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Poverty, Land Resource Management and Gender Participation in Libokemkem District of Northern Ethiopia.

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Abstract

High population pressure and land degradation are threats of food security in the highlands of Ethiopia. Poverty and food insecurity are closely related phenomena. Both of them compel poor farmers to practice unwise use and resource management, which lead to low resource productivity. This study examines the various factors determining poverty and resource management at a household level with gender perspective in Libokemekem district of Ethiopia. Farm level diversification of crops and mitigating food insecurity is highly constrained due to lack of farm resources principally limited land size. Consequently, households with large family sizes and limited resources are vulnerable to food insecurity. Although households practice various coping mechanisms and alternative resource management strategies, they are not sufficient to curb household food security. The magnitude however, varies between female and male-headed households. Socioeconomic factors such as age, soil type, farm size, sex of household heads, area under rice production, number of oxen, and slope of the land are among the major factors to influence and discriminate between female and male-headed households. This study concludes by highlighting and indicating possible direction for policy intervention in view of enhancing food security and sustainable resource management.

Keywords: resource management, poverty, gender, Ethiopia

1 Introduction

Land degradation is one of the major threats in the Ethiopian highlands where intensive cultivation is practiced. More than 88% of the Ethiopian 65 million people are engaged in agriculture, and livestock stocking rates are the highest of any agro-ecological zone in sub-Saharan Africa (Omiti *et al.*, 1999). This pressure appears to continue in the face of growing population and it has resulted in accelerated rates of natural resources degradation that is of major concern. The principal environmental problems of soil erosion, gully formation, continuous loss in soil fertility and severe soil moisture stress are partly the result of loss in soil depth and organic matter. As a matter of fact, the massive soil loss is perhaps the country's largest export. Soil erosion and land degradation in general contribute to variations in output and affect household food security.

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The Libokemkem district of South Gondar zone (Figure 1) shares some of the common features of environmental degradation (largely in the forms of deforestation and soil erosion) taking place in the country. The area is basically characterized by low road density and limited access to market outlet, lower agricultural technology intervention and less institutional services. The population is increasing and this creates extra pressure on the land, thus leading to increased poverty.

On the other hand, concerted efforts and measures have been taking place to redress the prevailing development bottlenecks. Some of these measures include physical management of natural resources such as construction of stone terraces, soil bunds, area enclosure and tree planting; these have been supported by policy measures. Following the 1991 reforms, new economic policies were introduced to address issues related to landownership, liberalization of input and output markets, conservation of natural resources and other incentives to make the farming community responsive to economic reform and improved technologies. However, the interventions and impacts seem to have different forms and scales in different regions of the country. With a transition towards a market based economy many households might be engaging in practices that could restore or maintain soil fertility. Soil conservation measures of planting trees, crop rotations, applying organic and inorganic fertilizers are also some of the support measures, which are visible around the farming communities. These interventions might have gender implications at the household level. As the population increases, demand for fuel wood increases, and as commercialization increases more opportunities for markets would be opened up. Farmers switch to different economic activities responding and adjusting to market operation and policy incentives.

Time spent on management of resources reasonably changes between households and even with gender composition (women, children and men). The policy measures taken after 1991 have regional dimension and further implication on equity. Autonomous rights were given to regions for internal administration and policy implementation. In Amhara National Regional State, the redistribution of land has taken place in 1997, deepening the reform as an equity measure between males and females. Consequently, many women households have access to land irrespective of size and quality. It is recognized that the measures would show positive impacts in the long run if they also result in poverty alleviation and sustainable resource management.

The objectives of this study were to examine the state of poverty as related to food security and farm level resource management in the district, and identify determinants of household poverty and resource management and gender differentials.

