Dissertation

By

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ALEMAYA UNIVERSITY

MAGNITUDE AND DETERMINANTS OF RURAL HOUSEHOLD POVERTY IN CENTRAL ETIDOPIA: THE CASE OF BEREH-ALELTU DISTRICT

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ADANE NABSO FUFA

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Title of Thesis
Magnitude and Determinants of Rural Household Poverty in Central Ethiopia: The Case of Bereh-Aleltu District

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Dedication

This thesis is exclusively dedicated to all poverty prone people.

Biographical Sketch

The author was born in West Shoa Zone of Oromia Regional State, Bako District, Ethiopia on October 20, 1977 from his father Nabso Fufa Ababulo and his mother Zewdie Kure Gemechu. He pursued his education at Keku Bekerere Elementary School, Sheboka Junior Secondary School, and Gedo Senior Secondary School.

After passing the Ethiopian School Leaving Examination successfully, he joined Alemaya University in 1995/96 academic year and graduated with B.Sc. degree in Agricultural Economics on 10th July 1999.

Immediately, the author was employed by Oromia Planning and Economic Development on August 21, 1999, and served at branch office of Western Hararghe Zone for two years as an expert in the planning production section.

In 2000/2001 academic year, he joined the School of Graduate Studies at Alemaya University in Agricultural Economics Department.

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ACRONYMS and ABBREVIATIONS

ADLI	Agricultural Development Led Industrialization
AE	Adult Equivalent
ASE	Agri-Service Ethiopia
BADEO	Bereh-Aleltu District Education Office
CBN	Cost of Basic Needs
CSA	Central Statistics Authority
EHNRI	Ethiopian Health and Nutrition Research Institute
FAO	Food and Agricultural Organization
FDRE	Federal Democratic Republic of Ethiopia
FEI	Food Energy Intake
HH	Household
HIPC	Heavily Indebted Poor Countries
HPI	Human Poverty Index
IDA	International Development Association
IFAD	International Fund for Agricultural Development
IMF	International Monetary Fund
ISSER	Institute of Statistical, Social and Economic Research
KMs	Kilometers
MoFED	Ministry of Finance and Economic Development
NGOs	Non-Governmental Organizations
NSADD	North Shoa Agricultural Development Department
NSPED	North Shoa Planning and Economic Development
PAs	Peasant Association
PRSP	Poverty Reduction Strategy Paper
SD	Standard Deviation
SPSS	Stastical Package for Social Science
SSA	Sub-Saharan Africa
TLU	Tropical Livestock Unit
UNDP	United Nation Development Program
USD	United State dollars

Magnitude and Determinants of Rural Household Poverty in Central Ethiopia: The Case of Bereh-Aleltu District

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Abstract

Rural poverty is a complex, interlocked and multi-dimensional phenomenon. Different scholars attach different meanings to poverty. This implies that if poverty reduction strategies to be effective, sympathetic of the specific characteristics of individual groups are required.

In view of this, this study was carried out at Bereh-Aleltu district with the specific objectives of examining the extent of poverty and its determinants at household level. In order to attain this aim semi-structured questionnaire was prepared and the survey was undertaken in the three PAs of the district. This questionnaire includes family composition and their characteristics; land use system; crop-livestock enterprises; major agricultural constraints; consumption; expenditure; income, public infrastructure and copying mechanisms. To collect the data, two-stage random sampling techniques were employed. In the first stage, three PAs were randomly selected. Then proportionally individuals were randomly selected from the respective PAs.

For analytical purpose poverty index, descriptive statistics, logit regression model and marginal effect analysis were applied. Accordingly, by using expenditure per adult equivalent approach, the results of the studies reveal that 80% of the sampled populations were immersed in poverty. As well, the poverty gap and severity index were found to be 31% and 12% respectively. Whereas in Food Energy Intake Approach, those indexes are deflated to 70.8%, 25.4% and 9.11% in the order mentioned. Many socio-economics opportunities and constraints were explained with the help of descriptive statistics; and logit model was used to estimate the probability of being poor having dummy dependant for those household below

poverty line valued 1; 0 otherwise. All 11 hypothesized explanatory variables, interestingly, the direction of their association were as expected. The results of logistic regression shows that, the most six significant variables were: productivity of land associated negatively with the probability of being poor (at less than 1% of significance level), tropical livestock unit per AE associated negatively with the probability of being poor (at less than 5% of significance level), total family size in adult equivalent associated positively with the probability of being poor (at less than 10% of significance level), non farm income per household associated negatively with the probability of being poor (at less than 10% of significance level), dummy of education to complete at least primary school associated negatively with the probability of being poor (at less than 10% of significance level), and number of years modern agricultural inputs were used associated negatively with the probability of being poor (at less than 10% of significance level).

Shockingly, the probability of falling in to poverty was found to be 0.998. Nevertheless, when we observe the marginal effects of significant explanatory variables, above all, promotion of education, say from illiteracy to primary level, reduces poverty by half. Alike, increasing of TLU/AE has likelihood to reduce poverty by 7.418%. In like manner, increasing productivity of land, the use of modern agricultural inputs, and non farm income opportunity have a negative marginal effect on poverty by 4.523%, 1.3% and 0.032% respectively.

CHAPTER ONE: INTRODUCTION

1.1 Background

Ethiopia is one of the heavily populated poor countries in the world with about 63 million people of whom 85 % live in rural areas (FAO, 2001). The highlands, which extend over 40% of the land mass, are home to 80% of the human population and 75% of the country's livestock. Moreover, an economic growth averaged 5.9 percent during the period 1993-1999. This rapid growth was accompanied by a low average level of inflation of 3.9 percent over the same period. Nevertheless, external debt is estimated to be about $9.3 billion, or 142 percent of GDP. The climate is characterized by unreliable nature of the rainfall.

Having these economic background, Ethiopia has suffered from the main natural disasters, such as, drought-induced famines in recent times (1973/74 and 1983/84), which claimed hundreds of thousands of lives. Nearly, three-quarters of the drought-affected population were found in just three regions: Tigray, Wollo and Hararge (FAO, 2001). The probability of a drought occurring in Ethiopia is as high as 3 out of 10 years (FDRE, 1996). The moisture stress zones cover 55 percent of the total area of the country and an estimated 25 percent of the population lives in these areas (EPA, 1997).

Poverty is one of the triggering factors in the world, particularly in the developing countries. Reducing global poverty is the fundamental challenge of the 21st century. Despite economic progress in recent decades in many parts of the world, many people still live in conditions of

abject poverty. While social indicators have been improving, those for the poor remain generally much worse (World Bank, 2000a). Even though growth has reduced poverty through rising employment, increased labor productivity and higher real wages, till now could not be sufficiently mitigated (World Bank, 1995).

As identity of developing countries, though there is rich natural resource endowment and environmental diversity, poverty is aggravating in the rural areas of Ethiopia and worsening from year to year. Applying the poverty line proposed by Ravillion and others of the World Bank in the year 1994/95, that is US$ 1 per person per day, Dercon and Kirshnan (1996) showed that 31.3 percent of the total population of Ethiopia was below the poverty line at the beginning of 1994. Moreover, the proportion of people living below the poverty line is believed to be higher in rural areas than in urban centers (Mulat, 2001). In this country, excessive poverty is also interlocked with the problem of severe land degradation due to deforestation and erosion (Mulunch, 2001; Dessalegn, 2001). Additionally, the capacity of the nation to produce food to cope with alarmingly high population growth in Ethiopia is low causing low living standard, famine and poverty (Mulunch, 2001).

1.2 Statement of the Problem

In the year 1995, about 290 million people of Africa, which constitute about 46% of the total population of the region, live on less than $1 per day per person. Now, average income per capita is even lower than that of the 1960s. Incomes, assets, and access to essential services are unequally distributed. Those most vulnerable to poverty live in rural areas were largely

female-headed households (World Bank, 2000c). The regional poverty is also rising as indicated by inaccessibility to safe water, health and education, illiteracy, increased infant and child mortality rates, high incremental of population accompanied by parallel dependency ratios (ibid). In developing world as a whole, one third of the total population is estimated to live in poverty (World Bank, 1990).

Commonly, urban and rural poverty are closely linked. According to (FAO, 1997; 2001), in most developing countries, urban poverty is a consequence, at least partly, of rural poverty. In rural areas, livelihood insecurity pushes population towards urban centers in expectation of a better life. Accordingly, in the context of rural-urban migration, addressing rural poverty actually presents a formidable opportunity for preventing urban poverty (FAO, 2001).

In Ethiopia, poverty and destitution have become chronic problems. The World Bank's World Development Indicators (2000a) illustrate the grinding nature of Ethiopian poverty. For instance, Ethiopia ranks first among the poorest countries in the world with an annual per capita GNP of about US $120 in 1999, which is far below average for low-income countries, excluding China and India, which is US $290 at the moment. The World Bank's Global Poverty Monitoring estimates that close to 76 % of the population in Ethiopia live on less than US $2.00 per day in 1995 (World Bank, 2001).

In fact, famine-ridden areas of the Ethiopian highlands that occupy 44% of the national territory with 80% of the total population; further, overpopulation, political and economic

forces that relate to the peasant agriculture has exerted enormous pressure on the agro ecosystem making even life-sustenance hard for the desperate poor (Ayalneh, 2002, p.8).

For the last nearly four decades, its chronic food shortage has made the country to depend on external food assistance. Due to this, out of the total relief food needed, 35 percent was dispatched for Amhara region, 33 percent for Oromia, and 20 percent for Tigray (Mesfin, 1999).

To mitigate the problem, even though it is not always possible to cover all these dimensions to understand poverty at any level, the study of poverty is a continuous process, need to be supplemented by qualitative and quantitative measures (Mesfin, 1985; Mikkelsen, 1995; Peña-motenegro, 1999; FAO, 2001). Further research in this direction is continuously needed to identify the most vulnerable persons within each category (FAO, 2001).

In the study area, namely Bereh-Aleltu district of North Shoa Zone, the problem is not different. Agricultural land is under heavy population pressure accompanied by severe soil erosion. Drought and poverty are chronic in the area. Though some food aid was donated infrequently, systematic attempts have not been made in the district to study issues related to poverty.

Therefore, even if, the alleviation of poverty is not a simple task, a meaningful formulation and implementation of poverty alleviation strategies in the district requires an area focused

research. All these conditions call for a better understanding of current constraints to and opportunities for strategic mitigation of rural poverty.

Due to these, the main aim of this study is, to measure poverty at household level and, to examine the relationship between household poverty and different socio-economic characteristics of the household. In other words, a central issue in this study relating to poverty is the analysis of integrative and disintegrative forces at micro levels. Because, even if, the aforementioned opportunities and constraints are the true highlight of Ethiopia, now the majority of people in the rural areas are exposed to poverty which needs area focused research. As a result, identifying factors causing poverty at grass root level within poverty prone groups is of primary concern of the study.

Ultimately, in the study area, quantitative and qualitative factors that are expected to be a part and parcel of vicious circle of poverty were not studied yet. To achieve the goals of poverty reduction strategies, provided that there were enough resources to investigate the possible determinants, the bottom up research from real circumstances of the farmers is indebtable. This is because the different economic and climatic conditions in the various geographical areas of the country may call for different inter regional strategies of combating poverty.

1.3 Objectives of the Study

Rural households were prone to poverty. Despite a high proportion of the country living in the rural parts, until now, few attempts have been made at grass root level to identify and analysis the factors causing rural poverty. Therefore, the general objective of this study was to identify and analysis the main socio-economic factors of rural household poverty at Bereh-Aleltu district so as to answer some of the reasons why the poor is poor and examine its magnitude.

The specific objectives of this study were:

(1) to examine the nature and magnitude of poverty among rural households, and

(2) to analyze the determinants of household poverty.

1.4 Significance of the Study

It is expected that an understanding of the patterns of poverty and the relationship between poverty and socio-economic factors can provide the necessary basis to formulate appropriate measures & plausible intervention strategies. Therefore, the outcome will contribute towards perception of the extent of poverty problems in the society, its distribution and underlying features so as to help combating poverty in the study area as well as areas with similar characteristics. Therefore, local, international organizations and stakeholders benefit from the result of the study to direct their efforts of alleviating poverty. NGO's namely, Agri-Service Ethiopia which has been operating in the district is expected to be an immediate and direct beneficiary of the research output to mitigate the aggravating socio-economic factors of poverty.

1.5 Scope and Limitations of the Study

The study was undertaken in the Bereh-Aleltu district of North Shoa Zone of the Oromia National Regional State. The study covered only three peasant associations in the district with a total sample size of 120 household heads. Therefore, the scope of the study was confined to only the specified site with the mentioned sample size due to limited resources in terms of time, budget, and other facilities. Nevertheless, the result of the study can be used for the study area and other areas where there are similar socio economic circumstances.

1.6 Organization of the Thesis

The contents of this thesis have been grouped in to five main chapters. Chapter one deals with an introduction parts encompassing the justification of the study, such as problems of poverty, objectives of the study, and then the importance and scope of the study. In Chapter two the concept of poverty, measurement approaches and empirical findings currently were reviewed and poverty reduction strategy was explained. Chapter three describes the study area and methodological approach used in this study. Chapter four discusses the results of the study. In the fifth chapter, finally, the summery of the study and important policy implications were presented.

CHAPTER TWO: REVIEW OF LITERATURE

2.1 Concepts and Definitions of Poverty

Poverty can have different dimensions: it is reflected in incomes and non-monetary factors such as output, modes of production, attitudes, behavioral patterns, institutions, and socio-economic relations, political, social, cultural and psychological aspects of welfare. This clearly shows that income may not be an adequate indicator of well-being (Mesfin, 1985; Sen, 1992; Tsui, 1996; Andah, 1986; FAO, 2001).

It is being a multi-dimensional phenomenon there is no consensus on any common meaningful definition of poverty. Its perception varies by gender, age, culture and other social and economic contexts. For example, men may associate poverty with lack of assets, whereas for women poverty may be defined as lack of economic and physical access to sufficient food to lead a healthy and productive life. Younger men consider generating income as the most important asset, whereas older men cite as most important the status connected to traditional agricultural life style (Norton *et al.*. 1995, cited by Ayalneh, 2002 p.29). In developing countries, poverty is perceived as deprivation in physiological and sociological (World Bank, 2000b). As to physiological deprivation, people are poor because they lack income, food, clothing, and shelter, which have high correlation with basic need concepts. For example, inadequacy of housing shown by materials used for walls, roofs and floor, lack of accessibility of infrastructure such as electricity, potable water and sanitation; school-age children not attending school; and large number of dependency ratio. From sociological

deprivation point of view, poverty is perceived as outstanding in underlying structure, inequalities, and inherent disadvantages governing issues mainly on inequalities of distributional chain embodied in macro policy framework (UNDP, 1997).

For instance, chronic poverty is expressed as the state of having no future, food insecurity, and hopelessness and desperation (Rahmato and Kidanu, 1999, p.30). In this context, no future refers to the state where a person eats all he/she produces without having anything to spare, and food insecurity here implies the poor eats what he/she has, and goes to bed hungry when he/she hasn't. Therefore, having no means of livelihood, most are dependent on others and their living is pitiful. Whereas, hopelessness and desperation indicates fear, insecurity, dependency, anxiety, shame, hopelessness, isolation and powerlessness are feelings named by the poor as being associated with poverty. Therefore, all of these feelings have an impact on the poor people and their ability to move out of their situation. In a similar fashion, for the case of Ethiopia, poverty has to be understood as both deprivation of basic capabilities and low income (Sen, 1999, cited by Ayalneh, 2002, p.31).

Some of the special characteristics of rural poverty are summarized by Jazairy, *et al.*. (1992) as:

Material deprivation: inadequate nutrition, poor health and education, lack of clothing, housing, and consumer durables.

Alienation: Excluding from growth process such as new technology.

Isolation: geographical isolation (living in remote areas), lack of access to roads and communication, mass media, etc.

Dependency: weak bargaining power in social relations, e.g. landlord versus tenant, employer, versus employee, buyer and seller, creditor and debtors, etc.

Lack of participation: limited opportunity to participate in production, consumption, employment, and socio-political representation.

Lack of assets: measured by levels of holding, number of livestock, tools, etc.

Vulnerability due to natural factors (drought, flood, cyclone, and attack by locusts and other pests), changes in the market (collapse in commodity prices), demography (loss of earning member of family), health (illness) of earning members, loss of employment, war, etc.

Insecurity: the risk of being subjected to physical violence because of low social status or physical strength, gender, religion, race, ethnic or linguistic status.

Therefore, commonly, different scholars define poverty in different ways. One possible definition is '...the inability to attain a minimal standard of living' (World Bank, 1990.p.26). On the other hand, Minot *et al.*. (2000) defined poverty as household lying below the 25th percentile per capita consumption expenditure. Alternatively, poverty is defined as a scarcity of key resources in terms of development objectives. Poverty is, therefore, lack of basic human necessities, a condition arising largely from absence, scarcity or underdevelopment of requisite resources or attitudes towards the utilization of the resources (ISSER, 1993 cited by Edilegnaw, 1997).

The most frequently used definition of poverty, according to Parkin *et al.* (1997), is a state in which household's income is too low for it to be able to buy the quantities of food, shelter and clothing that are deemed necessary. In line with this, a related benchmark concept for poverty

is poverty line, which means a level of income or consumption that can sustain only a bare minimum standard of living (MEDaC, 1999; FAO, 2001).

Generally, there are two common sub-divisions of poverty. That is, absolute and relative poverty. Absolute poverty is "the inability to secure the minimum basic needs for human survival, i.e the income level below which individual households cannot meet minimum income to meet basic needs" (ISSER, 1993; MEDaC, 1999; FAO, 2001). Mesfin (1985) stated that absolute poverty means lack of food, cash and any assets. It is deprivation of the basic needs of life to meet the minimum level required for survival. In the context of Ethiopia, absolute poverty is often taken to mean lack of access to purchasing power sufficient (at least) to cover the cost of minimum basic needs (MEDaC, 1999).

