frequency of extension service is negatively related to poverty not only due to transfer of technology but also motivation of the households.

In addition, the coefficient for access to credit is negative and it is inversely proportional to poverty. Training of the borrowers on how to spend it, follow-up and encouraging continuous saving of the borrowers will get them out of poverty.

Recommendations

The variable, total livestock size owned, was found to be significant with negative coefficient implying that additional units of livestock reduces household's chance of falling into poverty. But due to shortage of grazing land it is impossible to increase size of livestock beyond certain optimum level. As a result increasing the productivity of livestock by using good management practices and using improved breeds have no alternatives. Therefore, encouraging farmers to enhance the productivity of their livestock through good management and replacing unproductive animals with the improved one through time is expected from farmers and responsible bodies.

Family size was found to be a significant determinant of rural poverty in the study area. Average household size was 5.15, 5.4 and 4.9 in adult equivalent units for the whole sampled households, for the poor, and for the non-poor respectively. Bearing in mind this concept, expansion of family planning education and improving access to family planning programme supported by demonstration at grass root level are amongst areas deserving prime attention. In the result and discussion part it was discussed that credit is an important determinant of the ability of poor to adopt new technologies. In other words lack of finance is amongst the major bottle necks that constrained the rural people from engaging in productive activities.

In addition only giving money to the poor is not enough but training them on how to use it, and encouraging them to save money deserve prime attention. Because saving habit, has a significant contribution in escaping out of poverty. The regression result shows that as the educational level of the household head increases the probability of the household to fall in to poverty decreases keeping other things constant. Therefore, providing adult education supported by demonstration at Farmers Training Center for the farmers and motivation of children to attend school are key roles to be played by responsible bodies.

The increase in frequency of extension visit between the household head and development agent increases the probability of the household to get out of poverty keeping other things constant. Therefore, DAs should provide fair and equal service for the poor and non-poor at least through group method and field visit to achieve all inclusive development.

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