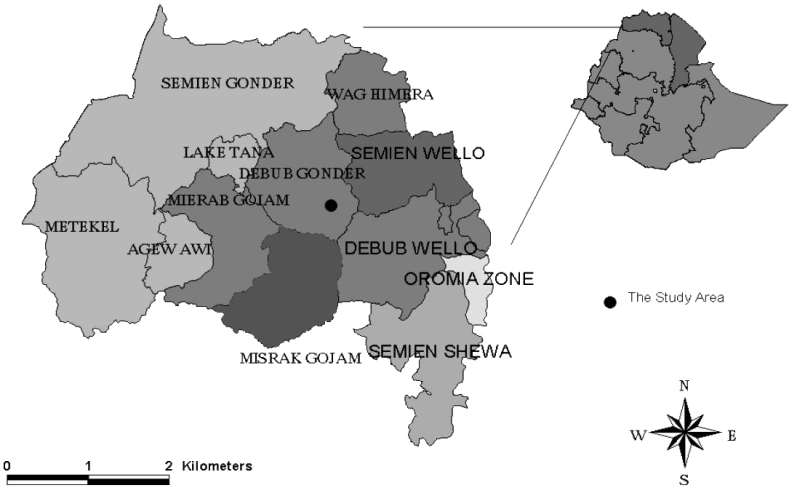
2 Methodology

2.1 Choice of the study area

Libokemkem district was deliberately chosen among other districts because it is one of the five food insecure districts of the zone, characterized by low road density and limited access to markets, inadequate technological intervention with continuous land degradation, food insecurity and various coping mechanisms to food security. The total

population of the district is about 160,603 (information obtained from Libokemkem district council) of which 90% are living in rural areas and engaged in farming activities. The illiteracy rate is alarmingly high.

Figure 1: Location of the study area.



(Source: Atlas of Amhara Regional State, Ethiopia)

2.2 Sample selection

The study was conducted in June 2000/2001. The initial step in data collection was to obtain household level information thereby incorporating gender in the study. Reconnaissance type of survey was conducted to rapidly investigate and visualize the resource endowments and institutional set up of the area under investigation. After examining the initial data set including the secondary data sources, survey was conducted on sampled households. Equidistant strata of households were constituted from which households were selected from sex and age proportions within the households. Inter and intra household composition was considered in setting the sample size. The proportion (N_i) of households selected from each *Limat tabias* (development centers), depend on the number of male and female households (n_i) and standard deviation of major variables. A total of 150 farm households were selected of which 94 were male and 56 were female-headed households. The data collection procedure involved selecting and training enumerators and sample farmers. Some response and measurement errors were difficult to detect and correct, although efforts were made to minimize errors. Details of methodologies followed are given in a seperate report (Winrock International Ethiopia, 2000).

Non-parametric and descriptive statistics and frequency analysis, ratios and partial analysis were employed to describe changes in resource management perceptions. Probit response model was employed to examine factors responsible for management of resources. In addition discriminant analysis was employed to capture factors responsible for food security differences between male and female-headed households (Maddalla, 1983).

3 Results and discussion

3.1 Poverty and household food security

The definition and classification of poverty is one of the controversial and inconsistent concepts. Nevertheless, the conventional definition of the poor refers to those persons who subsist below a level of income that can sustain only a bare minimum standard of living (Dércon and Krishman, 1994). In this connection poverty can be related to various concepts of income such as very low level of food self-sufficiency and low purchasing power. Food availability situation in the district indicates that food availability and food self-sufficiency ratio was at a level of 75% in 1994/95 and the same ratio raised to 80% in 1996/97 (South Gondar Administrative Zone, 1997). This evidence shows that there is still food deficit to match the demands for food. Analysis of the household level baseline survey data showed that low agricultural productivity and food insecurity are the results of many factors, which are many and probably interwoven. The causes can be grossly attributed to low level of land resource management, which lead to low agricultural productivity, access to resources, limited off-farm activities and poor infrastructure development. In Libokemekem district, it is generally hypothesized that the level of poverty is specifically related to farm resources such as oxen, land size, access to credit and infrastructure, although, the problems may vary from one household to another.