The relative poverty reflects the differences in the level of living between the top and bottom strata of society (ISSER, 1993). According to MEDaC (1999), a relative poverty line is usually set at an arbitrarily selected fraction of the average income or expenditure in a country. So, the relative poor are defined as those people whose mean expenditure per annum falls below two-third of the national average expenditure per adult equivalent (ibid); and it varies with the level of average income in the country (MEDaC, 1999; FAO, 2001). Because of this, the concept of absolute poverty is preferred to relative poverty, which facilitates comparative analysis (FAO, 2001; Kakwani, 1993).

Accordingly, from the above explanation, the implication is that, the concept of poverty has been broadened beyond the notions of inadequate private income or consumption, towards a

more comprehensive perspective, and indicates that poverty is a relative concept varying from one country to the other. Hence, it is a relative concept such that poverty in one country might be considered as acceptable standard of living in another. Virtually, the notion of poverty may change overtime and place, but its core concerns, especially absolute poverty, are the inability to fulfill fundamental minimum requirements of the society.

2.2 Measurement and Indicators of Poverty

Some socio-economic indicators clearly explain that poverty exists in the country in its extreme form. For example, the status and availability of infrastructures, such as road, transport, communication, market, etc are very poor. Public utilities, such as electricity and water, are unavailable to a significant portion of the population (Mekonnen, 1999). Low level of human development is one of the ways poverty is manifested in Ethiopia. For instance, life expectancy is about 42 years, 75% of the population has no access to safe water, 54% is without access to health services and 81% without sanitation (UNDP, 1998).

At an international level, the situation of poverty has been measured using human poverty index (HPI) for 77 developing countries, of which about 42% were from the SSA region. Though this index excludes lack of political freedom and participation, lack of personal security and threats that is hardly obviously measurable and quantifiable, it includes life expectancy (health), access to education and income status. Based on this, the results of HPI range from 3% for Trinidad and Tobago to 62% in Niger. Accordingly, Ethiopia has been

ranked of 74th (UNDP, 1998). Similarly, as indicated in table 1, the life expectancy of Ethiopia, Ivory Coast and Uganda were below the average of the SSA region.

Table 1. Development Indicators for Some of the SSA Countries

Country	GNP per Capita		Life Expectance	School Enrolment (%)			
	US$	Growth Rate (%)	1998	Primary		Secondary	
	1999	1988-99	1998	1980	1994-97	1980	1994-97
Ethiopia	100	1.3	43	37	43	9	12
Ivory Coast	710	O.6	46	75	71	19	24
Nigeria	260	0.7	53	109	98	18	33
Kenya	360	0.0	51	115	85	20	24
Uganda	320	3.9	42	50	74	5	12
Ghana	390	1.5	60	79	79	41	-
Average for SSA	490	-0.7	50	81	78	15	24

Source: World Bank, 2001b.

As shown in table 2, by using international poverty line of 1 US$, 31.3% of the Ethiopian population lives below the poverty line of $1 per person per day, while 76.4% of the population lives under 2 US$ per day. For comparison purpose, the poverty levels in selected SSA countries are given Table.2.

Table 2. Poverty Levels in selected SSA Countries

Country	Survey Year	International Poverty Lines			
		Less than $1 per day (%)	Poverty gap (%)	Less than $2 per day (%)	Poverty gap (%)
Cote D'Ivoire	1995	12.3	2.4	49.4	16.8
Ethiopia	1995	31.3	8.0	76.4	32.9
Kenya	1994	26.5	9.0	62.3	27.5
Nigeria	1997	70.2	34.8	90.8	59.0
Uganda	1992	36.7	11.4	77.2	35.8

Source: World Bank, 2001a.

Concerning the measurement of poverty, one approach is based on the materialist view, which makes an important distinction between welfarist and non-welfarist approaches (Sen, 1979). The welfarist suggests that measuring of well being is entirely based on individual utility levels as measured by the person themselves while non-welferist gives little or no concern to an individual's utility.

In line with these views, economists have usually kept away from non-welferist way and support an assessment of well-being on utility information. Nevertheless, individuals themselves may not accurately give a judgment on the importance of nutrition attached to well-being (Ravallion, 1992). Therefore, the non-welfarist poverty comparison could be a best proxy because even if the poor are better off they may deceive it.

On the contrary, welfarist takes account of expenditure on goods and services consumed by the individual, valued at appropriate prices for both purchased and own produced; and takes into account leisure time, which is priced at appropriate wage rate. A basic assumption is that

households are rationally allocating resources so as to maximize his/her basic needs in the actual consumption behavior (Shaffer, 1996). Alike, economists perceived poverty in terms of economic deprivation. Then they argue that poverty can exist in a given society when one or more people fell to meet a level of economic welfare, which is established at a reasonable minimum either in absolute sense or by standard of that society (Lipton & Ravallion, 1995).

By implication, welfare measurement in terms of current consumption is better than that of current income because either part of the current income saved or inaccuracy may occur due to data collection. Therefore, due to consumption smoothing behavior of the household, current consumption would be a good indicator of well-being. On the other hand, according to Hagennaars (1991), welfare is theoretically the best basis for a poverty line definition. However, in practice, both the measurement problems and essentially the subjective nature of welfare cause a new set of problems. Therefore, even if this is the case in theory, most studies on the economics of poverty focus on income for practical reasons (simplicity of its measurement and comparison). Thus to measure poverty, income may be supplemented by such attributes of well-being as health conditions, nutritional status, life expectancy and achievements in education (Edilengaw, 1997).

The second approach involves income and expenditure measurement. Though there is a lot of literature explaining the debate of employing welfare comparisons on either of this, the preference argument lays mainly on the level of the development of ones country. As well, variability in income and saving issues are the most plausible reason. Income of the poor usually varies over time in fairly predictable way particularly in less developed countries,

which depends on rain-fed agriculture. Specifically, there is consumption smoothing and insurance opportunities available to the poor such as through saving and community based risk sharing (Ravallion, 1992).

Accordingly, as suggested by Friedman "permanent income hypothesis", which gives a white clue that permanent income may be represented more accurately by total expenditure, which more probably reflects the purchasing power of households better than measured current income. Because recorded income during a survey may be distorted or unavailable by transitory components such as windfall income; and then, leading to inadequate measurement of the real income (Kyerem & Thorbecke, 1991). According to the hypothesis, the marginal propensity to consume out of permanent income is high while transitory income would be saved (Hassen and Chandra Babu, 1991).

The other approach that suits to developing countries is Cost of Basic Needs (CBN) and Food Energy Intake (FEI) approach. Both methods stick to a daily nutritional requirement though they differ in estimation procedure. In FEI method poverty lines are set by computing the level of consumption or incomes at which households are expected to satisfy the predetermined normative requirement (say, 2100 calorie) (Greer and Thorbecke, 1986). Nevertheless, in CBN poverty lines are set by computing the cost of consumption good basket that enable the poor households to meet the nutritional requirement and with provision to an allowance for non-food consumption that are anchored on the consumption pattern of the poor (Ravallion & Sen, 1996). Understanding its comparability, any method for computing poverty

lines is likely to make a room for both consistency and specificity, even though, as to which methods to be employed is still debatable.

Fundamentally, there is a controversy in the measurement of poverty dimensions at both aggregate and disaggregated levels. Till now, a proper mapping of poverty has never really been done and that there exists considerable lack of co-ordination among concerned agencies on poverty measurements and trends, and on related analytical tools (FAO, 2001).

As a result, poverty is conventionally measured by the income or expenditure level that can sustain a bare minimum standard of living. For instance, internationally the 1990 World Development Report (WDR) used an upper poverty line of US$ 370 per year as a cut-off point for absolute poverty. Those whose consumption levels fall below that level are considered poor. The WDR also used a lower poverty line of US$ 275. Those whose consumption levels fall below that level are very poor (Mikkelsen, 1995).

Consequently, measurement of poverty is a challenging issue, so that different scholars used to employ different alternative measurements (Alderman and Garcia, 1993). Nevertheless, the most common measurements of poverty identified in the literature were absolute and relative poverty. Absolute poverty, measured in terms of a minimum level of calorie intake required for survival (say, 2100 intake per adult per day). It is the most common indicator of poverty. While relative poverty is measured interms of standards of living, which is considered to be below a national/international average (Haaland and Keddeman, 1984 and Ahmed *et al.*., 1991 cited by Mohammed, 2001, p.46).

For the purpose of identification of the poor, poverty line estimated with expenditure on food as a percentage of the total expenditure can be used as a norm and a cut-off. Therefore, all households and persons with per capita total expenditure below that level of which the expenditure on food say, 75% or 80% may be called poor. This percentage can be independent of calorie, as Dandekar (1981) suggested, or it may be based on calorie calculations. Another, approach is the per capita quantity of food grains consumed. In the absence of detailed physical data on consumption of items of food other than food grains, the total food grains consumed per capita per day is used as the norm for identifying the expenditure class and the poverty line (ibid). For Ethiopia, as (MEDaC, 1999) pointed out, the food poverty line was determined using a minimum food or nutrition intake (2200 calories per adult per day being the benchmark). The calorie intake is an important welfare indicator in the countries like Ethiopia where the food shortage is a usual phenomenon. For a low-income country, a level of income (or total expenditure) that was just able to ensure adequate food to every member of the household during the year. That is, minimum income may be considered, and all households with less income than this may be called poor, therefore. In order to translate food items in to some measurable quantitative form, calories provided from quantitative data of every individual food items is used(Rath, 1996).

Lastly, even though several approaches have been suggested and/or used for the purpose of poverty measures, poverty line is found as the yardstick starting point for poverty analysis in assessing well-being and determining who is poor and who is not as a main indicator (Rath, 1996; FAO, 2001; MEDaC, 1999). Based on this, three poverty measures identified by Foster

et al., (1984) may be employed. These include headcount index (HC); the poverty gap index (PG); and severity index or Foster-Greer- Thorbecke (FGT) index of poverty (MEDaC, 1999; ISSER, 1993 cited by Edilegnaw, 1997; FAO, 2001). Headcount index (HC) is defined as the proportion of the population whose measured standard of living is less than the poverty line. However, this index does not capture differences among the poor. The poverty gap index (PG) indicates the depth of poverty, which is, the difference between the poverty line and the mean income of the poor expressed as a percentage of the poverty line. This as well, has a drawback being insensitive to the distribution of income among the poor. Besides these, the widely used measure of poverty is the severity index. This measures the mean of the individual poverty gaps raised to a power reflecting society's valuation of different degrees of poverty. Therefore, the three poverty index was employed in this study.

As stated under the concept of poverty, poverty is not only measured by income and consumption deficiencies. Hence, a number of measurable indicators do widen the picture of poverty. Health, life expectancy, access to education and clean water, for example, are central dimensions of welfare and prosperity, the absence of which is a sign of poverty (Chamber, 1987). Other measurable indicator of poverty is vulnerability. As an aspect of poverty, vulnerability translates into three critical indicators: physical insecurity, crisis-proneness and coping capacities (Rahman and Hossain, 1995). Mesfin (1985) mentioned that undernutrition, life expectancy, and illiteracy are the most indicators of deprivation.

In wrapping up the aforementioned, the problems associated with poverty indicators, we follow for this study the common practice in taking poverty to mean a lack of command to

meet a person's typical food caloric intake just sufficient to meet a predetermined food energy requirement. Setting this predetermined food energy requirement is also not immune from problems although there are good reasons to use it. Estimates of daily per capita requirement vary widely from country to country. For instance, 2100 cal for Indonesia (Ravallion and Bidani, 1994), 2250 cal for Kenya (Foster *et al..*, 1986), 2300 cal for Ethiopia (Dercon and Krishanin,1998); a value of 2350 cal is recommended by the world Bank for the study of poverty (Schubert 1994 cited by Ayalneh, 2002, p.123-124).

2.3 Empirical Findings

Though it is believed and evidenced that the major attributing factor for rural poverty is a complex and integrated phenomenon, some findings on most causal effects are pointed as follows. Rural poverty is integrated in that its dimensions are interlocking. Pena-montenegro (1999) mentioned that the causes of rural poverty are not well known, since it is reflected in the disproportionate rate of failure of international and national poverty eradication programs compared to other types of development initiatives.

Parkin *et al..* (1997) & Mulunch (2001) reported that within any one country, poverty results from two main factors: limited access to high-paid employment and the extra costs associated with having children, which may vary through someone's lifetime. As FAO (2001) & Mesfin (1985) indicated, the primary sources of poverty are lack of assets, occupation, employment & wages; demographic factors (e.g. age, sex, family size and education); low income, health

and status; low factor markets (e.g. land and credit), all interact to constitute the overall process of poverty generation.

For example, in Asia poverty incidence is as large as to induce near despair, with 40% of the population estimated to be "absolute poor" to afford adequate nutrition (Lipton, 1988). Similarly, in Latin America, it was estimated that by the end of the 1980s 44% of the total and 61% of the rural population lived in rural poverty (Feres and Leôn, 1990). By using logit model in 1994, in Costa Rica, some selected variables were found to have effect on the probability of poverty such as head's employment condition, head's educational level, family size, and child dependency ratio, marital status of household head, and location of dwellers. In view of that, when employment condition is permanent, high education, low family size, low children dependency ratio, engagement in off farm employment have a positive effects on reducing the probabilities of being poor (Rodriguez *et al.*., 1994, p.392).

Adams *et al.*. (1995) and Lunch (1991) had employed a logistic regression model to examine the relationship between household poverty status and determinants of poverty variables. They have shown that poverty is determined by household income, which encompasses non-farm, agricultural, transfer, livestock, and rental income. In Pakistan irrigated land, rain fed land, value of livestock, capital, number of male per household, education, and migration were found to be significant variables (Adams *et al.*., 1995).

Similarly, Parkin *et al.*. (1997) pointed out that the major factors influencing household poverty are family size, economic status, age of household head, occupation, and related skill

and region of residence. Gender, religion, and race are also contributing factors. Alike, Haaland *et al.*. (1984) and Ahmed *et al.*. (1991) cited by Mohammed (2001, p.46) have found out that poverty levels mainly depends on household characteristics such as age, sex, education, health, asset ownership, etc; and wrong economic policies. Tesfaye and Yisehac (1998) used multivariate analysis, and showed that the main factors causing poverty in Bostwana were age of household head, sex of household head, education of household head, family size, and livestock ownership. Except family size; age, sex of household head if male, education, and livestock owned have a negative implication on the likelihood of rural household poverty.

Similarly, Edilegnaw (1997) demonstrated that the likelihood of poverty in Ghana were determined by education of household head, residence area, economicaly active working labor, migration, sex of household head, age of household head, land size and family size.

In the case of Ethiopia, poor households tend to be younger by 2.70 years, have large dependent ratio (27.5%), less education, have less access to land, and have less number of livestock wealth under their disposal (Ayalneh, 2002, p.140). He specifically used logit model and pointed out that age of household head, dependency ratio, location, education of household head, per capita household expenditure, sex of household head, family size, per capita household income, land holding, and oxen ownership were the main determinants of rural poverty. Among these, an increase in age, female household, educational levels, per capita household income, land size and oxen are negatively related with rural household poverty. In addition, the poor spends on average only 72% of the overall average per capita

consumption expenditure on food and the non-poor household spend 60% of the average per capita expenditure. From the 1995/96 CSA Household Income Consumption and Expenditure Survey, it was found out that at national level 45.5% of the population in the country are absolutely poor, implying that they are not in a position to sustain their life at least by fulfilling the minimum living standard (MEDaC, 1999).

By employing probit model to the national data it was found that age of household head, dependency ratio, family size, sex of household head, educational status, export crops, number of oxen owned, and non-farm activities were the main causes of rural poverty (MoFED, 2002). Accordingly, oxen ownership, age, sex of the household head if male, educational status and export of crops were negatively related with rural poverty. Summery of recent findings was presented in the table 3.

Table 3. Summary of Selected Rural Poverty Determinants

Authors	Year	Model Employed	Explanatory Variables	Poverty Index (%)		
				HC (α=0)	PG (α=1)	FGT (α=2)
Rodriguez *et al.*	1994	Logistic Regression	Dummy Sex of HH head, family size, dummy Marital Status of HH head, Age of HH head, Age squared of HH head, education of HH head in years, child dependency ratio, dummy employment situation, dummy location of residence	NC	NC	NC
Adams *et al.*.	1995	Logistic Regression	Irrigated land, rain fed land, total value of livestock per HH, Value of capital (tube well, tractor & tools), No. of male >15 years, No. of male in HH attain at least primary school, dummy internal migrant, dummy external migrant, & residence location.	NC	NC	NC
Edilegnaw Wale	1997	Logistic Regression	Education of HH head in years, Working age (18-64) years, non-farm income, Sex HH head, Age HH head in years, land size, family size in No., dummy location of residence	65.3[a]	23.7[a]	6.7[a]
Tesfaye and Yisehac	1998	Multivariate Analysis	Age HH head in years, dummy Sex HH head, dummy education of HH head if at least some primary school, Family size in AE, dummy of livestock ownership (low, middle, upper)	50[a]	17[a]	8.1[a]
Ayalneh Bogale	2002	Logistic Regression	Age of HH head in years, dependency ratio, dummy for location, education of HH in years, per capita household expenditure, sex of HH head, family size, per capita household income, land holding and oxen ownership	38[b]	4.7[b]	0.9[b]
				43[a]	7.3[a]	1.8[a]
MoFED	2002	Probit function	Age of HH head in years, Age squared of HH head, dependency ratio, family size in No, dummy education of HH head if at least some primary school, non-farm income, No. oxen owned, export crops.	47.5[a]	13[a]	5[a]

Note: NC=note computed; [b]=by using direct calorie intake approach; [a] = by using direct cost approach

Source: Own Compiled

2.4 Poverty Reduction Strategies

The situation of poverty manifested a long way to go in Ethiopia. It varies within a region and among the regions in the country. As a result, Ethiopia has prepared the Poverty Reduction Strategy Paper (PRSP) for promoting development and poverty reduction. The PRSP is organized by Ministry of Finance and Economic Development (MoFED) in May 2002, submitted to the World Bank and International Monetary Fund (IMF) to achieve the intended objectives, and now approved. The broad goals of the PRSP of Ethiopia comprise four main blocks, namely: Agricultural Development Led Industrialization (ADLI), judiciary and civil service reform, decentralization and empowerment, and capacity building in public and private sectors.

