Alleviating Rural Poverty through Efficient Small Holders Farming Systems in Ethiopia: Relevance of Macro Policies with Ground Realities

D.K. Grover and Anteneh Temesgen

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D.K. Grover
Deputy Director
Agro-Economic Research Centre
Department of Economics
Punjab Agricultural University, Ludhiana, Punjab-India,
Fax: 0091 161 2400945, Phone (Residence): 0091 161 2770481
dkg_59@rediffmail.com

Anteneh Temesgen
Deputy Director, AERC,
Dept. of Economics, Punjab Agricultural University,
Ludhiana, Punjab - India and former Visiting Professor of Agricultural Economics,
Alemaya University, Alemaya,
Ethiopia and Agricultural Economics Expert, North Wollo, Woldia, Ethiopia respectively.
Fax: 0091 161 400945, Phone
(Residence): 0091 161 2770481
dkg_59@rediffmail.com

ABSTRACT
Ethiopia is one of the poorest and least developed countries in the world. The country had a real per capita GDP of less than US $100 in 1995, and over 60 per cent of its population lives in absolute poverty. The problem of rural poverty and underdeveloped agriculture are closely linked with both micro as well as macro dimensions. To tackle the challenges of poverty in Ethiopia, the policies need to be initiated both macro and micro in nature and especially the macro-micro linkages are extremely crucial. In order to formulate and implement the macro policies effectively, there is an urgent need to first understand the ground realities of the Ethiopian society in general and of agricultural economy in particular. The micro-level study has been conducted in North Wollo zone, situated in the north –eastern part of the country. The linear programming model was used to study the existing farm income and scope of improvement through optimal and alternative plans. The optimal solutions in both base model and alternative optimal plan resulted in an increase in gross margin. This was obtained by using improved seed with fertilizer. Thus, the availability of improved seed, fertilizer, working capital and other inputs is crucial, i.e. modern inputs should be delivered at right time and place with a reasonable cost, so that all farmers can afford to use it. Agricultural

and poverty related macro policies and strategies were reviewed to highlight that how effectively the ground realities of smallholders were addressed through the macro level government agricultural policy initiatives in Ethiopia. The utilization of improved seeds has not exceeded 2 per cent of the overall seed requirements of the country. Hence, pragmatic seed policy needs to be formulated and implemented effectively to make available improved seeds to the farmers for improving their income and reducing rural poverty. The macro fertilizer policy should be designed to encourage the farmers to make use of this crucial input for raising their income and reducing poverty. Contrary to it, the present macro policy of decontrolled fertilizer has discouraged the farmers to adopt crops with fertilizers. The credit extended by Commercial Bank of Ethiopia has been increasing yet it should be taken up on priority at macro level in order to improve the economic conditions of rural folk and hence reducing the poverty in the country. The Small Scale and Micro Industry Development Strategy (SSIMD) and related programs initiated by Government of Ethiopia are very much in line with the micro level requirements. Such efforts must be further strengthened for generating rural non-farm employment and hence tackling the problem of rural poverty in the country. On scarce land, improved technology needs to be made available to farmers through macro policies for intensive utilization of the existing land. Besides, government and NGO's should promote subsidiary activities requiring less land such as poultry and bee keeping. Land-use-planning needs to be initiated to advise the smallholders to use their scarce land only for most desired enterprises and abandon the practice of growing trees like eucalyptus. Besides, Intensive Agricultural Technology Dissemination Programs needs to be chalked out and implemented to improve the efficiency of smallholders farming systems in terms of increasing farm income and reducing rural poverty in Ethiopia.