The measurement of poverty and analysis of food security by itself is a difficult task. As a result this study outlines the poverty in terms of proxy variables in relation to the condition of the household, without direct measurement of the level of poverty. The main purpose of this exercise is not to indicate the correlates of poverty but rather to argue that on both theoretical and empirical grounds there are numerous pitfalls in defining poverty in a single dimension-using variable related to gender differentiated households.

To this effect, a variable related to gender-differentiated farmers' classification of poverty has been used as a benchmark to show poverty at the household level. During the PRA survey farmers used farm size, number of oxen, area allocated for teff (*Eragrostis tef*) as a surrogate for wealth status. Those farmers having less than 0.5 hectares of land and with one or no ox were classified as extremely poor farmers and these groups are vulnerable to food poverty. Having such poverty indicators, an average household has less than one hectare of land with an average family size of 5 and some oxen or no ox while 30% of households have less than 0.5 hectares of land.

3.2 Diversification of crop production

The main crops for diversification are limited to few crops like teff, wheat and chickpea and lentil. Some horticultural crops like potatoes are commonly used as catch crops. The diversification is therefore limited. The risk is also high since farmers have a limited option for diversification. The major problem for diversification of crops is not lack of crop varieties but rather a limited land size often not more than a hectare of land.

On the outset, a household may allocate his/her land to various crops grown in the area to optimise the limited resources. If the land size tends to be a limiting factor, a farm household gives priority to the most preferential crop. That means he/she would allocate land either to teff or wheat based on their priority without much of diversification. Even those who have access to diversification use limited improved technology and hence productivity per unit area is very low for the preferred crops. This clearly shows that those farmers especially those having below a hectare of land and with no access to diversification are susceptible to food insecurity even with optimum use of the available technology. Crop diversification option is limited usually to one or two major crops and even worse for those farm households with an average family size of 5 and having less than 0.5 hectares of land (Table 1).

Table 1: The level of crop diversification by sex differentials in Libokemkem district, Ethiopia

		Sex of head	
Crop types	*Farm size in ha*	*Male (N)*	*Female (N)*
Teff	0	42	26
	0.12-0.37	26	15
	0.5-0.75	24	14
Wheat	0	30	24
	0.12-0.75	61	29
	1	0	2
Chickpea	0	72	42
	0.12-0.25	21	11
Potatoes	0	93	52
	0.12	1	3

Source: survey result

3.3 Food availability

The level of household consumption at anyone year is determined by what the household has initially produced and how much of the produce it has given away to meet its obligation. On a limited land the household consumption is very much limited to the

capacity of production to a limited crop with in a specific period usually one year. In addition, the crops produced and available for household consumption at anyone time may vary from one year to another due to unpredictable rainfall or weather change and hence consumption levels are not uniform throughout the year. Under normal years, there is enough food from end of November to May. The months of food availability often coincide during normal years with the time of harvesting, threshing and grain storage activities.

The months of June, July and August partly September and October are months of food shortages. Even the relatively food surplus seasons are crowded with cultural and religious festivals and weddings. This, though, has to do with social and cultural taboos, too much food is wasted which otherwise would be used for the family household consumption. Although these occasions seem to be temporary, some farmers sell their animals, while others take loan from local moneylenders with high interest rate to smooth out the food shortage. Under worst condition, some sell their assets to cope up with the food deficit. Table 2 shows that nearly all households employ more than one copping strategy to alleviate food shortages. Borrowing is the most common strategy employed

Table 2: Coping mechanisms in % by sex of households in Libokemkem district, Ethiopia

Mechanisms of indicators	*Male*	*Female*	*Total*
Borrowing	36	16.7	53.6
Aid	3.6	3.6	7.1
Gift	7.1	3.6	10.7
Selling assets	11.9	8.3	20.2
Off-farm	-	8.0	8.3