This strategy was initiated by the World Bank and IMF in 1999, in the context of debt relief for the world's poorest countries to provide debt relief and lending under the enhanced Heavily Indebted Poor Countries (HIPC) initiative. Wholly, the major principles underlying the PRSP focuses on the importance of country's poverty reduction strategy as paramount, enhancing the participation of civil society in the adoption and monitoring of PRS tailored to country's circumstances, for sustainability. For effectiveness of the strategy, understanding of the nature and determinants of poverty are much desired. To ensure these, the key medium and long-term goals for poverty reduction, key mainstay indicators are required so that the concerned policies and strategies are effectively implemented and consciously monitored. It is expected that the strategy help to reduce poverty through rapid economic growth, macroeconomic stability, structural reforms and social stability. These are required since

poverty is multidimensional nature. It enables the poor to increase their production capabilities, livelihood, and mitigate their vulnerability to risks. To summarize the above, integrated institutional, structural and sectoral interventions and a consistent macroeconomic framework is needed. The achievement also requires the consented effort of the concerned government partners, the World Bank and IMF; besides, that of regional development banks and other multilateral, bilateral assistance agencies, NGOs, private sector organization, academia and mass media (IMF and IDA, 1999; MoFED, 2002) are paramount.

On the other hand, at the household level, the knowledge about the copying mechanisms of the household during crisis is a crucial step in formulating a plausible development aid intervention aimed at poverty reduction.

As a principle, survival strategies of the poor can be grouped under three categories (Cornia, 1987 cited by Edlegnaw, 1977): strategies for the creation of resources, improvement of the use of existing resources, and family composition and migration strategies.

In the first strategy the poor increases the supply of labor to the economy, increasing self-production (households at times withdraw from market production and increase self-production or subsistence production), and changing assets -liability position such as increasing volume of sales of assets particularly livestock during crisis.

In adopting strategies for the improvement of the use of existing resources, the poor changes the purchasing habits, in food preparation and overall consumption patterns. Poor households,

which spend between 60 and 80 percent of their incomes on food, are forced, first to increase the proportion of food expenditure in total expenditure, then, to substitute cheap for expensive sources of calories.

In family composition and migration strategies, people just resigned themselves to the situation and tried to manage their affairs under the prevailing circumstances. That is, they either hire out their family for daily laborer or leave their environment and migrate to other places where they can survive.

Coping with poverty assumes that the poor are active agents responding to their life conditions in ways calculated to ensure their survival and their esteem in their communities. When the crisis occurs, the peasant is often burdened his entire obligation by consuming less, reducing his spending on the family, and foregoing certain basic benefits. Alternatively, peasants meet their burdens by borrowing or by selling capital assets only for the seek of postponing household's scarification for a while (Dassaleng, 1992, p 44). Therefore, in this study knowing the copying mechanisms of the household under their specific circumstances is a crucial step to intervene when they face a hardship for survival during crisis of poverty.

CHAPTER THREE: METHODOLOGY

3.1 Description of the Study Area

The research was conducted in Bereh-Aleltu district, North Shoa Zone of Oromia National Regional State. This zone has 12 districts with 303 peasant associations. It is situated between 8^0 55'-10^0 23' North, 37^0 01'-38^0 55' East at an altitude of 1000-3500 meters above sea level. Fiche, the capital city of this zone is located at 112 km away from the capital city of the country to the North. The total area of the zone is about 1,160,698 hectare. Climatically, North Shoa Zone has 54% high land, 28% middle altitude and 18% low land. While the average temperature ranges from 7.9^0c - 20.3^0c. As projected from 1994 population and housing census, the total population of the zone is about 1,302,185 in 2001 fiscal year. Of this, 92% and 8% are rural and urban dwellers respectively (NSPED, 2001).

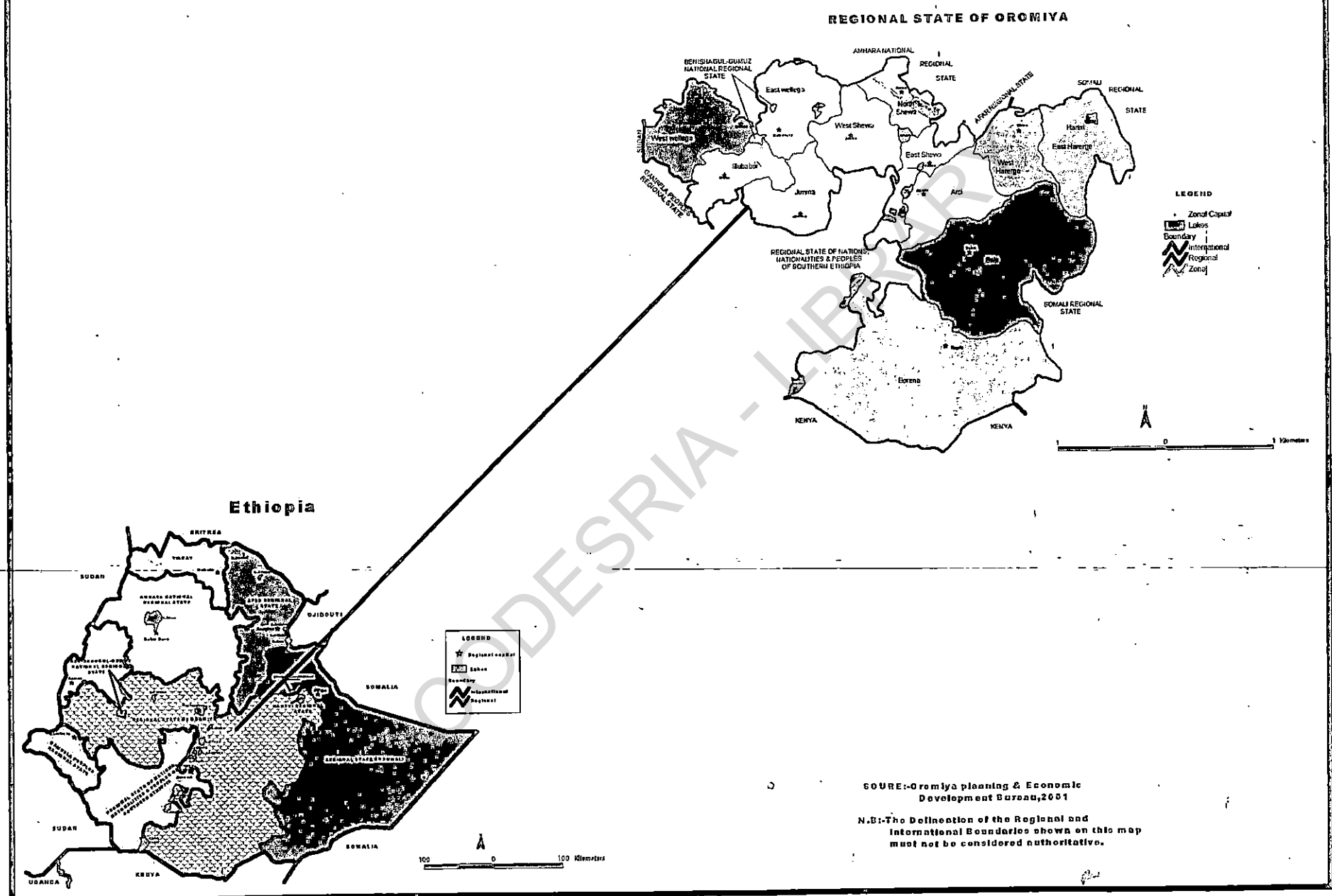
The study area is located at about 580 km away from Alemaya University. This district has 45 peasant associations, which are the largest number compared to all other districts in the zone. Its altitude ranges from 1400-2900 meters above sea level with average annual rainfall of 975 mm. The total area of the district considered is 12% of the zone. The soil type of the district is characterized by 12% red soil, 68% black and the remaining is brown type. The soil texture is 45% clay, 51% silt and 4% is sandy (NSADD, 2001).

The total population of the Bereha-Aleltu district is about 136,233 as projected from population and housing census of 1994, of which 91% is rural and the remaining is urban

dwellers. From estimated 124,347 rural population 49.6% are female and the rest are male (NSADD, 2001).

Livelihood of the population of the district relies mainly on crop production and some cattle rearing. The main crop produced is wheat followed by lentils and some teff, wild oat, haricot beans & barely in order of importance. The livestock reared are cattle, sheep, goats, horse, mules, donkey and poultry (ibid).The map of the study area was fully described in the subsequent page of fig. 1 and fig.2.

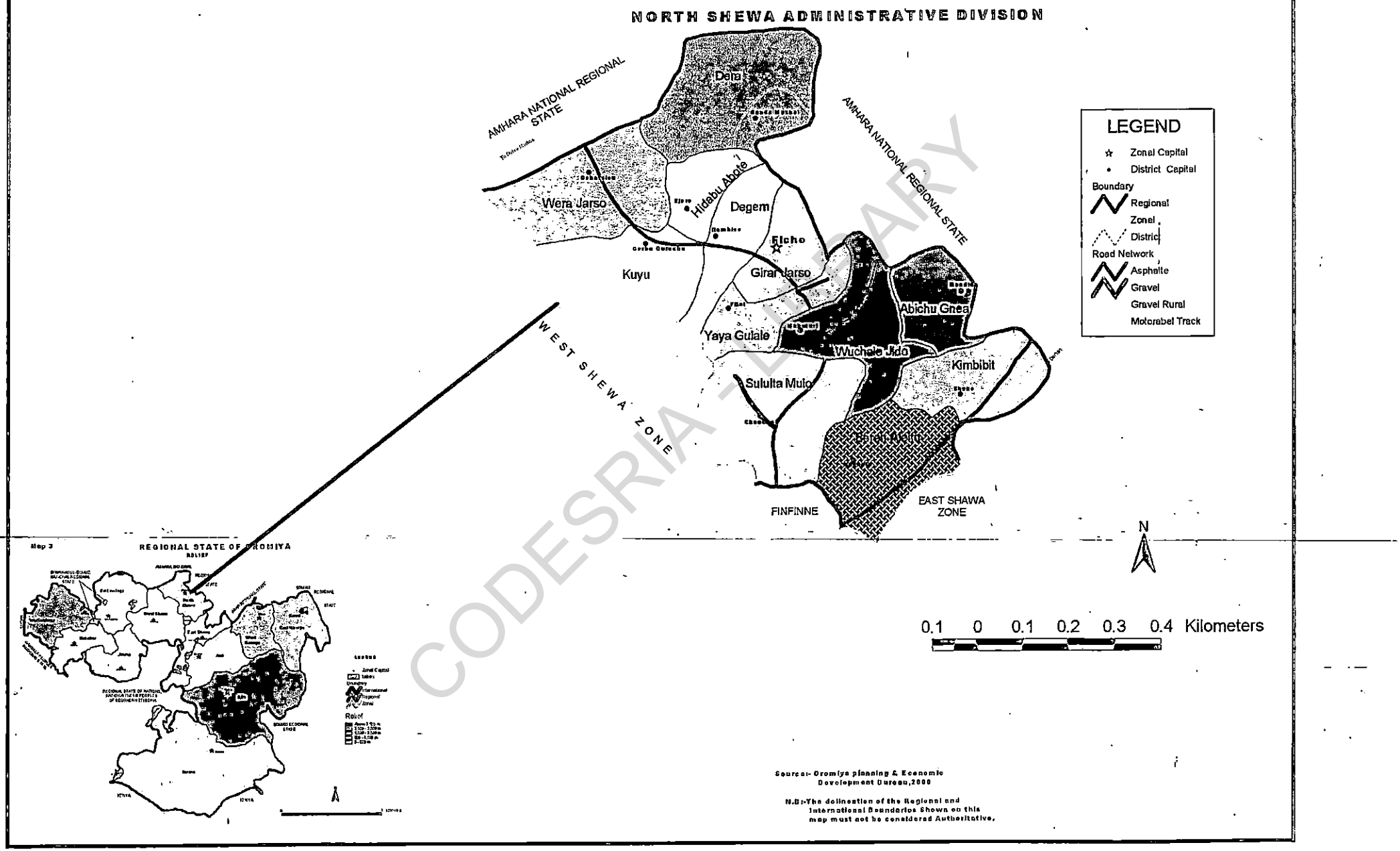
Fig.1 Map of Ethiopia & Oromiya Regional State by Zone



SOURE:-Oromiya planning & Economic Development Bureau,2001

N.B:-The Delineation of the Regional and International Boundaries shown on this map must not be considered authoritative.

Fig.2 Map of Oromiya Regional State & North Shewa by District



Source:- Oromiya planning & Economic Development Bureau,2000

N.B:-The delineation of the Regional and International Boundaries Shown on this map must not be considered Authoritative.

3.2 Methods of Data Collection

The data used in this research were collected mainly from a primary source of rural household located in three PAs in North Shoa Zone, Bereh-Aleltu district during August to September, 2002. A two stage random sampling procedure was used. In the first stage, 3 peasant associations were randomly selected. In the second stage, a total of 120 farmers were randomly selected. This sample size was assumed to represent the population since the study area is more or less homogeneous with regard to family size, age, level of education, income, expenditure, crop produced, livestock production, and access to credit services, non-farm activities, and traditional institutions (ASE, 2001 p.7).

The three PAs, namely, Bura Didibe Kike, Bido Tereko and Tebo were randomly selected to get insight about the representativeness of sample selected; then, proportional sampling technique was applied based on the number of household heads in each PAs.

Table 4. Sample Size by Peasant Associations

Name of PAs	Household		Sample
	No.	%	No.
Bura Dedibe Kike	428	19.9	24
Tebo	785	36.6	44
Bido Tereko	933	43.5	52
Total	2146	100	120

Source: Own Computation, 2002

Accordingly, 24, 52 and 44 households were selected and interviewed from Bura Dedibe Kike, Tebo and Bido Tereko PAs, respectively, by using semi-structured survey questionnaire, which was designed and pre-tested. Thus, the households were the main sources of information. Chandan *et al.*. (1995) confirmed that the method of interviewing individual is more reliable as the enumerators can explain the objectives and aims of the enquiry to the respondents and win their co-operations. The questionnaire covered information on household demographic characteristics, crop and livestock production, household income and expenditure, household consumption, problems of agricultural production, soil conservation, and ownership of assets, health facility, modern input, water, and etc.

For the data collection, nine enumerators with a minimum qualification of Diploma were recruited and trained. When the data collection was undertaken, each enumerator worked under strict supervision. Finally, after completion of the data collection, a day discussion was made with each enumerator to know the problems they encountered and how did they overcome concerning each questions.

In addition to primary data, relevant secondary data were collected from Agricultural, Education and Health offices, NGOs, namely, Agri-Service Ethiopia which is currently working there and various documents of Oromia Planning and Economic Development Bureau.

3.3 Methods of Data Analysis

The first step taken was distinguishing the poor from non poor. This was used as a framework in the poverty analysis and involves demarcation points which represents single yardstick namely poverty line obtained by quantifying the various indicators of well-being. Then, the extent to which the poor are represented in different groups is studied using simple descriptive statistics such as mean, frequency, standard deviation, etc. In addition to this, poverty index, which was specified underneath was used. Subsequently, binary logit model was employed to estimate the strength of the relationship of each factor with poverty when the other variables are controlled. Finally, marginal effects on the probability of being poor was examined with respect to each significant explanatory variables.

Additionally, conversion factors for tropical livestock unit (TLU) and adult equivalent (AE) have been employed from various sources so as to aggregate and compare with standard unit of measurement. Food consumption data have been standardized using food consumption table for use in Ethiopia (EHNRI, 2000).

3.3.1 Poverty Indices

With the increased awareness and availability of data, various approaches of poverty indices have been developed overtime. These indices are *Head Count Index*, *Poverty Gap Index* and *Poverty Severity Index*. Generally, the Foster, Green and Thorbecke class of poverty index is the most commonly applied. Accordingly, as Kakwani (1993) explicitly put forth:

suppose income (I) of an individual or household is a random variable with the distribution function $f(I)$, and let (Z) shows the poverty line. Then, $f(Z)$ is the proportion of individuals or households below the poverty line, obtained by dividing the number of poor (q) by the total number of people in the population (n), that is *head count index (HC).*

$$HC = \frac{q}{n} \qquad \text{.....(1)}$$

Nevertheless, the headcount ratio does not tell us whether the poor are only slightly below the poverty line or whether their consumption falls substantially short of the poverty line. Moreover, the head count measure also does not reveal whether all the poor are about equally poor, or whether some are very poor and others just below the poverty line.

This calls for the second poverty index called *Poverty Gap* that is specified as:

$$PG = \int_0^Z g(I) f(I) dI \qquad \text{.....(2)}$$

$$= f(Z)\left[\frac{Z - \overset{*}{I}}{Z}\right]$$

Where

$g(I) = \frac{Z - \overset{*}{I}}{Z}$, $f(I)$ is the density function, and $\overset{*}{I}$ is the mean income of the poor belonging to below poverty line category. Assuming that all the poor have exactly the same income, PG indicates the intensity of poverty. Therefore, PG can be used as an indicator of potential for

eliminating poverty by targeting transfer to the poor, where the poverty gap yields the minimum possible cost.

However, PG cannot adequately indicate the severity of poverty. Neither HC nor PG, or any combination of HC and PG adequately capture the idea of poverty. Because, some transfer from the poor to the better one but both remaining below the poverty line will not change either HC or PG, and combination of them. That means both HC and PG do not allow for inequality amongst the poor.

Therefore, as Sen (1976) stated, to make PG sensitive to the income inequality among the poor, the severity poverty measure is specified as:

$$FGT = {}_f(Z)\left[\frac{z - I^*}{z}\right]^2 \quad \text{.....(3)}$$

Where

$\overset{*}{I}$ is the mean income of the poor found below the poverty line.

$f(z)$ is head count index

Z is poverty line

FGT is severity index

This poverty index FGT gives greater emphasis to the poorest of the poor by weighting each poor person by the square of his/ her proportionate shortfall below the poverty line. FGT is more sensitive to redistribution among the poor in that a dollar gained by the very poor would have more effect on poverty than that gained by the moderately poor people. FGT is more

comprehensive, because it increases when the number of poor people increases, or the poor get poorer, or poorer get the poorest compared with other poor people (Foster *et al.*., 1984; Ravallion and Bidani, 1994).