Most nations of sub-Saharan Africa have been experiencing a decline in per capita income that has led to rising poverty. The incidence of poverty for Africa was about 47 per cent in 1985. Although the incidence of poverty was expected to decline to 43 per cent in 2000, the number of people below poverty line was expected to increase from 180 million to 265 million over this period. (World Development Report, 1990). Ethiopia is one of the poorest and least developed countries in the world. According to FAO (1997), the country had a real per capita GDP of less than US $100 in 1995, and over 60 per cent of its population lives in absolute poverty. The United Nations Development Program's (UNDP) human development report of 1997, ranked Ethiopia 170th out of 175 countries in terms of its human development index. Agriculture, being the main stay of the Ethiopian economy, accounts for about 40 per cent of gross national product. The decomposition analysis of agricultural sector highlights that about 60 per cent of the output in value terms comes from crop production, 33 per cent from livestock and 7 per cent from forestry. (FAO, 1992). At present nearly 85 per cent of the total population depend on agriculture for their livelihood at subsistence level. It is believed that agriculture is the base for industrial development and the means for overall economic development of this country.

The problem of rural poverty and underdeveloped agriculture are closely linked with both micro as well as macro dimensions. At micro level, the agricultural income- the basic indicator of poverty is based on land and labor productivity in farm and livestock activities, employment opportunities available to rural households etc. whereas at macro level, the agricultural output is determined by various policies parameters such as price policy of agricultural commodities, availability of human labor and their quality, land, level of technology and above all the agricultural policy of the government. Hence, in agricultural dominant economies, mainly the level of agricultural income and productivity determines rural poverty. Thus, for the reduction of rural poverty, the improvement in land and labor productivity is a pre requisite in such economies. To tackle the challenges of poverty in Ethiopia, the policies need to be initiated both macro and micro in nature and especially the macro-micro linkages are extremely crucial. In order to formulate and implement the macro policies effectively, there is an urgent need to first understand the ground realities of the Ethiopian society in general and of agricultural economy in particular. The present study is an attempt in this direction. The study has been designed to grasp the micro – level realities of Ethiopian agriculture to frame evidence based pragmatic macro-level policy recommendations to avoid any difficulty at their implementation level.

METHODOLOGY:
The micro-level study has been conducted in North Wollo zone, situated in the north – eastern part of the country. The required primary data regarding crop and livestock activities were collected from 110 randomly chosen farmers in the region with the help of an especially structured schedule. Based on the survey results and statistical output the 110 household respondents were grouped into two. Group-I denoted as High Income Group (HIG), consisting 28 households and Group-II denoted as Low Income

Group (LIG), consisting of 82 households. The present analysis is based on information gathered from 82 low-income respondents. The following Linear-programming (LP) model was specified in terms of its objective function, activities and constraints under normal conditions to determine the optimum resource allocation for specified farm activities for improving the income level at the household level. The secondary information was collected from researchers and information documented at various levels of Ministry of Agriculture, Planning and Economic Development Offices etc.

Specification of the LP Model:

Maximize $Z = \Sigma c_j x_j + \Sigma c_j^* x_j^*$ Objective function :   subject to

$\Sigma a_{ij}\, x_j \leq b_i$ Constrained equation

x_j and $x_j^* \geq 0$ Non-negativity constraint activities

Where, Z =   Gross margin

c_j =   Price of production activities

x_j =   Level of jth production activity

c_j^* =   Price of non production activity

x_j^* =   Level of jth non production activity

a_{ij} =   the ith resource required for a unit of jth activity

b_i =   the ith resource available with the sample farmers

j =   refers to number of activities from 1 to n and

i =   refers to number of resources from 1 to m

The constraints:

i)   **Land:**

$\Sigma a_{ij}\, x_j \leq OL$, $\Sigma a_{ij}\, x_j \leq SL$, $\Sigma a_{pj}\, x_j \leq OP$ and $\Sigma a_{ej}\, x_j \leq EL$

Where OL, SL, OP and EL is the amount of owned land, share land, own pasture and eucalyptus tree land holding respectively.

a_{ij} is the area of crop land required for jth activity, a_{pj} is the area of pasture land required   for

grazing and aej is the area of land required for eucalyptus production.