Source: survey data

by most of the households. Most households resort to informal credit since consumption credit is not available in the formal credit. Informal credit may take different forms mainly in kind. Credit in kind often includes grain and is usually paid back in equivalent doubling the amount borrowed. Such type of credit is usually easily available for borrowing and the transaction cost is very low for the borrower. Surprisingly enough, off-farm activities are one of the mechanisms employed by female households rather than male, although no statistically significant difference was observed. Females have more diverse opportunities than male and engage themselves in weaving, making local brewery etc, and use the income generated to overcome food insecurity. Most of the food insecurity is often transitional.

This variability in income affects the poor more than others. Obviously, women are the most vulnerable group, who are affected by the phenomenon, since it is they who are the majority falling in that category. Even those who have sufficient land but not oxen, have to arrange sharecropping or ox renting and hired labor. Whether this feature has

significant differential effects between male and female-headed households was examined using discriminate analysis based on hypothesized variables as shown in Table 3.

Table 3: Standardised canonical discriminant and classification functions *

Variables	*Canonical coefficients* †	*Coefficients/ linear discriminant Classification functions*	
		Male	*Female*
Number of oxen	0.688	2.25	1.65
Family size	0.579	0.117	0.026
Farm size (ha)	0.363	6.07	5.84
Priority of education (male/female)	-0.246	4.426	4.80
Fertility of the soil	0.187	2.78	2.15
Slope of the land	0.153	0.11	-.184
Black soil availability	0.057	17.46	17.9

* 66.4 % of original "grouped" cases correctly classified

† prior probability for each group is .500

Table 4: Summary of canonical discriminant functions

Eigen values	0.18
Cannonical correlation	0.39
Wilk's Lambda	0.842
Chi-square	23.15
Df	6.0
Significance	0.003

3.4 Factors influencing household poverty

It was assumed that since household food security is gender sensitive, about seven variables were hypothesized to influence the level of poverty and hence household level food security to discriminate between male-headed and female-headed households. Soil type (Black soil), fertility of the soil, slope of the land is considered as proxy for the availability of sufficient land to produce enough food. These factors tend to measure the physical quality aspect of the land. In addition to the physical factors related to land, number of oxen owned and farm size were considered as surrogate for wealth status while family size and priority given to education for male and female were considered in the household as proxy for human capital.

The result showed that the three variables, namely; number of oxen, family size and farm size discriminate level of poverty significantly between female and male headed households (Table 3). The remaining variables (as shown in the order of importance), priority of education (male/female) within the household, fertility of the soil, slope of the land and the availability of black soil discriminate poverty between male and female-headed households. The classification result shows that more than 66% of the group was correctly classified between the female and male-headed households.

Although the farm size, as it has been hypothesized, is an important factor of production, it should be combined with a pair of oxen to play a significant role. Nevertheless, most of the households have one or no oxen. This situation is worse with female-headed households than with males. Equity in distribution of land between male and female-headed households was not compensated by higher productivity due to lack of inputs. From the equation it is evident that the intensification of poverty, a case not unique to Libokemkem, has been largely attributed to shortages of resources in relation to the population pressure. The increasing shortage of land and other resources means greater male and female dependency in the household. Those who reach working age and want to marry do not have access to land and hence they remain dependent. Women are more vulnerable as they have to stay with the family and priority is often given to males in the household. The type of farmland as indicated by black soil type, fertility and slope of the land describes the quality of the farmland and hence clearly explains the differences in resource endowment between male and female-headed households.