Generally, to observe the effect of poverty aversion parameter, the Foster, Greer and Thorbeck (1984) class of poverty measure can be obtained by

$$P_{\alpha} = \int_0^z \left[\frac{Z - I}{Z} \right]^{\alpha} f(Z)dI \qquad \text{.....(4)}$$

Where

P is measure of poverty index

$f(z)$ is head count index

Z is poverty line

I is mean income of the poor found below the poverty line

α = poverty aversion parameter where $\alpha \geq 0$, and the commonly used values of α are 0, 1 and 2. This measure satisfies all the key desirable axioms of a poverty measure (Wodon, 1997) which are discussed below.

Thus, when $\alpha > 0$, P_{α} satisfies Sen's monotonicity axiom which states that a reduction in the mean income of the poor individual, given other things, must increase the poverty measure. If $\alpha > 1$, P_{α} satisfies Sen's weak transfer axiom which states that a pure transfer of

income from a poor individual below poverty line Z, to another richer individual must increase the poverty measure, ceteris Paribus (Sen, 1976).

When α>2, P_α satisfies Kakwani's transfer sensitivity axiom which states that if a transfer of income takes place from a poor person with income I to a person with income (I+γ), then for a given γ >0 the magnitude of increase in the poverty measure decreases as I increases (Kakwani, 1993). As Ravallion (1992) stated, though there are many poverty measurement indices, for this study Foster, Green and Thorbecke poverty index is employed since it captures the most desirable properties, decomposable and can be subgroup consistently.

3.3.2 The Model

In this study, after defining the poor, the binary model which uses a dichotomous variable is defined as a dependent where it assumes a value of 1 if the household falls below poverty line i.e. poor with the probability of P_i, or a value of 0 if it is non-poor with the probability of 1-P_i . Estimation of this type of relationship requires a qualitative response model. In view of this, the linear probability models, such as, logit and probit are among the possible alternatives that can be used. Several estimation problems occur particularly, when ordinary least square (OLS) regression and linear probability models are employed (Aldrich and Nelson, 1984; Gujarati, 1988). When the dependent variable is binary (0, 1), OLS regression technique produces parameter estimates that are inefficient and heteroscedastic error structure. As a result, hypothesis testing and construction of confidence interval become inaccurate and misleading (Aldrich and Nelson, 1984). Similarly, a linear probability model may generate predicted value outside 0-1 interval, which violates the basic tenets of probability (ibid;

Gujarati, 1988). It also creates a problem of non-normality, heteroscedasticity of the disturbance term; thereafter leading to lower coefficients of determination (Gujarati, 1988). To alleviate these problems and produce relevant outcomes, the most widely used qualitative response models are the logit and probit models (Amemiya, 1981).

Feder *et al.*. (1985) have recommended probit model for functional forms with limited dependent variables that are continuous between 0 and 1, and logit models for discrete dependent variables. Though, logit and probit models produce similar parameter estimation, a commutative logistic regression model is preferred (Agresti, 1990); and it is advantageous over others in the analysis of dichotomous outcome variable in that it is extremely flexible and simple model from computational point of view and meaningful interpretation (Hosmer and Lemeshew, 1989). Therefore, for this study, logit model is used.

Specification of the model:

$$P_i = \frac{e^{Z_i}}{1 + e^{Z_i}} \quad \text{.....(5)}$$

Where: p_i is the probability that a household is poor; 1-P_i is the probability of being non-poor.

$$Z_i = a_0 + \sum_{i=1}^{n} a_i X_i + u_i \text{.....} \quad (6)$$

where, i=1, 2,..., n; n= the number of explanatory variables

a_o = intercept

a_i = the coefficient of explanatory variables.

u_i =disturbance term

X_i = explanatory variables: experience of using modern agricultural inputs (years), age of HH, sex of HH, livestock asset, productivity of land, educational level, completion of primary school, frequency visit of extension expert, non-farm income, family size and child dependency ratio.

$e \cong 2.71828$

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

$$1 - p_i = \frac{1}{1 + e^{Z_i}} \quad \text{.....(7)}$$

The odds ratio is simply the ratio of the probability of being poor (P_i) to the probability that it would be non-poor. But P_i is non linear not only in X_i but also in a_i which creates an estimation problem. So, we cannot use the familiar OLS procedure to estimate the parameters. The odds ratio is specified as:

$$\frac{P_i}{1 - P_i} = e^{Z_i} \quad \text{.....(8)}$$

Therefore, to get linearity both in variable and in parameters we take the natural log of the odd ratio. As P goes from 0 to 1, the logit Z goes from $-\infty$ to $+\infty$. That is, although the

probabilities (necessarily) lie between 0 and 1, the logits are not so bounded (Gujirat, 1996). The model is estimated through iterative maximum likelihood procedure with the help of SPSS computer software. The coefficient of the logit model presents the change in the log of the odds (poverty as a 0 or 1) associated with a unit change in the explanatory variable (Hanushek and Jackson, 1977 as quoted by Edilegnaw, 1997).

$$\ln\left(\frac{p_i}{1-p_i}\right) = \ln(e^{z_i}) = z_i \quad \text{.....(9)}$$

However, after estimating the parameters a_i in equation 6 we would like to predict the marginal effects of any significant explanatory variables on the probabilities of any observation belonging to either of the two groups. To compute this effect of a particular explanatory variable the following formula is used (Maddala, 1993):

$$\frac{\partial p(y=1)}{\partial x_i} = \frac{\exp(x_i' a_i)}{[1+\exp(x_i' a_i)]} a_i \quad \text{..... (10)}$$

This was derived under assumption for the distribution of disturbance term (U_i) has a cumulative distribution in logistic regression. Thus,

$$y_i^* = x_i a_i + u_i \quad \text{..... (11)}$$

Where,

y_i^* is the underlying latent variable, that indexes the measure of poverty which is in principle unobservable but exhibits itself in a binary response variable such that:

$y_i = 1$ if $y_i^* > 0$; 0, otherwise.

3.3.3 Hypothesis Setting

The general statement to be tested is that if any independent variable is positively associated with poorness, it is expected to aggravate the poverty status while those independent variables that are negatively associated with the poor status are believed to mitigate the problems.

Dependent variable: in the analysis of determinates of poverty, the status of the household is taken as dependent variable having dichotomous value that assumes a value of 1 if a given household belongs to poor; 0 otherwise. Those households who could attain 2100 calorie /AE/ day are classified as non-poor and assigned 0 value while those households who were unable to fulfill this calorie level are identified as poor and assigned a value of 1.

Independent variables: any exogenous variable having negative coefficient is expected to decrease the undesirable poverty status, which is our main interest to build up in the policy implication and area of intervention. On the other hand, if other explanatory variables are found to be positively related to the poverty status, it is expected to deteriorate the well being of the households which should be counter acted in a plausible means of intervention. Therefore, some selected prominent independent variables to be tested in this study were selected based on theories and the scientific research done somewhere else as given below.

1. **SEXHH**: This refers to sex of the head of the household having a binary value. If the household head is male it takes a value of 1; 0 otherwise. Here it is proposed that the probability of being poor diminishes if the household head is male. Because, male household heads have more power to involve in the harsh working conditions like involvement in farm production and non-farm activities to generate resources for the family while female headed households are participating mainly in less income generating activities such as fetching of water, weeding, food preparation, etc.

2. **AGEHH**: this is a continuous explanatory variable designating age of the household head. The likelihood of being immersed into poverty is inversely related to age. As age of the household head increases, the person is expected to acquire more experience and endowed with more assets.

3. **ADEQVT**: total adult equivalent in the household representing the total family size adjusted to adult equivalent. There are two views arguing the effect of family size on the welfare of the household. One argument is that as family size increases there is an advantage of consumption economies of scale. In contrast to this, there is another convincing argument that as family size increases the probability of poverty would increase by creating disgussed unemployment so that its effect is more of the economies of consumption scale. In this study, the later statement is more likely to occur. Because, considering the real circumstances of Ethiopian rural dwellers, they have less capital to work with but high population pressure. Therefore, this variable is

expected to influence the well being of the people negatively, and associated with poverty positively.

4. **CHILDTA**: is the ratio of children less than 14 years to total family (childdependency ratio). The expectation is that, with high number of economically inactive children in the family, the burden of dependency on the shoulder of the household would increase. Hence, poverty would also increases.

5. **LEDHH**: this variable stands for educational level of the household head. The household head is highly influential decision maker in the Ethiopian family. He/She also engages in the income generating activities and leads the family. Hence, his/her education level has a positive impact on the welfare of the family so that inversely related to poverty.

6. **DUMEDUP**: This is a binary variable taking value 1 if the household head completed at least primary formal education; 0 otherwise. In addition to the real level of education, the dummy variable was also taken care of because there is a premise that, a minimum of 10 years threshold for education to make a difference in living standards as the critical threshold level is required (Manawabe and Mueller, 1984 cited by Tesfaye and Yisehac, 1998, p 7). According to Tesfaye and Yisehac (1998), however, none of the other poverty studies attempted to determine such a threshold. Hence, it is not yet evident whether the threshold for education makes a significant difference in the living standards and brings about substantial reduction in poverty.

7. **NONFRDE**: this is non farm income per household per year. Some of the households in the study area earn their livelihood from non-farm activities. If this non-farm income is significantly high, it is expected to decrease the probability of being poor. Hence, the availability of non-farm income per household is proposed to be one of the determinants that influence poverty negatively.

8. **YRSEXTSV**: this is the number of years that the household has been using modern agricultural inputs such as fertilizer, improved seeds, herbicides and pesticides etc. subsequently from its inception till the survey year. As the use of modern technology increases production, its use over many years is presumed to reduce poverty.

9. **EXTVIST**: this is a dummy variable for extension agents visit, having a value of 1 if the household has got advice from the extension agents for the past five years; 0 otherwise. Obviously, supplying of physical agricultural input to increase the productivity of land is not enough by itself, unless accompanied by proper application of the inputs. Therefore, the contact of agricultural extension agent has an implication on how to manage the resources and utilize properly in enabling the household to enhance the welfare level and copying with harsh economic crisis. Therefore, the household visited by extension agent, is expected to increase his/her living standard and reduce poverty level.

10. **TROCADT**: Livestock holding. It is expressed interms of Tropical Livestock Unit per adult equivalent. As an asset, livestock Ownership makes a positive contribution to the wealth of household. For instance, ownership of livestock is more likely to benefit from cultivated land, access to education and serve as collateral in obtaining credit. They also provide direct products that could be either consumed or sold. This implies that it is expected to have a negative implication on poverty.

11. **PRODCERL**: This represents productivity of land in cereal crops production. Land productivity is taken as proxy for fertility of land. Here, it is hypothesized that it is the quality of cultivated land rather than its size that has a more likely negative effect on poverty. The productivity of cereal land in quintal per hectare is considered, because in the study area the household's livelihood is mainly dependent on cereal production.

3.3.4 Methods of Estimation

In order to proceed with the econometric analysis, determination of poverty line is a crucial step. Generally, poverty line here means the level of consumption, which is deemed to be the minimum required to meet the basic needs of the household.

However, not to overlook in this study, income per capita as a welfare indicator in the threshold poverty line setting is excluded for the main reason that income in a season is often very lumpy in the peasant rural economy. For instance, Ethiopian rural household relies mainly on agriculture, from which it earns a relatively large amount of cash during some

years, and receives very little during other years. Another reason is that income is more of a measure of potential welfare than realized one. Truthfulness of respondents' income report, coupled with, assigning income values to the proceeds of each activity is another challenging one.

Practically, there are two commonly used methods of demarcating the poor from non poor households: cost of basic needs and caloric consumption (food energy intake) approach. Considering expenditure, a national average per capita consumption expenditure that was established by CSA (1997) has been considered. This threshold level is 497 Birr per adult equivalent per year.

To examine the poverty status of the household by using consumption expenditure, the per capita consumption expenditure of the household was determined by taking the cost of food bundle and making an allowance for non-food component, which was collected from the real expenditure of the household.

The second approach is food energy intake. In this case, a basket of food items typically consumed by the household is converted to grain equivalent by using the conversion factors published by EHNRI (2000). Then a typical household's caloric intake per adult equivalent per day was compared with 2100 caloric intake per adult equivalent per day as a household level of poverty line. If the household falls below this line it was labeled poor and those household who at least meet this threshold level was categorized as non poor.

Actually, the food energy intake approach of poverty line was preferred in this study than the per capita consumption expenditure on the following ground. The first justification is the price variability. As Ayalneh (2002, p. 126) noted, there is a significant variation in the price of goods, particularly of agricultural produces between different seasons. Obtaining appropriate prices becomes more crucial as price dispersion in rural Ethiopia is high, owing to time required to perform arbitration (Deaton, 1995). The poor infrastructure also hinders the development of efficient markets to serve rural households. Therefore, relying merely on average price can mask particularly transient seasonal poverty.

Second, the approach assumes the availability of these commodities in the local market and that the local units of measurements are standardized, which is actually difficult to believe in the real conditions of rural Ethiopia. Hence, after observing the extent of poverty by employing the two approaches, the food energy intake threshold level of poverty line was used in the subsequent analysis for the sake of demarcating the poor from non poor households.

To this effect, in the food energy intake approach, in order to translate adequate food into some measurable quantity form, Dankekar and Rath (1996) used calories provided by the food to the household. However, no separate norms were considered for the non-food requirements of the household. Hence, whatever the observed level and pattern of expenditure on non-food items, the level of income (or of total expenditure) which permitted to provide food with the level of calories on average to the members of the household was assumed to be reasonable for the purpose of defining the poverty line (Rath, 1996. P. 77).

Contrastingly, Rao stated, "Poverty has to be identified with deficiency in the total level of living. And, total level of living includes not only energy requirements but also balanced diet needed for human existence at a tolerable level "(Cited by Rath, 1996. P. 77). Nevertheless, no one has done this (ibid). Therefore, it is better to compare expenditure on food and non food with food energy intake. It is faire also to take either of them that most suits without underestimating or overestimating the magnitude of poverty in relation to studies previously conducted on poverty.

Therefore, observing the two popular methods of measuring poverty, namely, cost of basic needs and food energy intake approaches, the later norm of defining poverty line was used. Besides the reasons mentioned above, it was observed from the collected data that different individuals have been assigning different price for the same goods, especially on food items.

In the procedure of estimating the caloric intake of the household from the data collected, gender specific distribution of food among the household was taken care of. Then, the caloric intake was computed from the recommended requirement set by Ethiopian Health and Nutritional Research Institute. As a result, the consideration of energy intake approach is a plausible one for this study.

However, in order to compare the consumption expenditure approach with that of the caloric intakes goods consumed per AE (i.e. produced or purchased) the consumption is converted into monetary terms using prices obtained directly from the respondents and the total non-

food expenditure of the household per AE. This value was compared with 497 birr per AE of the national average requirement established by Ethiopian Central Statistical Authority (1997). Subsequently, in the caloric intake approach each food item (i.e. produced or purchased) is changed to caloric supply, and compared with 2100 calorie per AE per day as benchmark which is the poverty line. Generally, the definition of the poverty status of the households appeared to be similar. However, due to the arguments provided earlier, the definition of the poverty status is based on the caloric intake for further analysis.

Hence, hereafter, the households who are able to meet at least that poverty line are designated as non poor while those who could not attain the poverty level are designated as poor.

Therefore, as stated in the model specification part, a dependent variable is a status of household appearing as a dichotomous variable such that it takes a value of 1 if the household is poor; 0 otherwise. But there are about eleven independent variables, which are supposed to affect this dependent variable.

Before considering the hypothesized variable as a candidate to be analyzed with the help of logit model it is very essential to verify the existence of series multicollinearity among the independent variables. Because the existence of multicollinearity will affect seriously the parameter estimate (Kothari, 1990).

To check for multicollinearity, the tolerance (TOL) measure diagnostic among continuous independent variables was used. This is defined as

$$TOL_j = 1 - R_j^2 \quad \text{..... (12)}$$

$$= \frac{1}{VIF_i} \quad \text{..... (13)}$$

Where, VIF is Variance inflation factor; and R_j^2 is Coefficient of determination.

Clearly, in an extreme case, TOL_j is 1 if X_j is not correlated with the other regressors, whereas it is zero if it is perfectly related to the other regressors. The decision rule is that when TOL_j is less than 0.1 it is a serious problem (Gujarati, 1995).

Similarly, in the case of discrete variables, the coefficients of contingency were computed from the survey data:

$$C = \sqrt{\frac{x^2}{n + x^2}} \quad \text{.....(14)}$$

Where, C= contingency coefficient, x^2 =Chi-square test and n= total sample size.

The next step is parameter estimation. Due to non-linearity of the logistic regression model, an iterative algorithm is necessary for the parameter estimation. The maximum likelihood method of estimation suggests choosing estimates from the values of the parameters that maximizes the likelihood function. But, in many cases, it is convenient to maximize the logarithm of the livelihood function rather than the non-transformed likelihood function and the same results are obtained (Maddala, 1992).

Another test is an independent sample test between the groups. This is employed by using t-statistic to test the significance of a given independent variable on the poorness i.e on the poor and non-poor group. Specifically, t- test is used to check the mean values differences of continuous variable in the two groups (Lind and Mason, 1994). In employing the t-test, two cases are considered: assuming equal variances of the two samples when levenen's test is insignificant, if not, unequal variances assumption would be employed. The chi-square test would be employed to test difference between the two groups in terms of discrete variable.

CHAPTER FOUR: RESULTS AND DISCUSSION

In this chapter, the analysis of poverty has been undertaken with the help of poverty index, deceptive statistics, and then econometric model.