(ii) Family Labour:

$\Sigma a_{tj} - h_t\, x_j^* \leq L_t$, $h_t x_j^* \leq A_t$, Where L_t, A_t are available family and hired labor in the t th period. h_t is the amount of hired labor required in the t th period for j*th activity.

a_{tj} is amount of labor required in the t th period for j th activity.

iii) Oxen power:

$\Sigma w_{tj} x_j - w_t\, x_j \leq 0$, Where w_t is the amount of power available per pair of oxen in the t th period. w_{tj} is the amount of power required per pair of oxen in the t th period.

(iv) Working capital:

$\Sigma k_{ij} x_j \leq W_k$, Where W_k is the amount of available working capital.

k_{ij} is the amount of working capital required for production and non production activities.

RESULTS AND DISCUSSION:

The study is divided into three sections. Section-I analyzes the existing farming systems of small holders and to explore the potential for improvement in agricultural production, productivity, labor use efficiency and hence the gross margins per unit of land at household/micro level. Section-II briefly reviews the macro level policies related to the problems of agricultural development and rural poverty. The policy suggestions, micro-macro linkages to reduce the rural poverty through efficient small holders farming systems are outlined in Section-III.

Section-I

Exploring Potential for Improvement in Income Level of Smallholders
This section deals with the existing farm situation, optimal base model, alternative optimal plan, sensitivity analysis and microanalysis based policy suggestions.

Existing farm situation:
Farm income: Farmers derived income from both farm and non-farm activities. Based on the existing farm situation and prevailing price levels, the sample farmers were obtaining Birr 2176 as gross margin to cover all expenses including subsistence requirements, clothing, land tax, hiring of labor and other variable input expenses.

Table 1: Sources of cash income and expenses of the sampled farmer, 2000

Particulars	Birr
1 Gross Margin	2176
1.1 Crops	1552
1.2 Livestock	443
1.3 Eucalyptus	181
2 Off farm income	230
3 Total income (1+2)	2406
4 Expenses	2400
4.1 Variable cost	470
4.2 Subsistence	1822
4.3 Cost of clothing	71
4.4 Land tax	20
4.5 Hired labor cost	-
4.6 Other expenses	17
Farm cash income (1-4.2)	354
Net cash income (3-4)	6

As indicated in Table 1 these farmers were not able to meet all these expenses from farm income and were expected to reduce either the variable costs or subsistence

requirements, which might lead to undernourishment or needed additional income from non-farm activities.

Resource productivity: Land and labor productivities have been estimated and presented in Table 2. The gross margin and cash income per hectare was Birr 2790 and 454 respectively. The available labor productivity of gross margin per man hour (GM/MH) showed the number of working force per hour whereas gross margin per man equivalent (GM/ME) was the total number of man equivalent for the representative farm. Employed labor productivity of gross margin per hectare was Birr 1.12 and that of available working force was Birr 0.67 only. The farm cash income per employed man-hour was Birr 0.18.

Table2: Marginal value productivities of various resources under existing, optimal and alternative plans on sampled holdings, 2000.

(Birr)

Resource Productivity	Existing plan	Base optimal plan	Alternative plan
Land: GM/ha)	2790	3011 (+8)	3060 (+2) [+10]
(CI/ha)	454	676 (+49)	724 (+7) [+60]
Labour: (GM/MH)			
Employed	1.12	0.74 (-34)	0.77 (+4) [-31]
Available	0.67	0.72 (+7.5)	0.73 (+1.4) [+9]
Employed CI/MH	0.18	0.19 (+5.5)	0.18 (-5) [0]
Working capital	470	532 (+13)	696 (+31) [+48]

(GM, CI, MH, ha means Gross Margin, Cash income, Man hour and Hectare) Figures in parenthesis ( ) under base optimal plan shows the percentage increase / decrease over existing practices and under alternative plan shows the percentage change over optimal plan. Figures within [ ] shows the changes in alternative plan over the existing plan.