3.5 Farm resource endowment and land resource management

The average family size is 5.5 in male-headed households as against 4.4 in female-headed households. The variability is however, very high within female-headed households. The average farm size also differs between female and male-headed households. The mean holdings in female-headed households are 0.809 ha as against 1.02 ha in male-headed households. Farm area can actually be classified as cultivated area (allocated to various crops), grazing area, forest, and unused area. The allocation of farmland to various crops depends on the priority of crops in the household (Table 5). Continuous subdivision and redistribution of the available land resulted in excessive fragmentation of landholdings and a decrease in the size of land. Some evidence in the study area indicates that land fragmentation has increased and is greater than the previous time (since 1992). On the other hand landlessness has decreased because of redistribution. The decrease in average land size holding, on the other hand, might probably be due to distribution and redistribution of land, which took place in the region. Distributional effect also resulted in various forms of tenure arrangement to acquire extra land, and is not however, the subject to be discussed in this paper.

Beside limited farmland, more than 80% of the farmers are aware of and perceived soil erosion problems as an important economic problem in constraining the productivity of the land. The effects of soil erosion were also perceived as major causes for the reduction in crop and pasture yield. As a result, many farmers at the household level have taken different forms of land conservation measures. The level of participation appears to have

Table 5: Average farmland holdings for various crops in Libokemekem district, Ethiopia

Resource category	*Male -headed (Area in ha)*	*Female headed (Area in ha)*	*Total*
Farm size	1	0.8	0.93
Wheat	0.33	0.34	0.33
Teff	0.41	0.38	0.40
Chickpea	0.31	0.28	0.30
Lentil	0.32	0.25	0.29
Rice	0.40	0.33	0.35
Potato	0.12	0.33	0.35

Source: Survey result

some forms of gender dimension.

According to the survey results, 58% of the male-headed households practice contour

Table 6: Soil and water conservation practices by sex difference in Libokemekem district, Ethiopia

Practices of soil and Water conservation	*Male (%)*	*Female (%)*	*Total*
Contour ploughing	58	64	60
Criss-cross ploughing	42	35	36
Flood control	9.7	2	6.8
Terracing	52	47	51
Check dams	43	30	38
Intercropping	9.7	13	11

ploughing while 64% of the female-headed households including those female household members practice the same (Table 6). Some 41% of the male farmers practice traditional soil conservation practice as against 35% in female-headed households. Close to 70% of the total sampled farmers perceived the practice as useful practice to control soil erosion and in this case contour ploughing is considered as the major control measure against soil erosion by the majority of farmers. In addition, 53% and 47% of the male and female-headed farmers respectively considered terracing as effective measure of soil and water conservation although it demands more labor. The major impediments to soil and water conservation measures, in general are lack of labor and willingness of the farmers to collaborate in terrace making. Labor shortage particularly is the most serious constraint within women-headed households.

3.6 Maintaining soil fertility

The dominant soils in the area are traditionally classified as brown soils. They are susceptible to erosion. The farmers perceived that due to continuous ploughing and soil erosion, the characteristics of the soils have changed and hence one finds predominantly less fertile soil at the top. As a result farmers use different mechanisms (a combination of indigenous and modern techniques) of soil fertility improvement. These techniques vary between households depending on land size, type of land and availability of labor. As shown in Table 7, the most commonly known practices include inter-cropping, com-

Table 7: Soil fertility maintenance as practiced by farmers (% respondents) in Libokemkem district, Ethiopia

	Head of household		
Types of practice	*Male*	*Female*	*Whole sample*
Inter-cropping	9.7	13.2	11
Compost	10.7	9.4	10
Animal dung (manure)	45.2	28.3	39
Crop rotation	91.4	92.5	91.8
Fallow	3.2	–	2.1

Source: survey result

post making and application on farm land, use of animal dung, crop rotation and fallowing. Crop rotation is the dominant practice followed by application of animal dung. About 90% of the farm households use crop rotations to improve the fertility of the soil. Crop rotation practices in general involve alternative combinations of cereals, legumes and rotational fallow within a 2-3 years cycle. They do not have definite rotational practice except they combine their indigenous knowledge of the farming systems with the environment and grow different mix of local varieties. This practice is almost equally applied between male and female-headed households. Only some 3% of the male households leave some of their land under fallow. Due to the population pressure (as in the central highlands of Ethiopia) and the consequent decline in farmland, fallowing practice is declining from time to time.