4.1 Magnitude of Poverty

To examine the magnitude of poverty under the two approaches, the result shows that the percentage of poor people measured in head count index (α=0) from the norm of the total expenditure enabling an adult equivalent to obtain 497 birr per year indicated that about 80% (table 5) of the total sampled household live below poverty line. While in using caloric intake poverty line of 2100 per AE per day as benchmark, about 70.8% of the total sampled households are living under poverty line (table 6). From this, the expenditure approach is exaggerating and has showed that the number of poor living below poverty line is so much high in relation to the pervious studies (table 3). The poverty gap index (α=1) is also higher when the expenditure approach is used. That is, on average 31% and 25.4% of the total poverty line are short of fulfilling the expected basic subsistence, respectively, when the expenditure and caloric intake approaches are used. This index clearly shows the extent of the intensity of poverty. That is, the distance between status of the poor group and poverty line weighted by the proportion of the poor in the whole sampled household. Nevertheless, the *FGT* severity index (α=2) in consumption expenditure shows that 12% fall below the threshold line implying sever inequality. In the case of caloric per AE per day, this index was found to be 9.11%. This implies that the expenditure based of poverty measurement shows a

substantial presence of poor household in the study area than calorie intake based on measuring poverty. Nevertheless, the figure of poverty indices are higher than the previous study (table 3) due to high number of poor in the study area.

Table 5. Distribution of Sampled Household Expenditure by Groups and the Poverty Index

Birr /AE	Poor (n = 96)		Non poor (n = 24)		Overall (n = 120)	
	No.	Percent	No.	Percent	No.	Com.Percent
≤250	30	31.25			30	25
251-350	32	33.33			32	51.7
351-497	34	35.42			34	80
498-650			13	54.17	13	90.8
651-800			8	33.33	8	95.5
801-1000			2	8.33	2	99.2
≥1001			1	4.17	1	100
min(Birr/AE)	119.9		502.03		119.90	
max(Birr/AE)	487.83		1190.56		1190.56	
mean(Birr/AE)	304.38		664.92		376.49	
SD(Birr/AE)	88.35		160.35		179.37	
HC	80%					
PG	31%					
FGT	12%					
		t-Value=10.62		P<0.01		

Source: own survey, 2002.
Note: 1$ = 8.56 Birr

The minimum and the maximum expenditure per AE for the year was 119.9 and 1190.56 birr, and the mean expenditure for the poor and non poor group is 304.38 and 664.92, respectively.

Generally, on average the distribution of expenditure between poor and non poor is significantly different at a probability of less than 0.01 level (table 5).

Table 6. Calorie Intake per AE per day of the Sampled Household and its Poverty index

Caloric /AE/day	poor (n = 85)		Non poor (n = 35)		overall (n = 120)	
	No.	Percent	No.	Percent	No.	Com.Percent
≤ 1700	65	76.47			65	55
1701-1800	5	5.88			5	59.2
1801-1900	5	5.88			5	63.3
1901-2100	10	11.77			10	71.7
2101-2300			7	20	7	76.6
2301-2700			11	31.43	11	85.8
≥2701			17	48.57	17	100
min(Cal/AE/day)	466.8		2101		466.8	
max(Cal/AE/day)	2013.50		4251		4251.98	
mean(Cal/AE/day)	1347.05		2967.19		1819.59	
SD(Cal/AE/day)	406.37		835.69		628.95	
HC	70.8%					
PG	25.4%					
FGT	9.11%					
t - value = 10.95 P< 0.01						

Source: own survey, 2002

The minimum and maximum caloric intake per AE per day was found to be 466.8 and 4251.98 for the poor and non poor groups, respectively. Statistically, there is a significant difference between the poor and non poor in caloric consumption at less than 1% level of

significance (table 6). To examine the main socio-economic variable affecting poverty separately, the univariate descriptive analysis is given below.

4.2 Description of the Sampled Household Characteristics

4.2.1 Family size

Obviously as hypothesized, if there is large family size in either of the group it creates high disguised unemployment then causing more probable to be impoverishment. Accordingly, the mean family size of the sampled household found to be 6.35 and 5.17 with a range of 2 to 13 and 1 to 12 for the poor and non poor, respectively. Interestingly, 46% of the poor and 31% of non-poor groups own more than 6 persons in their family. This implies that the poor households had larger family size than the non-poor. The difference in family size endowment is highly significant between the groups at less than 0.05 level of probability (table 7).

Table 7. Distribution of Family Size by the Household Group (No.)

No.	Poor (n = 85)		Non poor (n = 35)		overall (n = 120)	
	No.	Percent	No.	Percent	No.	Com.Percent
1-2	4	4.7	6	17.1	10	8.3
3-4	16	18.8	8	22.9	24	28.3
5-6	26	30.6	10	28.6	36	58.3
≥7	39	45.9	11	31.4	58	100
min (No.)	2		1		1	
max(No.)	13		12		13	
mean(No.)	6.4		5.2		6.0	
SD(No.)	2.5		2.4		2.5	
T - value = -2.39 P< 0.05						

Source: own survey, 2002

In addition to the unscaled family size, it is interesting to observe the distribution of adult equivalent that takes care of sex and age of individuals. Accordingly, 27% of the poor and 14% of non poor had an adult equivalent of 7 and above. Here, the mean of family size is 4.91 and 4.03 for the respective groups.

The minimum adult equivalent for the poor and non poor were 2 and 1, respectively, while the respective maximum were 9.7 and 8.9. Similarly, there is a significant difference in the mean of adult equivalent for the two groups at less than 0.05 level of significance (table 8). Therefore, large family size is associated with the poverty status of the household.

Table 8. Distribution of Family Size (AE/HH)

AE/HH	Poor (n = 85		Non poor (n = 35)		Overall (n = 120)	
	No.	Percent	No.	Percent	No.	Percent
≤2	4	4.71	7	20	11	9.2
3-4	28	32.94	8	22.86	36	30
5-6	30	35.29	15	42.86	45	37.5
≥7	23	27.06	5	14.28	58	23.3
Min(AE/HH)	2		1		1	
Max(AE/HH)	9.7		8.9		9.7	
Mean(AE/HH)	4.91		4.03		4.65	
SD(AE/HH)	1.88		1.86		1.91	
	T - value = -2.33 P< 0.05					

Source: own survey, 2002

4.2.2 Age Structure

Examining of the distribution of age has an implication on economic productivity, experience thereby on poverty. For instance, the mean age of household head was about 43 years and 45 years for the poor and non poor group, respectively. The result shows that the non poor group is older than the poor by about 5% year.

This more probably shows that as farmers get older, they can acquire farming experience through life and can accumulate assets that could have a positive contribution in raising their living standards. On the other hand, of the total sampled households only 11% was 65 to 77 years old while the rest are in the age range of minimum 20 and maximum 64 (see table 9).

Table 9. Distribution of the Head of Household Age in Year

Age	Poor (n = 85)		Non poor (n = 35)		Overall (n = 120)	
	No.	Percent	No.	Percent	No.	com. Percent
20 - 25	4	4.71	2	5.71	6	5
26 -35	23	27.05	10	28.57	33	32.5
36 -45	26	30.59	9	25.71	35	61.7
46 - 64	25	29.41	8	22.86	33	89.2
≥65	7	8.24	6	17.14	13	100
Min(Age)	20		24		20	
Max(Age)	76		77		77	
mean(Age)	43.12		45.09		43.83	
SD(Age)	12.99		15.46		13.71	
			T - value = 0.64	P= 0.523		

Source: own survey, 2002

The family size falling in the active age group (14-64) years, on average, was 2.92 for the poor and 2.54 for the non poor group. Moreover, 26% of the poor have a working age group of at least 4 persons while 23% of the non poor had the same family size. There is no remarkable difference between the groups in terms of the mean family size (table 10).

Table 10. Distribution of Family Size in the Working Age group ranging from 14 to 64 Years per HH (No.)

No.	Poor (n = 85)		Non poor (n = 35)		Overall (n = 120)	
	No.	Percent	No.	Percent	No.	com. Percent
≤1	3	3.53	5	14.29	8	6.7
2-3	60	70.59	22	62.86	82	75
4-5	19	22.35	8	22.86	27	97.5
≥6	3	3.53	0	0	3	100
min(No.)	0		0		0	
max(No.)	7		5		7	
mean(No.)	2.97		2.54		2.81	
SD(No.)	1.26		1.22		1.24	
	t - value = -1.49		P= 0.139			

Source: own survey, 2002

A remarkable difference is observed between the poor and non poor groups with regard to children less than 14 years. As indicated, the poor household had large proportion of dependent children: 28.23% of the household have at least 5 children of less than 14 years, while only 8.57% of the non - poor have the same size of children. There is a significant difference in the number of dependant children between the two groups at less than 0.05 probability level (table 11). The remarkable point is that even if the poor households had more family size than non poor households they were not better off. This might be due to a disguised employment or larger number of children dependent on the household.

Table 11. Distribution of Number of Children Less than 14 Years/HH.

No.	Poor (n = 85)		Non poor (n = 35)		Overall (n = 120)	
	No.	Percent	No.	Percent	No.	com. Percent
0	7	8.24	6	17.14	13	10.83
1	13	15.29	6	17.14	19	26.66
2	12	14.12	7	20	10	42.49
3	15	17.65	7	20	22	60.82
4	14	16.47	6	17.14	20	77.49
≥ 5	24	28.23	3	8.57	27	100
min (No.)	0		0		0	
max(No.)	7		8		8	
mean(No.)	3.2		2.37		2.96	
SD(No.)	1.92		1.80		1.916	
t - value = -2.187 P< 0.05						

Source: own survey, 2002

4.2 3 Educational Status

Wholly, the educational level attained by the household head was very low. For instance, 65% of the sampled household was illiterate, and about 83.3% was either illiterate or could only read and write without formal schooling. Despite this, the educational level of the poor household head who attended from grade 7 to 12 was 7% while the non poor was 8.57%. The mean educational level for the poor and non poor was found to be 1.023 and 1.29, respectively. However, there is no statistically significant difference between them (table 12).

Table 12. Literacy Status of the Household Head

Educational Level	Poor (n = 85)		Non poor (n = 35)		Overall (n = 120)	
	No.	Percent	No.	Percent	No.	com. Percent
Illiterate	57	67.06	21	60	78	65
Reading and writing	18	21.17	10	28.57	28	88.3
1-4	3	3.53	1	2.87	4	91.7
5-6	1	1.18	0	0	1	92.5
≥7	6	7.06	3	8.57	9	100
Min(Grade)	0		0		0	
max(Grade)	11		12		12	
mean(Grade)	1.02		1.29		1.1	
SD(Grade)	2.44		3.09		2.62	
	t - value = 0.494		P= 0.622			

Source: own survey, 2002

In the rural area of Bereh-Aleltu district, of the total population enrolled for education in the year 2000/01 academic year, the drop out rate for female was 13.28% while in the urban area it was 7.57%. In the same year, the male dropout rate in the rural area was 9.4% whereas it was 8.45% in the urban (Appendix 1).

In the subsequent academic year, the dropout rate for females was inflated to 16.08% in the rural area and for urban it was found to be 6.78%. Similarly, the male dropout rate in the respective educational area, it was accelerated to 15.13% and 9.25%, respectively (Appendix 2).

4.3 Farming Practice of the Household

4.3.1 Land Use Pattern

In the survey year, broadly, the land use pattern of the household was categorized in to four groups: cultivated, fallow, grazing / forest and wasteland. The mean land size allotted to crops was the same for poor and non poor group implying, unless there is land fertility differences, there was no difference interms of land size. But, the fallow land owned by the poor is significantly less than that of the non poor. On the other land, the poor household posses large size of wasteland than that of the non poor household (table 13). The forestland is almost nil. However, there was some grazing land. Comparatively, this finding clearly shows that 82.35% of the poor and 82. 86% of the non poor are holding less or equal to 1.5 hectare of land for crop cultivation. There is a significant difference between the poor and non-poor group in fallow and wasteland holding, at less than 5% probability level. On the other hand, there is no significant difference between the two in total cultivated land holding.

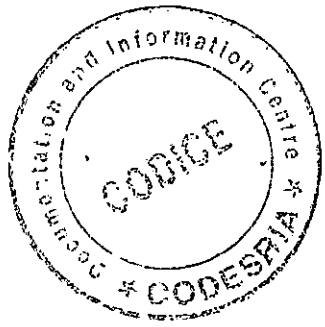


Table 13. Land use pattern in hectare / HH

Hectare (ha)	Poor (n = 85)				Non poor (n = 35)			
	Percent				Percent			
	Cultivated	Fallow	grazing forest	Wasted land	cultivated	Fallow	grazing forest	Wasted land
0	20	85.88	14.12	92.94	14.29	71.43	17.14	100
0.001-0.5	23.53	14.12	50.59	7.06	17.14	20	48.57	
0.501-1	21.17		35.29		20	8.57	34.29	
1.01-1.5	17.65				31.43			
1.51-2	17.65				17.14			
Max(ha)	3.25	0.5	1.50	0.5	3.75	1	1.5	0
Mean(ha)	1.53	0.05	0.48	0.02	1.53	0.15	0.51	0
SD(ha)	1.19	0.14	0.38	0.09	0.82	0.27	0.40	0
t-Value	0.01	2.04**	0.32	-2.29**				

** Significant at less than 5% probability level

Source: own survey, 2002

4.3.2 Major Crops

Even though, there were other crops produced in the study area such as teff, lentil, peas, linseeds and haricot beans, only the major crops are discussed for the harvested crops in the survey year. Thus, on average 0.3, 0.52, 0.48 and 0.25 hectare of land was allotted for wheat, wild oat, barley and faba bean by the poor group while 0.54, 0.70, 0.38 and 0.25 hectare of land was allotted by the non-poor for the explained crops, respectively. Except the wheat area,

the other three crops have no significant difference between the two groups. The size of land allotted to these major crops is clearly shown in table 14.

Table 14. Area allotted to Major Crops per HH in hectare.

Crops	Poor (n=85)		Non-Poor (n=35)		t-value-
	Mean	SD	Mean	SD	
Wheat	0.30	0.40	0.54	0.360	1.68***
Wild Oat	0.52	0.52	0.70	0.72	1.39
Barley	0.48	0.59	0.38	0.39	-0.90
Faba Bean	0.25	0.29	0.25	0.33	0.13

*** is significant at less 10% probability level
Source: own survey, 2002

4.3.3 Livestock ownership

Livestock raised in the study area is very important source of food, drought power, income, and manure for the farm. Among livestock categories, on average per head, sheep was found to be the highest: 2.99 units of sheep owned by the poor whereas the non poor household has 3.46. On the other hand, goat constitute the least number of livestock for both groups which is an average of 0.09 for the poor households and 0.11 for the non poor households. Generally, the livestock reared by the households include cattle, sheep, donkey, horses and poultry in descending order of importance for the two groups of the households (table15).

Table 15. Average livestock Owned by Type per HH

Type	Poor(n=85)		Non poor (n=35)		T-value
	Mean	SD	Mean	SD	
Oxen	1.26	1.22	1.6	1.33	1.36
Bulls	0.44	0.73	0.57	0.85	0.88
Cows	1.27	1.90	1.69	1.49	1.15
Heifers	0.48	0.75	0.71	0.96	1.28
Calves	0.73	0.93	1.26	1.52	1.91***
Sheep	2.99	3.51	3.46	3.14	0.69
Goat	0.09	0.40	0.11	0.53	0.23
Horses	0.42	0.81	0.54	0.66	0.78
Donkey	0.89	0.87	0.88	0.90	-0.047
Poultry	1.98	1.94	2.66	2.69	1.36

*** Significant at less than 10% probability level.

Source: own survey, 2002

Since livestock is part of the household's assets particularly in the rural parts of the country, it is necessary to weigh each livestock to examine the extent of endowment based on the scaled standard of specific animals. Based on this, the result clearly shows that out of the total sample households, 14.2% of them own 1.01-1.50 TLU /AE, but the mean was 1 TLU/AE.

On the other hand, there is noticeable difference in TLU/AE between the poor and non-poor household group at less than 0.01 levels of significances. Thus, on average the poor household group owns 0.88 TLU/AE while the later is 1.30 (table 16).

Table 16. Distribution of Livestock Holding (TLU/AE)

TLU/AE	Poor (n = 85)		Non poor (n = 35)		Overall (n = 120)	
	No.	Percent	No.	Percent	No.	com.percent
≤0.5	31	36.47	7	20	38	31.7
0.51 - 1	27	31.76	8	22.86	35	60.8
1.01 - 1.50	12	14.12	5	14.28	17	75.0
1.501 - 2	6	7.06	8	22.86	14	86.7
2.01 - 2.5	4	4.71	3	8.57	7	92.5
2.501 - 3	3	3.53	2	5.71	5	96.7
≥ 3.01	2	2.35	2	5.71	4	100
Min(TLU/AE)	0		0		0	
Max(TLU/AE)	3.29		3.17		3.29	
Mean(TLU/AE)	0.88		1.30		1.00	
SD(TLU/AE)	0.786		0.874		0.83	
	t – value = 2.62		P< 0.01			

Source: own survey, 2002

Oxen ownership is unevenly distributed. From the total household inquired 33.3% of them have no ox whereas more than half of them have either no ox or have only one ox. The poor household group who owned no ox, no ox or one ox accounted for 35.29% and 50% of the group, respectively, while the non poor household possessing no ox, no ox or one ox represented 28.57% and 43%, respectively. The mean of oxen holding by the poor group is 1.26 and the non-poor is 1.6 (table 17), which is statically shows that there is no significant differences between the group. Strangely, unlike other parts of the country, in the study area,

there is no cultural practice of hiring in or out the oxen for farming purpose. But they are engaged mainly in share cropping system.

Table 17. Number of Ox Owned per HH

Ox	Poor (n = 85)		Non poor (n = 35)		Overall (n = 120)	
	No.	Percent	No.	Percent	No.	com.Percent
0	30	35.29	10	28.57	40	33.3
1	19	14.12	5	14.29	24	53.3
2	28	32.94	14	40	42	88.3
3	8	9.41	1	2.86	9	95.8
4	0	0	5	14.29	5	100
Mean	1.26		1.60		1.36	
SD	1.22		1.33		1.26	
	t - value = 1.358		P< 0.177			

Source: own survey, 2002

4.4 Income and Expenditure of the Household

The major income sources for the households in the study area include farm income and non-farm income. In the subsequent section, the discussion of non-farm income, own crop consumed, livestock product consumed, cash income obtained from sale of live animals and its products and sale of crop produced are analyzed. Then, sources of expenditure are examined.

Thus, the households earn non-farm income mainly from food aid, hiring out of family labor, migration, employment as guard, selling of fire woods especially the leaves of eucalyptus, trading of live animals and little supports from relatives. On average, the poor group earns 116.77 birr/HH/year for their livelihood from the non-farm income while the non-poor earned 196.18 birr. However, there is no significant difference in earning of this income between the groups.