Optimal base model:
The base optimal model showed a significant change in the production pattern, resource use, farm income and returns to farm resources over the existing farm situation. The optimal model favored incorporating wheat crop in the cropping pattern and also crops with fertilizers. The result was compatible with farmers' enterprise prioritization for food security goals together with the consideration of production per unit of land. The area allocated to wheat was increased by 50 per cent.

Farm income: The optimal plan under reallocation of resources indicated an improvement in gross margin and cash income per hectare by 8 per cent and 49 per cent respectively. (Table 2). The gross margins and cash income per farm increased

from Birr 2176 to 2349 and Birr 354 to 527 in base optimal model over the existing plan. (Table 3)

Table 3: Change in farm income under optimal base model and alternative plan over the existing plan, sample holdings, 2000

Particulars	Birr		
	Existing plan	Base optimal plan	Alternative plan
Gross margin	2176	2349 (+8)	2387 (+2) [+10]
Subsistence requirements	1822	1822	1822
Cash income (CI)	354	527 (+49)	565 (+7) [+60]

Figures in parenthesis ( ) under base optimal plan shows the percentage increase / decrease over existing practices and under alternative plan shows the percentage change over optimal plan. Figures within [ ] shows the changes in alternative plan over the existing plan.

Resource productivity: The land productivity increased in optimal base model by 8 per cent (Table 2). In case of labor productivity, gross margin per man-hour for employed persons were decreased, as the increase in farm income was lower than the increase in labor usage. The gross margin per man-hour for available persons was increased by 7.5 per cent. Cash income per man-hour for employed persons was increased by 5.5 per cent.

Alternative optimal plan:
The optimal alternative plan was prepared to find ways in which the productivity of existing resources could be increased by solving some of the existing constraints especially working capital constraint. Farmers were assumed borrowing enough additional capital for buying improved seed and fertilizer as well as improved livestock breeds. Though the farmers had other more serious constraint i.e. shortage of land yet it was not possible to increase the holding size under the existing circumstances.

Farm income: Alternative optimal plan indicated the possibility to improve farm income by proper allocation of resources with enough working capital. As observed from table 2 that the gross margin and cash income has increased by 2 per cent and 7 per cent over the base optimal plan while 10 and 60 percent over the existing plan.

Resource productivity: The land productivity increased in this plan by 2 per cent. In case of labor productivity, gross margin per man-hour for employed person has increased by 4 per cent whereas, cash income per man-hour for employed has declined by 5 per cent (Table2). Land still remained the most limiting factor; even borrowing of money did not bring the farmers a significant increment in total gross income due to serious shortage of land.

Marginal value productivity of resources: The production option showed relatively more farm resources but cultivable land still remained the most limiting factor. The shadow price of cropped land was Birr 960 and 3021 in the base optimal model and alternative

plan as indicated in Table 4. The labor has a shadow price of Birr 0.24 and 0.23 per man-hour on base optimal and alternative plan respectively. The marginal value (shadow price) of working capital was not seen in alternative plan because of enough money availability.

Table 4: Shadow prices of limiting resources under optimal base model and alternative plan, sample holdings, 2000

Resources	Base optimal plan	Alternative plan
Cropped land (Birr/ha)	960	3021 (+215)
Labour (Birr/MH)	0.24	0.23 (-5)
Working capital	2.7	-

MH: Man-hour
Figures in parenthesis show the percentage change in alternative plan over the optimal plan.