Female-headed households apply less animal dung as farm manure than males. Probably female-headed households tend to sell animal dung in the market and own less number of livestock than the male counterparts. Animal dung as organic fertilizer is more applied in the backyards compared to the farmlands located in a far distant area. On the other hand, it is often observed that the application of inorganic fertilizer is limited and often depends on the household's purchasing power and crop types grown. In fact, the limited number of farmers who use fertilizer apply sub-optimal level, as against recommended levels. Nevertheless, recent development in the area shows that there is a tendency of increased use of fertilizer. Fertilizers are often applied on most preferred crops like teff, rice, and wheat and to a lesser extent on pulses. The reasons for low use of inorganic

fertilizers include lack of purchasing power, non-availability of fertilizer at planting time, unpredictable weather, and use of alternative methods of maintaining soil fertility.

3.7 Afforestation

Although the effective area under forest is not known with certainty, deforestation and de-vegetation in the past have certainly contributed to severe soil erosion and low agricultural output. Nevertheless, this situation appears to be changing after the transition from collectivization of agriculture towards liberalized and private ownership. As a matter of fact, tree-growing status appears to be changing in response to the demand for fuel wood, construction wood, and other wood products in rural areas. The establishment of fuel wood projects played an important role in planting trees on private farmland (woodlots), farm boundaries and gardens in the area. More than 80% of the farmers have a tendency to expand tree planting for marketing, fuel wood, farm boarder fencing, animal feed and to a lesser extent to control erosion.

The most common species planted include *Eucalyptus globulus*, *Acacia albida*, and sesbania. Nevertheless, *Eucalyptus globulus* is the most dominant and fast growing species preferred by almost 100% of both female and male farmers for marketing, fuelwood and construction purposes. Eucalyptus serves as a cash crop and the planting has increased on woodlot. Some farmers even grow it on agricultural land for marketing. The justification is that they get better returns from growing trees than from crop, due to the opening up of markets far distant in the north. Nevertheless, they have got different management systems. Some use very dense (less than 30 cm) spacing, while some go up to 1 meter spacing. This management practice will clearly have an effect on the final harvesting and sale of forest assortment.

The farmers sell the products from eucalyptus in various assortments. They sell it as pole (*quami*), fuel wood and *atena* (thinner logs used for fencing). The price for pole commands higher market value than for fuel wood. Most farmers harvest the poles from the seedling stands after four years and second rotation from coppice stand after 3-4 years. Farmers with relatively large size of farm would like to allocate their land for tree planting compared to farmers with smaller size of farmland who would like to grow more crops and plant trees on farm boundaries. Although, the economic returns from planting trees seems to be attractive, because of the long-term benefit, farmers with limited resources allocate their land to crop production. Hence, in general poor farmers, particularly the women group plant less trees on their farmland. This situation clearly shows the need for intervention in the area of policy-oriented action in tree planting and development.

3.8 Determinants of land resource management

There are various factors affecting the management of resources at the household level. The mean values of the variables hypothesised to affect the land resource management (conservation measure) are shown in Table 8. These are age, soil type, farm size, sex of household, area under rice production, number of oxen, and slope of the land.

To see the effect of various factors on the adoption of conservation measures response