Table 18. Amount of Non-Farm Income per HH per year (Birr)

Birr/HH	Poor (n = 85)		Non poor (n = 35)		Overall (n = 120)	
	No	Percent	No	Percent	No	Com.Percent
≤50	33	38.82	14	40	47	39.17
51-100	18	21.18	5	14.29	23	58.34
101-150	11	12.94	0	0	11	67.51
151-200	5	5.88	3	8.57	8	74.18
201-250	8	9.41	4	11.43	12	84.18
≥ 251	10	11.76	9	25.71	19	100
Max(Birr/HH)	842		1196		1196	
Mean(Birr/HH)	116.77		196.18		139.93	
SD(Birr/HH)	132.2		272.16		186.61	
	t-value = 1.648		P = 0.107			

Note: 1$ = 8.56 Birr
Source: Own Survey, 2002

The result shows that 61.18% and 60% of the poor and non-poor group earned at least 50 birr per year, respectively from non-farm activities. Between the groups, there is no as such remarkable difference in the mean income from non-farm works (Table 18).

The gross mean income from different crops shows that there were significant differences between the poor and non-poor household at less than 1% level of probability. About 60% of poor households were earning a maximum gross income of 100 birr per year per adult equivalent from crop produced gross income whereas 34% of non-poor households earned at least 251 birr per year per adult equivalent. From the total sampled household, 90% of them were getting a maximum gross income of 250 birr per year per adult equivalent (table 19).This differences mainly came from the productivity of land.

Table 19. Total Value of Own Crop Production Consumed/AE/ in 2001/02 (Birr)

Birr/AE	Poor (n=85)		Non-poor (n=35)		Overall (n=120)	
	No.	Percent	No.	Percent	No.	Com.Percent
≤100	51	60	5	14.3	56	46.7
101-150	26	30.6	6	17.1	32	73.3
151-200	7	8.2	7	20.0	14	85.0
201-250	1	1.2	5	14.3	6	90.0
≥251	0	0	12	34.3	12	100
Mean	94.09		205.70		126.64	
SD	42.27		95.38		80.35	
	t-value=6.66		P<1%			

Note: 1$ = 8.56 Birr
Source: Own Survey, 2002

Similarly, there were significant differences observed between the poor and non-poor households group interms of mean gross value of livestock products obtained but consumed in the household at less than 1% probability level. Of the total sampled households, 92.5%

earned a maximum of 80 while about 66 % of poor group earned a maximum of 25 birr per year per adult equivalent from this product (table 20).

Table 20. Total Value of Livestock Product Consumed/AE/ in 2001/02 (Birr).

Birr/AE	Poor (n=85)		Non-poor (n=35)		Overall (n=120)	
	No.	Percent	No.	Percent	No.	Com.Percent
≤25	56	65.9	13	37.1	69	57.5
26-50	20	23.5	12	34.3	32	84.2
51-80	6	7.10	4	11.4	10	92.5
≥81	3	3.50	6	17.1	9	100
Mean	25.80		51.46		33.28	
SD	23.74		50.62		35.6	
t-value= 2.87			P<1%			

Source: Own Survey, 2002

Table 21. Cash Income from sale animal products and crop produced in 2001/02

Birr/HH	Poor (n=85)		Non-poor (n=35)		Overall (n=120)	
	No.	Percent	No.	Percent	No.	Com.Percent
≤50	45	52.9	10	28.6	55	45.8
51-100	18	21.2	10	28.6	28	69.2
101-150	8	9.4	5	14.3	13	80.0
151-200	9	10.6	4	11.4	13	90.8
201-350	3	3.5	5	14.3	8	97.5
≥350	2	2.4	1	2.9	3	100.0
Mean	74.34		107		83.87	
SD	94.58		84.67		92.65	
t-value= 1.77			P<10%			

Source: Own Survey, 2002

The mean cash income obtained by the poor and non-poor groups showed that statistically there is a significant difference between the two at less than 10% of probability level. That is, on average the poor and non-poor households earned cash income of 74.34 and 107 birr /HH/year, respectively (table 21).

Concerning the household expenditures, there were differences between the poor and non-poor groups with respect to food expenditure at 1% and non-food expenditure: alcoholic drink at 1%, whereas clothes expenses and land use taxes at less than 5%, respectively.

Table 22. Expenditure by Group of Food and Non Food in 2001/02

Category (Birr)	Poor (n=85)		Non-poor (n=35)		t-value
	Mean	SD	Mean	SD	
1. Food Expenditure/AE	198.15	64.11	345.19	115.66	7.09*
2. Non-food Expenditure/HH	529.02		709.81		
2.1 Clothes	205.64	156.42	300.86	242.16	2.15**
2.2 Medical	50.65	149.56	48.57	125.07	-0.073
2.3 Education	17.98	35.27	18.67	39.40	0.092
2.4 Farm implements	10.65	14.88	14.81	18.92	1.82
2.5 Alcoholic drink	78.12	69.56	126.49	144.51	2.48*
2.6 Land taxes	47.62	32.42	66.07	40.41	2.4**
2.7 Social Obligation	47.51	45.44	54.20	51.54	0.669
2.8 Household Utensils	24.29	26.12	20.97	18.35	-0.790
2.9 Others	46.56	106.04	59.27	136.04	0.55

* and ** are significant at less than 1% and 5% level of significance
Source: Own Survey, 2002

Other expenditures include transportation cost, rent for livestock for transportation and miscellaneous expenses (table 22).

From summary of household expenses and income of table 23, we clearly understand that the home food produced crop by non- poor group was 1.76 times of the poor group. However, the purchased food item was greater for poor group which was 1.08 times of the non-poor group.

Table 23. Summary of mean income and Expenses in birr per year by household groups

Income/Expenses	Poor (n=85)	Non poor (n=35)
Income		
Own produced food/HH	588.51	1036.35
Cash from production/HH	74.34	107
Non farm income/HH	116.77	196.18
Total income/HH	*779.62*	*1339.53*
Total income/AE	*158.78*	*332.39*
Expenses		
Purchased food /HH	384.41	354.77
Non food expenditure/HH	529.02	709.81
Total expenditure/HH	*913.43*	*1064.58*
Total expenditure/AE	*186.03*	*264.16*

Source:Own Survey, 2002

4.5 Major Agricultural Constraints

As responded and ranked by the household, their livelihood was obscured by different factors. From the direct voice of the poor: food shortage, drought, crop pest, and diseases are the major problems in descending order. The group also underscored lack of oxen power and animal feed with equal ranking as major constraints to agricultural production.

In addition, the non-poor household reported the problem in same order. Only in place of lack of oxen power, the non poor group indicated that they face scarcity of working capital and labor shortage. The household felt that recurrent drought has been seriously affecting their livelihood through killing of livestock and hindering crop cultivation. As it is observed, this difficulty more probably goes hand in hand with bareness of forestland and high population pressure on natural resources.

The other problem is food shortage. Even if it seems that there were some differences in degree of food shortage between the poor and non-poor, the effect of food deprivation were ranked in the same order. Besides these, land infertility is the main problem in the study area. As mentioned by most of the households, the obscurity of land infertility is caused mainly due to water logging and soil erosion.

The third challenging issues are crop pests and diseases. The two groups also gave the same rank order for these problems. On the other hand, when the poor has given priority for the lack of oxen power and animal feed, the non-poor group said that their main constraint were lack of working capital and labor shortage.

Table 24. Number of Households Ranking the Problems (Matrix Ranking)

	Poor (n= 85)								Non-poor (n = 35)							
Constraints Rank →	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
1.Drought	32[a]	10	9	3	1	0	0	0	9[a]	5	0	2	0	1	0	1
2.Food Shortage	25[b]	22[c]	7	0	1	0	2	0	8[b]	4	8[b]	1	0	1	0	0
3.Land infertile	3	3	8	5	4	1	2	0	1	1	2	4	3	7[c]	2	3
4.Crop disease & Pest	10	16[d]	7	1	2	2	1	0	6[d]	3	6[d]	3	0	1	1	0
5.Labour shortage	0	0	1	2	1	1	3	8	0	1	0	1	0	0	0	5[e]
6.Animal feed	1	10	14[e]	3	1	6	4	0	1	3	2	3	2	1	5[e]	2
7.Working Capital	0	5	7	6	6	1	1	5	0	5[e]	3	2	0	1	3	2
8.Oxen power	5	4	7	6	2	4	2	14[e]	3	1	4	0	2	1	0	1

a, b, c, d and *e* were the five top sever problem in decreasing order.
Sources: Own Survey, 2002

Beside these, the non-poor expressed their demand for inadequacy of labor than the poor group (Table 24). The table shows the number of people who mentioned the problems.

4.6 The Cause and Effect of Poverty at the Community Level

4.6.1 Accessibility to Public Services

The presence or absence of community services are both a cause for and outcome of poverty. Understanding the importance of infrastructure in supporting socio-economic development and in reaching poverty reduction is paramount to highlight the accessibility of those social services in terms of proximity in kilometers to the sampled household. This is just an indicator of poverty.

In the light of the above information, the poor households who settled at mean distance in KMs were: 4.42, 6.84, and 5.95 from agricultural development center, health services, nearest to school, respectively. On the other hand, the non-poor households were located at mean distance of 3.21, 4.80, and 4.4 KMs, respectively, from the mentioned services.

Statistically, there is a difference of proximity observed between the two groups and found to be significant at less than 1%, 5% and 1% probability level in accessing health services, the nearest school and agricultural development center, respectively. While accessing the other services showed no significant difference in statistical terms (Table 25).

Table 25. Proximity to Public Services in KMs

Services	Poor (n=85)		Non Poor (n=35)		t-Value
	Mean	SD	Mean	SD	
Agricultural Development Center	4.42	3.33	3.21	4.42	-2.58*
Health Services	6.84	4.45	4.8	2.63	-3.11*
Dry weather road	4.25	3.08	4.06	2.67	-0.326
All weather road	13.14	9.27	15.34	9.6	1.153
Grain mill	5.25	4.28	4.34	3.69	-1.1
Distance to nearest school	5.95	4.2	4.4	2.93	-1.98**
Telephone service	15.16	8.99	15.97	9.19	0.447
Post Office	16.26	8.00	16.89	8.40	0.381

*and ** are significant at less than 1% and 5% probability level respectively
Source: Own survey, 2002

4.6.2 Health Problems

As stated earlier, the health facility is not available in the vicinity of village. Due to this, prevalent disease was not uncommon in the study area. According to the responses, the most frequently occurring diseases are pneumonia, water born disease, intestinal helmenthiasis and eye infections. As well, due to low human health service coverage in the study area, the households were using either traditional medicine or buying directly the medicine from shop. The infant mortality is also reported to be high. More probably, these problems go with the prevalence of diseases due to food deficiency and insufficiency of access to health services or poor hygiene so that it substantially contributed to rural poverty since poor health conditions lead to economically inactive labor forces. Empirically as obtained from the responses: pneumonia, water born disease, intestinal helmenthiasis and eye infections are reported by

64% , 52.2% , 51.2% and 41.9% of the poor households respectively. Whereas 58.8%, 52.9%, 44.1% and 44.1% of the non-poor households was mentioned the respective problems.

Other more probable cause of human health problems in the study area is poor hygiene. The responses obtained from the poor group showed that those who are monthly accustomed to wash their clothes and body were 29.1% and 37.2% of the households respectively. Similarly, the non-poor group households who wash their clothes and body monthly accounted for 26.5% and 28.36% of the group, respectively. Over and above, 75.6% of the poor and 52.5% of the non-poor are sharing their residence house with livestock. This implies there was lack of know how the households could kept their hygiene and its consequences.

4.6.3 Water

Supplying adequate and clean water to the population improves many of the economic and social dimensions of the poverty. It improves the health of the population with concomitant advances in the quality of its life. Moreover, it releases the labor (particularly that of women and female children) used to carry water, which in turn could be used elsewhere, mainly in education for girls. At a large scale, increasing the availability of water are also essential for crop production, livestock rearing, and electricity in power generation. Now, at the national level, accessing potable water in the rural area has reached 24% (MoFED, 2002).

On the other hand, in the study area 89.5% of the poor group and 97.1% of the non-poor group are using unprotected spring. Only 3% of the poor group and 0% of the non-poor group

were getting potable water. Exclusively, 98.8% of the poor group and 97% of the non poor group were using human as the means of transporting water (table 26).

Table 26. Sources of Water and Means of Transport

Distance	Poor (n = 85)		Non-Poor (n = 35)		Over all (n=120)	
	No	Percent	No	Percent	No	Percent
1.Source						
Spring (unprotected)	76	89.5	34	97.1	110	91.65
Spring (protected)	3	3.5	0	0	3	2.51
River	6	7	1	2.9	7	5.84
2.Means of fetching						
Human	84	98.8	34	97.1	118	98.32
Animal	1	1.2	1	2.9	2	1.68

Source: Own survey (2002)

4.7 Determinants of Poverty at the Household Level

Poverty is a complex, having multi dimensional causes and consequences. In this study, attempts have been made to examine the most likely factors that determine household poverty by using descriptive and econometric analytical approach based on the data gathered at household level.

The summary of the explanatory variables used in the model are defined in table 27 and the stastical summary of the variables is given in tables 28 and 29. In this case means, standard deviations, t-values for continuous variables and chi-square values for each discrete variable

were computed for the poor and non-poor groups. Subsequently, those hypothesized explanatory variables were analyzed using logit model.

Table 27. Definition of Explanatory Variables

Code	Type	Explanation
AGEHH	Continuous	Age of household head in years
LEDHH	Continuous	Educational level of schooling completed by household head
CHILDTFA	Continuous	Children dependency ratio which is number of children less than 14 years old to total family size
ADEQVT	Continuous	Total adult equivalent per household
PRODCERL	Continuous	Productivity of cereal land in quintal per hectare
YRSEXTUSV	Continuous	Number of years that the household used modern agricultural inputs
NONFRADE	Continuous	Non farm income in birr per household per year.
TROCARDT	Continuous	Tropical livestock unit owned per adult equivalent by the household
SEXHH	Dummy	1, if the gender of household head was male; 0 otherwise
EXTVIST	Dummy	1, if the household has gotten advices from the extension agents during the past five years; 0 otherwise
DUMEDUP	Dummy	1, if the household head completed at least primary formal education; 0 otherwise

Source: Own set, 2002

The statistical test regarding continuous independent variables shows that there is no significant difference between the poor and non-poor households with respect to mean age of household head, level of household head education and children dependency ratio. However, total adult equivalent, productivity of land, years of agricultural input used, earning of non-farm income and TLU have significant effect on the two groups differently (Table 28).

Among those influential variables, tropical livestock unit per AE and productivity of land are significant at less than 1% of probability level. Similarly, total adult equivalent of the family is significant at less than 5% probability level. But, number of years of modern agricultural inputs and non farm income were significantly different for the two groups at less than 10% probability level (table 28).

Table 28. Descriptive Summary of Continuous Explanatory Variables

Variables	Poor (n=85)		Non-Poor (n = 35)		t- value
	Mean	SD	Mean	SD	
AGEHH	43.31	12.99	45.09	15.45	0.640
LEDHH	1.02	2.44	1.29	3.09	0.49
CHILDTFA	0.33	0.16	0.27	0.18	-1.65
ADEQVT	4.91	1.88	4.03	1.86	-2.33**
PRODCERL	3.49	2.07	5.57	2.97	4.37*
YRSEXTSV	2.84	3.45	4.2	4.06	1.87***
NONFRADE	116.77	132.26	196.18	272.16	1.65***
TROCARDT	0.87	0.78	1.30	0.87	2.62*

Note *, ** and *** are significant at less than 1%, 5% and 10% probability level
Source: own survey, 2002

The result of chi-square test shows that the association of each discrete variable with the households' welfare level is not significant. However, this does not guarantee about the strength or direction of the relationship between those discrete variables and the poverty status of the household. This is mainly because of the fact that there is a drawback with any univariate approach in that it ignores the possibility that a collection of variables, each of which is weakly associated with the outcome, can become an important predictor of outcome when taken together. Therefore, we should consider them as candidates to be included in the multivariable model along with all known important variables (Hosmer and Lemeshow, 1989, p. 86). The summary of those discrete variables is presented in the table 29.

Table 29. Descriptive Summary of Discrete Variables

Variables	Score	Poor (n = 85)		Non-Poor (n = 35)	
		No.	Percent	No.	Percent
SEXHH (1=male)	1	79	92.9	30	85.7
	0	6	7.1	5	14.3
EXTVIST (1=Yes)	1	47	55.3	17	48.6
	0	38	44.7	18	51.4
DUMEDUP(1=Completed	1	6	7.1	3	8.6
primary School)	0	79	92.9	32	91.4

Source: own Survey, 2002

Before the analysis of the causes of poverty with the help of logit model, it is highly recommended to examine the degree of multicollinearities among independent variables. To this effect, the tolerance test was employed. If the value of tolerance test is less or equal to

0.1, the multicollinearitys effect is high so that the identified explanatory variable having this problem should not be included in the model analysis (Gujarati, 1995). Interestingly, besides theoretical and practical consideration for the selected continuous variables weather they are linearly related or not, the tolerance test has confirmed that there was no problem of multicollinearity (Table 30).

Table 30. Measure of Tolerance for Continuous Explanatory Variables

Variables	R^2_j	Tolerance $_j$
AGEHH	0.254	0.746
LEDHH	0.258	0.742
CHILDTFA	0.349	0.651
ADEQVT	0.371	0.629
PRODCERL	0.128	0.872
YRSEXTSV	0.119	0.881
NONFRADE	0.191	0.809
TROCARDT	0.135	0.865

Source: own computed, 2002

In a like manner, there is a need to diagnose the extent of multicollinearity among discrete explanatory variables. To do this, contingency coefficients have been computed which assume a value between 0 and 1 to indicate the degree of association between the variables. The decision rule is that if the values approach to 1 there is a problem of association between the discrete variables (table 31).