Sensitivity analysis:
Impact of 10 and 25 per cent reduction in output and its prices as well as 5 per cent and 25 per cent increment in input price on optimal base model and alternative model was observed because this amount of reduction and increment was common in the study region.
Impact of output price reduction on base model solution: Output price reduction results showed no variation on the production pattern, resource use productivity and farm income at both levels of price variation. This might be explained by the fact that most of the produced crop on this low-income group was used for self-consumption and hence price variations did not affect the model.
Impact of input cost increment and output reduction on base model solutions: Input cost increment and output reduction affected the production pattern, resource use, resource productivity and farm income at both levels of price variation in similar trend. 5 per cent input cost increment and 10 per cent output reduction showed variation and at more than 10 per cent input cost increment and 25 per cent output reduction, the optimal model became infeasible.
Impact of output price reduction, input cost increment and output reduction on alternative plan solutions: The impact of the three parameters in the alternative model was affecting in the similar trend with the base model but the seriousness is lesser in case of alternative plan. This showed that the presence of enough working capital would make the optimal model more stable i.e. a farmer can resist more for changes in these important parameters than without working capital. Output price reduction effect, in contrary to the base model, showed no variation on the production pattern, resource use and productivity at both levels of price variation. Input cost increment and output reduction affected the production pattern, resource use and productivity, farm income and marginal value of resources at both levels of price variation in similar trend; in that, at both 5 and 10 per cent input cost increment and 10 per cent output reduction showed a variation and with more than 25 per cent output reduction the effect was higher and the optimal model became infeasible in case of output reduction but it was

feasible for input increment as oppose to the base model. This was because the amount of input usage was lower in the study area.

Microanalysis- based policy suggestions
- The study showed the existence of ways to increase farm income/ reducing rural poverty by optimally allocating the resources and proper choice of enterprise pattern. Thus, the development efforts that will encourage necessary adjustments in the enterprise pattern should be taken up.
- The optimal solutions in both base model and alternative optimal plan resulted in an increase in gross margin. This was obtained by using improved seed with fertilizer. Thus, the availability of improved seed, fertilizer and other inputs is crucial, i.e. modern inputs should be delivered at right time and place with a reasonable cost, so that all farmers can afford to use it.
- Working capital is another crucial constraint in the study area. The availability of sufficient operating capital through borrowing enables the farmers to get inputs on time.
- There is need to facilitate non-farm employment opportunities such as petty trade, pottery making, weaving and handcrafting etc. This would increase income of peasants and reduce poverty through mobilizing surplus labor.
- Land is the most acute constraint at existing condition as well as in the future. The only solution for the time being is intensification of the existing land by using improved technology. However, even with these technologies, the optimal solution is not stable for high variation in output reduction and increase in input cost. Besides, activities such as poultry and beehive production which need less or no land should be expanded and a strong support should be given from the government and concerned NGO's,
- Given the existing acute land shortage and availability of excess mountainous area, planting eucalyptus on farmland is not appropriate, and the concerned bodies should work hard to convince the farmers to abandon such practice. The previous started distribution of mountainous area to the farmers should continue with strong follow-up, so that the farmers should use the land thus allocated only for planting of trees.

Section-II

Review of Agriculture and Poverty Related Macro Policies and Strategies:
The practical, need based, relevant, sound and prudent agricultural policies encourage the economic growth while ill-conceived policies on agriculture related issues in terms of insufficient linkage to the micro-level realities stuck development which ultimately leads to poverty. This section highlights that how effectively the ground realities are addressed through the macro-level Government agricultural policies initiatives in Ethiopia. The country's development policies are expected to revolve around productivity enhancement of smallholder agriculture. The strategy of Agricultural Development Led Industrialization in the context of Ethiopia focuses primarily on

agricultural development. This is to be attained through improvement of productivity under smallholdings that help expand market for domestic manufacturers as a result of increased incomes of smallholders.