Table 8: Description of mean values of variable(s) in the analysis

Variable	*Description*	*N*	*Mean*	*Standard deviation*
AGEHEAD	Age of the head	149	39.97	10.00
BLAKSOIL	Have black soil	149	1.79	0.40
FARMSIZE	Farm size, ha	146	0.93	0.58
FAMLYSIZ	Total family size	146	5.17	2.00
REDSOIL	Have red soil	146	1.44	0.49
SEXHEAD	Sex of the head	149	1.37	0.48
RICEAREA	Area covered with rice, ha	149	0.005	0.45
NUMOXEN	Number of oxen owned	149	0.97	0.87
SLOPE	Slope of the land	149	1.58	0.70
SHTREFIR	Is there shortage of fire wood	149	1.18	0.39

models were fitted into the equation. conservation practice here considered as dependent variable is a combination of contour ploughing practice and agroforestry. These variables were found to be the dominant practices during the survey. The inverse-mills ratio, φ, which measures the probability of the household being an adopter, is used to address self-selection bias that may result, since adoption of agro-forestry and conservation was a voluntary choice exercised by farm households (Pattanayak and Mercer, 1998). Since data exists for non-adopters, it is not a matter of concern to the sample selection problem, which requires truncated regression. The probability of adoption can be specified as:

$$\varphi = \frac{\psi(\gamma'' \kappa)}{1 - \delta(\alpha' \kappa)}$$

Where κ is a vector of socioeconomic characteristics which explain the adoption decision, and ψ and δ are the probability density and cumulative distribution of the error term, respectively.

Out of the ten variables hypothesized to affect the probability of adoption of conservation measures, seven of them are found to significantly affect the decision (Table 9). Age of the household affects the decision of conservation negatively and significantly. This shows that older people undertake less conservation activities compared to the younger generation. This might be related to attitudinal changes and the availability of labor required for conservation. The availability of rice area within the household farm affects conservation positively. Rice production in the study area is getting increasingly more attention from time to time, although it demands capital and labor. Those farm operators with relatively larger area allocated to rice production give more attention to conserve the soil. Shortage of firewood also seems to compel farmers to use the practice for planting more trees, which also lead to conservation measure.

Table 9: Probit model of soil and water conservation adoption

	variables in the equation						
Variable	*B*	*S.E.*	*Wald*	*df*	*Sig.*	*R*	*Exp(B)*
AGEHEAD	-.0428*	.0221	3.7715	1	.0521	-.0959	.9581
BLAKSOIL	-1.5578*	.6631	5.5194	1	.0188	-.1352	.2106
FARMSIZE	-.5763	.5901	.9536	1	.3288	.0000	.5620
FAMLYSIZ	-.2075**	.1116	3.4560	1	.0630	-.0869	.8126
REDSOIL	-.1817	.5215	.1214	1	.7275	.0000	.8338
SEXHEAD	.0946	.4855	.0380	1	.8454	.0000	1.0993
RICEAREA	5.4963*	2.2404	6.0185	1	.0142	.1444	243.7812
DISTMKT	.1146*	.0543	4.4517	1	.0349	.1128	1.1214
NUMOXEN	.1489	.2878	.2676	1	.6049	.0000	1.1605
SLOPE	-.5037	.3385	2.2145	1	.1367	-.0334	.6043
SHTREFIR	1.5247*	.8437	3.2662	1	.0707	.0811	4.5939
CONSTANT	4.2906*	2.1260	4.0729	1	.0436		

-2 Log Likelihood: 143.651

Goodness of Fit: 175.073

4 Conclusion

Resource endowments and household food security are affected by various factors. As most of the households with large family size do operate on a limited scale of land, most of the households are food insecure. The food insecurity is different between sexes. Wealth status in terms of oxen ownership, farm size and quality of land (slope, fertility of the soil) on one hand, and education priority given to males and females influence or determine food security differences between male and female-headed households.

Farm households in the study area use different practices of soil and water conservation measure for management of their limited land. Soil conservation measures, soil fertility and afforestation are some of the identified measures employed on private farmland. Nevertheless, it is known from the study that these practices are affected by various factors. Age, family household size, type of soil, shortage of fuel wood, availability of rice area and slope of the land affect the conservation measures practiced by the farmers. There should be clear-cut policy directions to focus on measures that would bring about sustainability and equity between the two groups of households. Food security cannot be achieved without giving much attention to micro-credit, education and training geared towards sustainable resource management.

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