Table 31. Contingency Coefficients of Discrete Explanatory Variables

	SEXHH	DUMEDUP	EXTVIST
SEXHH	1		
DUMEDUP	0.09	1	
EXTVIST	0.164	0.013	1

Source: own computed, 2002

The proposed 8 continuous and 3 discrete explanatory variables were entered in the binary logit model by using SPSS soft ware version 10. Those candidate explanatory variables were selected based on theory and empirical findings of previous studies. A maximum likelihood estimation technique or algorithm was used to estimate the model. Accordingly, the logit regression model was estimated and the parameters are given in table 32.

Table 32. Maximum Likelihood Estimates of Logit Model

Variables	Coefficient	Odds ratio	Wald static	Significance level
CONSTANT	8.482		6.318	0.012
AGEHH	-0.013	0.987	0.418	0.518
LEDHH	-0.332	0.718	1.547	0.214
CHILDTFA	0.189	1.209	0.010	0.918
ADEQVT	0.352	1.422	3.607	0.058
PRODCERL	-0.428	0.652	11.827	0.001
YRSEXTSV	-0.123	0.884	2.882	0.090
NONFRADE	-0.003	0.997	2.933	0.087
TRODCADT	-0.702	0.497	4.727	0.030
SEXHH	-0.506	0.603	0.382	0.537
DUMEDUP	-4.757	0.009	2.933	0.087
EXTVIST	-0.726	0.484	1.555	0.212

2 Log Likelihood	104.22
Model Chi-Square	40.653*
Correctly Predicted (count R^2)[1]	80
Sensitivity[2]	90.6
Specificity[3]	54.3

[1] Based on 0.5 cut value
[2] Correctly predicted poor group based on 0.5 cut value
[3] Correctly predicted non poor group based on 0.5 value
* Significant at 1% level
Source: Model Output

There are a number of criteria for comparing the fitness of the model. Among this, the most common are the -2 log likelihood which is also called deviance that measures how well the

model fits the data on the ground that the smaller the value the better the fit (Hosmer and Lemeshow, 1989). The change in -2 log likelihood tests the null hypothesis that the coefficients of the terms removed from the model are zero. It has a chi-square distribution with a p-value < 0.05, which provides evidence that at least one of the regression coefficients are non zero. Accordingly, -2 log likelihood of value 104.22 with chi-square value of 40.653 was significant at less than 1% level of probability. Therefore, the null hypothesis stating that all the coefficients of explanatory variables are zero is rejected.

Another criterion is the accuracy of model prediction. The logit model correctly predicted 80 % (of 120 samples), 90.6% (of 85 sample size in the poor group) and 54.3% (of 35 sample size in the non poor group).

Shockingly, the probability of being poor was found to be 0.998, which is computed from equation No. 5 of the logit model. This probability computed for continuous variables by considering their means and for the dummy variables their respective weighted means. Based on the model output, the hypothesized determinates of household poverty were categorized into significant and non-significant explanatory variables. As expected, all explanatory variables have a correct sign of association with the poverty status of the household (Table 32). However, out of 11 proposed variables, six of them were found to be statistically significant while the rest were not significant at less than 10% probability level.

The significant variables include: total adult equivalent (ADEQVT), productivity of land (PRODCERL), number of years modern agricultural inputs are used (YRSESTSV), non farm

income (NONFRADE), Tropical Livestock Unit per AE (TRODCADT) and the completion of primary schooling of household head (DUMEDUD).

The other category includes non-significant variables, which encompass age of household head (AGEHH), level of household head education (LEDHH), dependency of children (CHILDTFA), gender of the household head (SEXHH) and advice of extension agent (EXTVIST). The interpretations of significant explanatory variables are given below.

Total Adult Equivalent (ADEQVT): this variable has an important implication in affecting poverty status of the household. The result shows that the variable is found to have positive impact on the probability of being poor in the study area. In other words, the probability that a household will be non poor decrease as household size increases, but the chance to be in misery life under poverty line increase with household size. This variable is significant at less than 10% level with an odd ratio of 1.422 implying that, ceteris paribus, the odds probability of falling in poor group increases by this amount as adult equivalent increases by one. This output clearly shows the importance of decreasing fertility. The more probable solution is that reinforcing the access of the poor to education and information on family planning and expansion of birth control methods.

Land Productivity (PRODCERL): this variable is significant at less than 1% probability level and negatively associated with the poor group. The negative sign shows that as the productivity of land increases, the probability to be non-poor also increases. The odds ratio of the land productivity implies that, other things remain constant, a unit increment of the land

productivity leads to a decline in the probability to fall in poverty by 65.2%. The possible justification is that in the study area, water logging on the one hand, and drought on the other are not uncommon which counter acts on land fertility. This is highly interlocked with an environmental effect. For instance, as deforestation of forest increases, soil erosion increases. Similarly, as water logging increases salinity and acidity issues come into pictures. Another possible reason is that, the people in the study area rarely applied modern agricultural inputs, which is more probably related with different socio economic factors.

Years Modern Agricultural Inputs were Used (YRSESTSV): this has negative implication for the tendency to fall in the poor group. Given other possible explanatory variables, the odds ratios of this variable indicate that as a frequency of using modern agricultural inputs increases, the probability of being poor diminishes by 0.884. The implication of this finding depicted that the household who has been using modern agricultural inputs for long period were better off.

Non-Farm Income (NONFRADE): this has a negative correlation with poorness and significant at less than 10% level. Other things remain constant, a birr incremental earning of non farm income leads to an odd ratio in favor of being non poor increases by 0.997. Non farm income is not only hedging against poverty but also a means to upgrade the welfare of the poor. In other words, an availability of non-farm income improves the welfare status of the household that in turn enables them to invest in other areas like purchase of livestock, access to education, etc, and then reduces poverty.

Tropical Livestock Unit /AE (TRODCADT): this variable correlated negatively (at less than 5% probability level) with probability of poverty. The interpretation of negative correlation is that those households having high TLU/AE are at less risk to be poor. The odds ratio for this explanatory variable shows that, given other variables, the odd ratio disfavoring of being poor increases by a factor of 0.496 as household accumulates one more TLU/AE.

Completion of Primary School of Household Head (DUMEDUP): The completion of primary formal education has negative association (significant at less than 10% probability level) with increasing the risk of poverty. The odds ratio of 0.009 shows that, holding other factors constant, incremental of education say from illiterate to primary level, from primary to secondary level of the household has a positive consequence in reducing the probability of being poor by 0.9%. The plausible explanation is that an educated household head is more knowledgeable than uneducated or less educated one. Therefore, the educated person in general has an opportunity to manage resources and allocate them properly.

4.8 Marginal Effects of Explanatory Variables

In addition to the discussed determinants of poverty, the marginal effect for each significant explanatory variable has an important implication on the probability of being poor. It is computed at their determined mean value. To compute this, the mean of continuous explanatory variables and weighted mean of discrete explanatory variables considered and computed from the equation no.10. For instance, if an intervention makes one unit increase of tropical livestock per adult equivalent, it has a likelihood of reducing poverty by 7.418 percent, given other variables are constant. While an increase of educational status for

household head, say from illiteracy to primary, has a dramatic effect to reduce falling into poverty by about 50%, ceteris paribus. However, under the same assumption, an increase of one adult equivalent has an opposite effect by 3.72% (table 33).

Table 33. Marginal Effects of Explanatory Variables on Probability of being Poor

Explanatory Variables	Coefficients of estimate	Mean	Marginal Effect (%)
ADEQVT	0.352	4.650	3.720
PRODCERL	-0.428	4.100	-4.523
YRSEXTSV	-0.123	3.240	-1.300
NONFRADE	-0.003	139.930	-0.032
TRODCADT	-0.702	0.995	-7.418
DUMEDUP	-4.757	0.075	-50.267

Source: Own Computation, 2002

4.9 Coping Mechanisms at Household Level

Coping with poverty draws on both the natural and socio-cultural resources of the community as well as on individual peasant initiative. It may be said that the history of rural Ethiopia is, at least in good part, the history of the struggle of peasants against poverty and vulnerability, and the legacy of this history is evidenced in the social and value systems of rural communities today. Coping with poverty like coping with calamity, thus offers us greater insights into the workings of peasant society, and reveals to us in sharper relief the dynamics of social relationships, community values and human loyalties (Dessalegn, 1992).

Similarly, the household sampled have been practicing adaptive strategies against the persistently deteriorating welfare effect of poverty. As tried to perceive from the respondent, poverty is not some sort of transitory rather a natural occurrence of their identity. As they reported, the misery life that they have been leading due to overwhelmed poverty that goes friendly with the constraints of natural calamities, such as, drought, frost, land infertility, water logging, lack of working capital, lack of oxen, land shortage, insufficiency of animals feed. Over and above, unavailability of infrastructure and scarcity of public services in the study area were the main indicators of poverty.

Though some of the mentioned cursed gifts are out of their scope, they have been employing some of the counter acting measures against those to the extent they could till not have what to do. Thus, as coping mechanism, about 72.4% of the total sample households are taking an action of self-physiological deprivation by reducing food consumption at first stage. This action holds true for both poor and non-poor in the same order but to a different degree (Table 34).

The second alternative was seeking for non-farm income in hiring out the family labor to earn some causal daily wage or to engage in the collection and sale of eucalyptus leaves. If this is not enough or they could not get it, the third option was selling of their livestock. On the other hand, peasants who do not have livestock or had few of them used to start stretching their hands to acquire money or grain from the non poor neighbors or relatives. Unless these

alternatives are substantial for minimum provisions, they want to ask for food aid either from government or non-government institutions.

As a last resort, they leave the environment where they were born, and start the journey of migration. The percentage of respondents who adopted the different coping strategies is given in the table 34.

Table 34. Number of Households with different Coping Strategies

Mechanisms	Poor (n = 85)		Non-Poor (n= 35)		Overall (n=120)	
	No	Percent	No	percent	No	Percent
Food Aid	18	21.18	5	14.26	23	19.17
Borrowing	19	22.35	7	20	26	21.67
Gift or Remittance	4	4.71	1	2.8	5	4.17
Migration	6	7.06	1	2.85	7	5.83
Sale of livestock	45	52.94	19	54.29	64	53.33
Decreasing consumption	64	75.29	24	68.57	88	73.33
Other non-farm income	54	63.53	20	57.14	74	61.67

Source: Own survey (2002)

CHAPTER FIVE: SUMMARY AND POLICY IMPLICATIONS

5.1 Summary

Poverty being a multi-dimensional phenomenon, its perception also varies overtime and place but have a core concept of inability in fulfilling fundamental minimum requirements for subsistence. So, any poverty reduction strategy should need to harmonize the determinants of poverty in the society with the aims of creating conditions to ensure means of coping with it.

The main objectives of the study were measuring the extent of poverty at household level, and examining the relationship between household poverty status and different socio economic determinants. With these objectives, this study was undertaken at household level in the North Shoa Zone of the Regional States of Oromia at specific site called Bereh-Aleltu District. The data used in this study was primarily gathered from rural households. A two stage sampling procedure was used. In the first stage, three PA's were randomly selected. Secondly, proportional sampling techniques were applied based on the number of households in each PA and a total of 120 household heads were selected.

To analysis the problem, a calorie of 2100 per day per adult equivalent was used as poverty line. Thereafter, poverty indices: head count index, poverty gap and severity index were computed. For univariate analysis, simple descriptive statistics, such as mean, frequency distribution and standard deviation were calculated. Independent sample t-test was used to test the mean difference between the poor and non-poor interms of continuous variables. X^2–test

was used for discrete variables. Subsequently, binary logit model was employed to analyse the determinants of poverty.

By using t- test, accordingly, there is a significant difference between the poor and non poor group at less than 1% probability level interms of mean expenditure (Birr / AE), caloric intake per AE per day, TLU/AE, income from livestock product, income from crop produced and proximity to health services. Whereas variables that are significant at 5% probability level include family size, children dependency ratio, land allotted to fallow, wasteland owned by the household and proximity to school. In a similar way, land allotted to wheat production and cash incomes were significant at less then 10% probability levels.

The problems relatively ranked by the poor group are drought as outstanding, food shortage, crop disease and pest, animal feed and oxen power in declining order of importance. Correspondingly, the non poor group identified drought as a bottleneck constraining their agricultural operations. Then, the problem of food shortage, land infertility and crop disease and pest were found to obscure their farming operation in a declining order of importance.

Because of these and other intermingled problems, such as, institutional variables that provide access to public services, the study has revealed that head count index, poverty gap and severity index are 70.8%, 25.4%, and 9.11%, respectively by taking 2100 cal as poverty line.

The results of logistic regression revealed that out of 11 hypothesized variables there are 6 explanatory variables that are significant at less than 10% probability level. Accordingly, the

total family size expressed interms of adult equivalent has shown positive association with the probability of being poor (at 10% significant level). Its marginal effect is 3.72 % showing that a unit increment of a family size would increase poverty by this probability. Whereas, productivity of land is highly significant at less than 1% probability level and negatively associated with the probability of being poor having a marginal effect of 4.523%. Years of agricultural input used has the same correlation as productivity of land, except the significance level, which is 10% probability level with marginal effect of 1.3%. Likewise, non-farm income has a negative correlation with being poor and significant at less than 10% level of significance but its marginal effect was not as such high (i.e. 0.032%). Both TLU/AE and primary formal schooling of the household head have a negative correlation with the probability of being poor at less than 5% with marginal effect of 7.418%, and 10% significance level with marginal effect of 50%, respectively.

To counter act, households are struggling to survive in the face of poverty adversities to improve their livelihood. The primary sources of coping strategies adopted by both poor and non poor groups are decreasing consumption at the expenses of their physiological deprivation, involving in non-farm income, sales of livestock, borrowing and finally acquiring of food aid.

5.2 Policy Implications

With respect to policy to combat poverty, Glewwe and Van der Gaag (1988) identified three policy thrusts from their research. They are (a) direct transfer; (b) increased relative prices or wage rates to raise incomes; and (c) policies to change income earning capacities, such as education, job training, new agricultural techniques, or credit access. Certainly a fourth should be added-improved access to income-earning opportunities. Clearly, the first two would be of immediate effect, but would be only short term. The third and fourth are long-term effects that take time to show results, but the effects are long lasting and establish the needed base for continued development and improvement (cited by Rodriguez *et al.*., 1994).

In this study, the results obtained in the descriptive and econometric analysis underlined the fact that poverty is complex and multifaceted so that several pronged approaches are needed to at least sustain the poor group at Bere-Aleltu district. As examined, the complexity of poverty lay on that factors have been causing poverty were not only restrained at household level but also interlocked with the problem of accessibility to public services.

Therefore, plausible intervention to reduce poverty shall be required. This more probably will be realized through sectoral linkages of NGO's, governmental institutions and households in all development based mainstay project areas. In other words, to break the cycle of poverty in the district what is needed in the first place is to work out carefully together. For instance, understanding all the mentioned problems confronting the farmers, Agri-Service Ethiopia who is operating in the study area should take their immediate action on the recommended solution till any arrangement is made in the future for overall solution.

Therefore, the specific recommendations to tackle the prevailing constraints are as follows:

i) Expansion of education.

ii) Policy to improve the access of the rural poor to productivity increasing resources. As noted in the result, the land possessed by the poor group is very much infertile. Therefore, this land should be treated accordingly to improve its productivity. For instance, using of fertilizer, conserving soil, using of improved variety, avoiding of water logging.

iii) Policy to improve the access of the rural poor to credit and adequate training. Though it is not much emphasised in the discussion part concerning credit, because none of the households accessed credit from formal institutions. However, the availability of credit at reasonable interest rate is expected to generate income and alleviate the mentioned capital constraint. Therefore, it is a means to acquiring productivity increasing factors of production.

iv) Policy to control population growth through women education and training on birth control.

v) Policy to encourage agro forest based farming system. This helps in multi benefits. Because, land infertility due to erosion, unavailability of feed for livestock, low grazing area, soil erosion, drought were obscuring the farming operations of the rural people. But, inducing

afforestation on land is becoming impossible due to small farm size (table 13) unless agro forest based farming is introduced.

vi) Capacity building on livestock development. Since total tropical livestock unit per adult equivalent was one of the determinants of rural household poverty. Thus, intervention to improve livestock sector would lead to poverty reduction.

vii) Creation of public infrastructure and its accessibility is highly demanded. For instance, construction of agricultural development centre and health centre and expansion of its service.

viii) Provision of training on hygiene and sanitation are very important. Since the health problems could be caused by lack of hygienity and sanitation.

REFERENCES

Adams, R.H.Jr. & J.J.He .1995. Sources of Income Inequality and Poverty in Rural Pakistan. Research Report No.102, IFPRI: Washington D.C.

Agresti, A.1990. Categorical Data Analysis, John Willey.

Ahmed,A.U., H.A.Khan & R.K.Sampath.1991. Poverty in Bangladish: Measurement, Decomposition and Intertemporal Comparison, Journal of Development Studies.Vol.27(4):48-63.

Alderman, H.and M.Gracia.1993. Poverty, Household Food Security and Nutrition in Rural Pakistan. IFPRI Research Report No.96:IFPRI, Washington, D.C.

Aldrich, J.H and Nelson, F.D.1984. Linear probability, logit and probit models. Stage publication, London.

Amemiya, T.1981. "Qualitative Response Models: A survey." Journal of Economics Literature. 19:1483-1536.

Andah, K.1986. Strategy for Rural Development, in Brown, C.K., ed. Rural Development in Ghana. Ghana University press, Accra.

ASE.2001. Targeting and Livelihood Analysis of the Community in Bereh-Aleltu programme Area, Bekie, P.7.

Ayalneh Bogale.2002. Land Degradation, Impoverishment and Livelihood Strategies of Rural Households in Ethiopia. Farmers' Perceptions and Policy Implication. Institutional Change in Agricultural and Natural resources, Vol.8. Aachen:Shaker Verlag.

BEDEO.2002. Bereh-Aleltu District of Education Office, Unpublished document.

Chamber, R.1987. Rural Development-Putting the Last First: Long man Scientific and Technical, New York

Chandan, Singh, J.and Khanna k.k.1995. Business Statistics. VIKAS Publishing House Pvt.Ltd. New Delhi.

Cornia, G.A.1987. Adjustment at the Household level: Potentials and Limitations of Survival Strategies. In: Adjustment with a Human Face. Vol.I, Clarendon Press, Oxford.