Improved seeds policy:

Development of improved seeds for cereals and other food crops in Ethiopia began with the establishment of the Institute of Agricultural Research (IAR) in 1996. Production of improved commercial seeds for cereals, legume, and oil seed crops was introduced in Ethiopia through the then Ethiopian Seed Corporation (ESC). In October 1992, the TGE issued a National Seed Industry Policy (NISP) with the objective of laying the ground for the development of a healthy seed industry in which private seed enterprises would be encouraged to actively participate in the production and distribution of improved seeds. Hitherto, private operators had virtually no role in the production and marketing of improved seeds. The ERRP and the Extension Program have also become important actors in the use of improved seeds in subsequent years. For instance, the ERRP accounts for about 61 per cent of the use of improved seeds in 1992. The Extension Program also account for some 56 per cent of the improved seed utilized in 1995 and 1996, respectively. Improved seed utilized by private commercial farms was about 9 and 6 per cent in 1995 and 1996 respectively for which latest information is available. Of the total seed requirements for cereals and oilseeds in Ethiopia, only 45 per cent improved seeds are available. The overall utilization of improved seeds has not exceeded 2 per cent of the overall seed requirements of the country.

Fertilizer policy initiatives:

Despite the increase in the absolute level of fertilizer sold to farmers in Ethiopia, the country has still remained to be one with the lowest rate of fertilizer application even by the standard of sub Sahara African countries. Ethiopia's fertilizer utilization in terms of nutrient content averaged 7 kg of nutrients per hectare of arable land compared to a sub-Saharan average of 9 kg per hectare of arable land. The world average stood at 65 kg per hectare. Physical application rates of fertilizer by most peasant farmers are well below those recommended by the extension program (100 kg DAP and 50 kg urea per hectare) and could in some cases be as low as 20-30 kg per hectare. The physical application rates by state farms have been much higher at 130kg per hectare. The main reasons for the low physical fertilizer applications, among others, include:

- Poor cultural practices which include inappropriate application in terms of timing and dosage, water logging, and run-off;
- Shortage of fertilizer as a result of lack of purchasing power.
- Unpredictable weather which renders farmers to be reluctant to apply fertilizers;

Owing to these factors, World Bank studies have disclosed that only 22 per cent of the farmers were believed to have used fertilizer at the end of the 1980's. This rate is expected to have increased to around 25% in recent years.

During the past regime, fertilizer prices in Ethiopia had been under state control and maintain prices below its market rate prior to the transitional government of Ethiopia

(TGE). Following the new economic policy of TGE, a new marketing strategy was designed with the technical assistance of FAO in 1992. Available data sources revealed that the price of fertilizers has increased from 38 Birr per quintal for DAP and 30 Birr per quintal for Urea in 1971 to 262 Birr for DAP and 237 Birr per quintal for Urea in 1997. Even after the subsidy of 15 per cent, DAP prices increased successively by 19, 33 and 75 percent in 1995, 1996, and 1997,respectively. The increase in the price is believed to be the most important reason, if not the only one, for the decline in the amount of fertilizer consumption in 1993.

Agricultural credit policy:
Easy and economic access to capital is of paramount importance to purchase modern inputs such as fertilizers, improved seeds, pesticides and animal feeds etc. A recent study by Mekuria (1995) evaluated the profitability of new technology, based on a survey data of wheat growing regions of Ethiopia and concluded that farmers use sub-optimal level of inputs due to lack of credit and high input prices, in spite of being aware of the available improved inputs. Hence maintaining favorable commodity price and input subsidy policy to farmers was advocated. The share of credit extended to private holders, cooperatives and NGO's has been increasing sine 1990-91.The total credit extended to farmers by Commercial Bank of Ethiopia in 1994-95 stood at about 158 million Birr and has increased to about 242 million Birr in 1996-97 showing an average growth rate of about 24 per cent per annum over the period.

Poverty focused policies and programs:
Since 1993, Government of Ethiopia initiated steps to tackle the deep-rooted and widespread problem of poverty. Measure being taken to improve women's access for resource and public services such as education, serves as a corner stone for employment generation and poverty reduction. The Small scale and Micro industry Development Strategy (SSIMD) and the accompanying programs such as rural credit and micro financing schemes are crucial in terms of generating rural non-farm employment.

Agricultural technology dissemination program:
Increased crop productivity is anticipated through intensification of agriculture through improved cultivation practices and increased use of improved technologies, including irrigation, soil and water conservation, fertilizer use, improved seeds and pest control. This package program was implemented through smallholders on farm demonstration plots of the major cereal crops (maize, wheat, teff and sorghum) in selected locations in the country. As a result, the productivity levels of major crops have increased significantly. Recently, program was designed to include other potential crops like pulses, vegetables, oil crops etc that have higher economic value both in local and foreign markets.

Land policy:

The appropriate form of land reforms and land policy is crucial for future agricultural development and poverty alleviation. The continuation of the control of farm land by the state and undefined land rights plays an important role in inhibiting land tenure security and thereby posing a serious structural constraints and challenge on the long term agricultural development and poverty alleviation in Ethiopia. It is unlikely that the economic liberalization programs will result in reducing poverty when major structural impediments such as land reform remain intact.

Section-III

Linkage Development Between Micro Level Requirements and Macro Policies to Reduce Rural Poverty:

Keeping in view the policy issues emerged from microanalysis of smallholders and reviewing the macro policies of Ethiopian Government in these regards, an effort has been made in this section to examine the relevance of macro policies with ground realities as follows:

- Microanalysis of smallholders showed that improved seeds played an important role in increasing the gross margin\reducing poverty emphasizing the need of effective improved seed policy of government at macro level. At present, the utilization of improved seeds has not exceeded just 2 per cent of the overall seed requirements of the country. Hence, pragmatic seed policy needs to be formulated and implemented effectively to make available improved seeds to the farmers for improving their income and reducing rural poverty.

- The micro study brought out that in case of smallholders, crops with fertilizers would largely improve the gross income of the farmers. The macro data disclosed that only about 25 percent farmers are believed to have used fertilizer in the country and the major reason for low physical fertilizer applications has been the lack of purchasing power among farming community. Following the new liberalized fertilizer policy of Transitional Government of Ethiopia, the price of fertilizer has increased manifold. Even at subsidized rate, the DAP prices increased successively by 19,33 and 75 percent in1995, 1996 and 1997 respectively. The increased price of fertilizer has resulted in low fertilizer consumption. The macro fertilizer policy should be designed to encourage the farmers to make use of this crucial input for raising their income and reducing poverty. Contrary to it, the present macro policy of Government of Ethiopia has discouraged the farmers to adopt crops with fertilizers. Hence, government should design the macro fertilizer policy in line with the requirements at micro level.

- The present and the other micro studies on efficiency of smallholders have concluded that farmers use sub-optimal level of inputs due to lack of credit inhibiting the agricultural growth and rural prosperity. Though, credit extended by Commercial Bank of Ethiopia has been increasing yet it should be taken up

on priority at macro level in order to improve the economic conditions of rural folk and hence reducing the poverty in the country.

- The micro level study suggested strengthening non-farm employment opportunities to smallholders for reducing poverty. The Small Scale and Micro Industry Development Strategy (SSIMD) and related programs initiated by Government of Ethiopia are very much in line with the micro level requirements. Such efforts must be further strengthened for generating rural non-farm employment and hence tackling the problem of rural poverty in the country.

- Land scarcity was one of the crucial problems for smallholders in study areas. Therefore, improved technology needs to be made available to farmers through macro policies for intensive utilization of the existing land. Besides, government and NGO's should promote subsidiary activities requiring less land such as poultry and bee keeping.

- On scarce land in study area, smallholders were planting eucalyptus on farmland, which was not appropriate. Therefore land-use-planning needs to be initiated to advise the smallholders to use their scarce land only for most desired enterprises and abandon the practice of growing trees like eucalyptus. Besides, Intensive Agricultural Technology Dissemination Programs needs to be chalked out and implemented to improve the efficiency of smallholders farming systems in terms of increasing farm income and reducing rural poverty in Ethiopia.

- Land as per constitution, was owned by the state and farmers have a user right only inhibiting the agricultural development and poverty alleviation. Hence the liberal land reforms and policy is crucial for future agricultural development and poverty alleviation in the country.

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