CSA .1997. Report on the 1995/95 Household Income, Consumption and Expenditure Survey, Vol. I, Statistical Bulletin 170, Addis Ababa, Ethiopia.

Deaton, A.1997. The Analysis of Household Survey: A micro econometric Approach to Development Policy. Baltimore: Johns Hopkins University press.

Denkar, V.M.1981. "On Measurement of Poverty". Economic and Political Weekly, Vol.16, No.30.

Dercon, S and P.Krishinan.1998. Changes in Poverty in rural Ethiopia 1989-1995: measurement, robustness tests and decomposition center for the study of African Economics, oxford University and Katholieke Unversiteit Leuven.

Desalalgn Ramahto.1992. The Dynamics of Rural Poverty: Case Studies from a District in South Ethiopia. Institute of Development Research, Addis Ababa University, Ethiopia.

Dessalegn Rahmato and Akililu Kidanu.1999. Consultation With Poor: A Study to Inform the World Development Report 2000/01 on Poverty and Development: Addis Ababa.

Dessalegn Rahmato.2001. The Landscape of development: A complex reality. In: Food Security through Sustainable Land Use: Population, Environment and Rural Development Issues for Sustainable Livelihood in Ethiopia. Taye Assefa (ed).pp.7-17. Proceedings of 2nd national workshop. Addis Ababa: NOVIB Partner Forum.

Edilengaw Wale.1997. Household Income Inequality and Poverty during Structural Adjustment: The case of Ghana. M.Sc Thesis in Agricultural Development Economics, Wageningen Agricultural University.

EHNRI.2000. Food Composition Table for Use in Ethiopia, Part III. Addis Ababa

EPA.1997. Federal Democratic Republic of Ethiopia, Environmental Policy. Addis Ababa, EPA, April.

FAO.1997. Managing Anti-Poverty Programs. In Rural Development International Workshop, ANNCY HART (ed.).pp.27-35. Rome: FAO.

FAO.2001. Food, Agricultural and rural Development .Current and Emerging Issues for Economic Analysis and Policy Research, Economic and Social Department,(ed.) Stamoulis, K.G. FAO: Rome

FDRE.1996. Food Security Strategy. Policy document prepared for the consultative Group meeting of Donors. December 10-12, Addis Ababa.

Feder, G., R.E.Just and D.Zilberman.1985. Adoption of Agricultural Innovations in Developing Countries. Economic Development and Cultural Change. 33:255-298.

Feres, J. & Artuo Leôn .1990. The Magnitude of Poverty in Latin America, Cepal Review, No.41, PP.133-151.

Foster, J.; J.Greer & E.Thorbecke.1984. A Class of Decomposable Poverty Measures, Econometrical, Vol.52. No.3

Glewwe, P. and J.Van der Gaag.1988. "Confronting poverty in developing countries: Definitions, information, and policies," living Standards Measurement Study, Working Paper No.48, washington DC:The World Bank.

Gujarati, D.N. 1988. Basic Econometrics. Second edition. Mc Graw Hill.Inc.New York.

Gujarati, D.N.1995. Basic Econometrics, 3rd ed. Mc Graw-Hill, Inc. New York.

Haaland, G. & W.Keddeman.1984. Poverty Analysis: the Case of Rural Somalia. Economic Development and Cultural Change, Vol.32 (4):843-860.

Hagenaars, A.J.H.1991. The Definition and measurement of poverty, 'in Osberg, ed. Economic Inequality and Poverty: International Perspectives' New York: Sharpe.

Hanushek, E. and J.Jackson.1977. Statistical Methods for Social Scientists. New york: Academic Press.

Hassan,R.&S.C.Babu.1991. Measurement and Determinants of Rural Food Poverty, Food Policy.

Hosmer, D.W. and S. Lemeshew.1989. Applied Logistic Regression. A Willey Inter-Science publication, New York.

IM F and IDA, 1999. Poverty Reduction Strategy Papers-Operational Issues, Washington, D.C.

ISSER, 1993. Policies and Options for Ghanaian Economic Development, Nyanteng, V.K. (ed). ISSER, University of Ghana, Legion.

Jazairy, I., M.Alamsi as r and T.Panuccio .1992. The State of World Poverty: An inquiry in to its Causes and Consequences. IFAD. New York: New York University.

Kakwani, N.1993. "Measuring Poverty: Definition and Significance Test With Application to Cote d'Ivoir". In: Michael Lipton and Jacques Van Der Gaag, "Including the Poor". The World Bank,Washington. D.C.

Kothari, C.R. 1990. Research Methodology: Methods and Techniques, 2nd ed. Washwa Prakashan Pub.,New Delhin, India

Kyereme, S. & E.Thorbecke.1991. Factors Affecting Food Poverty in Ghana. Journal of Development Studies, Vol.28. No.1.

Linda, D.A.& R.D. Manson.1994. Basic Statistics for Business and Economics. Richard. D, Irwin, inc., Australia.

Lipton, M. & M.Ravallion.1993. Poverty and Policy. World Bank Working Paper, No.10. The World Bank, Washington.D.C.

Lipton, M.1998. The Poor and the Poorest: Some interim findings, World Bank Discussion Paper 25. The World Bank: Washington, D.C.

Lynch, S.G.1991. Income Distribution, Poverty and consumers preferences in Cameroon. Working paper No.26, Washington, D.C.: CFNPP.

Maddala, G.S.1992. Introduction to Econometrics. New York, Macmillan.

Maddala, G.S.1993. Limited Dependent and Qualitative Variables in Econometrics. Cambridge: Cambridge University Press.

MEDaC .1999. Poverty Situation in Ethiopia, Unpublished document, Addis Ababa.

Mekonnen Manyzewal.1998. Ethiopia's development Challenge: Breaking the Poverty Cycle and Take-Off in to Sustainable Development, Economic Focus. October-November.1999.

Mesfin Wolde-Mariam.1999. The Chronic Problemof Food Security: Can We Overcome it. In: Food Security through Sustainable Land Use: Policy on Institutional, Land Tenure, and Extension Issues in Ethiopia, Taye Assefe(ed.). addis Ababa: Proceedings of the first National Workshop of NOVIB of Partner Forum.

Mikkelsen, B.1995. Methods for Development Work and Research: Guide for Practitioners. Sage publications, New Delhi.

MoFED.2002. Federal Democratic Republic of Ethiopia: Draft Strategy Paper for Promoting Development and Poverty Reduction, Addis Ababa.

Mohammed Mussa.2001. An Overview of Poverty in Africa: Process of the Poverty Reduction Strategy Papers in Sub-Saharan Africa and the Ethiopia IPRSP. In:Poverty Reduction Strategy and Pastoral Development. Yonas Admassu (ed), PP.46-65.Proceeding of the Second National Conference on Pastoral Development in Ethiopia: Addis Ababa.

Mulat Demeke.2001. Rural Development in Ethiopia: A review of concepts, approaches and future directions. In: Food Security through Sustainable Land Use: Population, Environment and Rural Development Issues for Sustainable Livelihood in Ethiopia. Taye Assefa (ed.).pp.185-213. Proceedings of 2nd national workshop. Addis Ababa: NOVIB Partner Forum.

Mulunch Woldetsadik.2001. Impact of Population Pressure on land Resources as Reflected in Land-use/Land-Change in Ethiopia: Lessons Learned from West Gurageland. In: Food Security through Sustainable Land Use: Population, Environment and Rural Development Issues for Sustainable Livelihood in Ethiopia. Taye Assefa (ed.).pp.43-88. Proceedings of 2nd national workshop

Norton, A., 1995. Poverty Assessment in Ghana Using Qualitative and Participatory Research Methods. Washington, D,C.:World Bank.

NSADD.2001. North Shoa Zonal Agricultural Development Department Unpublished document, Ethiopia.

NSPED.2001. North Shoa Zonal Planning and Economic Development Unpublished document, Ethiopia.

Parkin, M.; M. Powell and K. Matthews.1997. Economics, 3rd ed. Addison Wesley Longman Limited, England.

Peña-montenego, R.1999. Challenges and Opportunities for Reducing Poverty in Latin America and the Caribbean. World Resources Report, no.86. FAO: Rome, Italy.

Rahaman, H. Zillur & M.Hassain (eds).1995. Rethinking Rural Poverty: A case for Bangladish. Sage publications, New Delhi.

Rath, N.1996. Indian Journal of Agricultural Economics: Poverty in India Revisited. pp. 76-109. Indian Society of Agricultural Economics, Numbai

Ravallion, M. & B.Sen.1996. When Methods Matters: Monitoring Poverty in Bangladesh. Economic & Cultural Change, Vol.44, No.4.

Ravallion, M.1992. Poverty Comparisons. A Guide to Concepts and Methods, LSMS Working Paper 88. The World Bank, Washington D.C.

Ravallion, M.and B.Bidani.1994. How Robust is Poverty Measure? The World Bank Economic Review Vol.8 (10):75-102.

Rodriguez, A.G. & S.M.Smith.1994. A Comparison of Determinants of Urban, Rural and Farm Poverty in Costa Rica. World Development, Vol.22, No.3, PP. 381-397, Printed in Great Britain.

Schubert, R.1994. Poverty in Developing Countries: Its Definitions, Extents and Implications. Economics 49/50, 17-40.

Sen, A.1976. An Original Approach to Measurement of Poverty, Econometrics, No.44

_____.1999. Development as Freedom. New York:Konof.

_____.1992. Inequality Re-examined. Oxford:Claredon press.S

_____.1981. Poverty and Famine: An Essay on Entitlement and Deprivation. Oxford: Oxford University Press.

Shaffer, P.1996. Beneath the Poverty Debate: Some Issues, Vol.27, No.1

Storck, H., Berhanu Adenew, Bezabih Emana, R.Begander & Getu Hailu.1997. Management Strategies for Farming Systems in an Uncertain Environment and Approaches for their Improvement. Farming Systems & Resource Economics in Tropics, Vol.27, Wissenschaftsverag Vau Kiel KG, Germany.

Tesfaye Teklu and Yisehack Yohannes.1998. On Poverty in Rural Bostwana: Results from a Survey of Small Villages. In:Eastern Africa Social Science Research Review, OSSREA, Vol. XIV, No.2, P.7.

Tsui, K.1996. Growth-Equity Decomposition of change in poverty; An Axiomatic Approach. Economic Letters, Vol.50, No.3.

UNDP.1997. Human Development Report, Oxford:Oxford University Press.

_____.1998. Human Development Report, New York:Oxford University Press.

Wodon, Q.1997. Food Energy Intake and Cost of Basic Needs: Measuring Poverty in India, London.

World Bank.1990. World Development Report. New York:Oxford University press.

_____.1995. World Development Report 1995. Workers in an Integrating World. Oxford University Press for the World Bank.

_____.2000. The World Bank Partnerships for Development. Published by creative Communicates Group for the World Bank.

_____.2000a. World Development Report 1999/2000: Entering the 21st century. World Bank: Oxford University Press.

_____.2000b. A Source Book for Poverty Reduction Strategy, Washington, D.C.:The World Bank.

_____.2000c. Can Africa Claim the 21th Century? The World Bank, Washington, D.C.

_____.2001a. World Development Report 2000/01:Attacking Poverty. New York:Oxford University Press.

_____.2001b. World Development Indicators, New York: Oxford University Press.

Appendices

Appendix 1. Educational Status of Bereh - Aleltu District in the year 2000/01.

Education level	Rural (No.)				Urban (No.)			
	Female		Male		Female		male	
	Enrolled	Dropout	Enrolled	Dropout	Enrolled	dropout	enrolled	dropout
1 - 4	2520	319	3728	366	1824	137	1961	1252
5 - 8	247	19	495	31	686	44	833	65
1 - 8	2767	397	4223	397	2510	181	2794	217
9 - 12	0	0	0	0	315	33	485	60

Source: BADEO, 2002

Appendix 2. Educational status of Bereh-Aleltu District for the year 2001/02

Level	Rural (No.)				Urban (No.)			
	Female		Male		Female		Male	
	Enrolled	Dropout	Enrolled	Dropout	Enrolled	Dropout	enrolled	Dropout
1-4	2609	435	3905	600	1859	144	2064	214
5-8	333	38	740	103	900	43	1143	75
1-8	2942	473	4645	703	2759	187	3207	289
9-12	0	0	0	0	312	31	422	54

Source: BADEO. 2002

Appendix 3. Conversion Factors used to Compute Tropical Livestock Unit (TLU)

Animal Category	TLU	Animal Category	TLU
Calf	0.25	Donkey(Young)	0.35
Weaned Calf	0.34	Sheep and Goat(adult)	0.13
Heifer	0.75	Sheep and Goat(young)	0.06
Cow and Ox	1	Chicken	0.013
Horse	1.1		
Donkey(adult)	0.7		

Source: Storck, *et al.*, 1991

Appendix 4. Conversion Factors employed to compute Adult Equivalent (AE)

Age Group	Male	Female
<10	0.6	0.6
10 to 13	0.9	0.8
>13	1	0.75

Source:Storck, *et al..*, 1991

Appendix 5. Conversion Factors used to Compute Calorie Supply of Food Consumed

Food item	Unit	Calorie	Food item	Unit	Calorie
Wheat	Kg	3574	Sugar	Kg	3850
Emmer wheat	Kg	3797	Coffee	Kg	1103
Teff	Kg	3589	Edible Oil	Lit	8964
Barley	Kg	3723	Beef	Kg	1148
Lentil	Kg	3522	Milk	Lit	737
Horse bean	Kg	3514	Butter	Kg	7364
Sorghum	Kg	3805	Egg	No.	61
Peas	Kg	3553	Honey	Kg	3605
Vetch	Kg	3470	Pepper	Kg	933
Linseed	Kg	5109			

Source:EHNRI, 2000

Appendix 6. Summary of research questionnaires

Summery of Research Questionnaire administered in North Shoa, Bereh-Aleltu District in the year of 2002.

Research Title: Magnitude and Determinants of Rural Household Poverty in Central Ethiopia: The case of Bereh-Aleltu District.

Selection number of the household_____

Interview date _____, Month_____,

Enumerator's Name _____, Signature _____

Name of PAs/Village_____

I. Household characteristics

1.Name of household head----------, Sex----, Age----, Experience in farming (years)------,religion----------, level of education----, marriage status-----, age at first marriage----

2. Family composition and their characteristics

S/N	Name of family members	Age	Sex	Labour force Status	Educational levels
A	**B**	**C**	**D**	**E**	**F**

Code: Column E: 1= engaged in productive work
2= disabled(0ld), 3= no job, 4= Sick
Column F: 1= Writing and reading, 2. Write the level

3.If you engaged in productive work, in which of the following current occupation?
a. Agriculture b.trade c.hand craft d. Others (specify)----------

4.What is your employment status?
a. employer b. employee c. own worker d. Others (specify)----------

II. Crop Enterprises

A. Land Resource use: total land holding, cultivated, fallow, rented in, rented out, forest /tree, grazing, received gift, shared, bare land, others (specify)

1.What is the total area of your land holding last year?

Land use type	**Area (hectare)**	**Fertility**	**Slope**
A	B	C: 1:Very fertile, 2=moderately fertile, 3=slightly infertile, 4=very infertile	D:1=Steep, 2=Plain, 3=mountainous, 4=Gully(Gorge)

2. What is the price of land if you rented out in the last year_____Birr/hectare, other forms of payments (specify).....(unit)

3. What is the price of land if you rented in the last year_____Birr/hectare, other forms of payment (specify).....(unit)

B.Input and Out put

1.Is there any double crpping practice? a. Yes b.No

2.How much do you pay pay annually if you rent in/out labour for crop production?-----birr.

3.For crop production have you hired any oxen? a. Yes b.No

4.Have you hired any labour last year? a.Yes b.No

5.If yes to No.4. how much did you paid him/her?----------birr.

6. What type of labour? Sex_____ Age_____

7.If yes to No.4, what is an average price of daily labour if you rent in/out----------birr.

8.Plaese list down the land allotted to different types of crops, out put obtained and other input used during last year.

Type of crops	A	B	input used										
			Seed(Kg)		Fertilizer(kg)			Labor in mandays					chemical used (unit)
			C	D	E	F	G	H	I	J	K	L M	

Notice:A=Area cultivated (hectare); B=Output (Qt); C=Local; D=Improved; E=DAP; F=Urea; G=Manure; H=Bullock days; I=Plowing; J=Sowing; K=Weeding; L=Harvest; M=threshing

9.Fill the average or estimated unit price of inputs used for the above crop production in the following table

Types of inputs	*cost per Unit*	*Total cost*
Chemicals		
Fertilizer		
-Dap		
-Urea		
-Manure		
Seeds-Locals-		
Seeds-improved -		
Labour		
Oxen		

III.Livestock Enterprises

Livestock types	No. Exist Now	Estimated Unit price	Sold last year	Feed used (Unit)	Feed cost	Labour herd costs	Veterinary drug costs
Oxen							
Bulls							
Others							

IV. Problems encountered in farm operations

1.Please prioritize the Problems encountered you for Crop and livestock Production, possible causes and expected solution(s). Type of problems: drought, large family size, land fragmentation, land infertility, lack of improved seed, crop disease& pest, labor shortage, soil erosion, animal feed shortage, animal disease, lack of fertilizers, lack of working capital, lack of oxen power, others (specify).

Type of problems	Rank (1for sever,...)	Causes of the problem	Expected solution(s)

2.If soil erosion or land degradation is a problem, did you practice any conservation measures last year? a. Yes b. no

3.If no to Qs.No.2, why not? a. Not want it, b. I don't know how to practice, c. ineffective to practice, d. Others (specify)----------

4.If yes to No.2, which one of the following measure you have implemented (multiple answer is possible)?

S/N	Measures	exprienced(traditionall y)	Modern(S cientificall y)	Agencies involved: NGO,MOA
1	engineering: terrace,diversion,chechdam etc.			
2	Forest: afforestation,agroforest, run-off forest,etc.			
3	tillage: crop residues,contour farming,strip farming,etc.			

5.Do you consider that you were adequately informed about the no.4 scheme. a=No at all b=conidered inadequate c=adequate

6.Which measures do you prefer? a. traditional soil conservation b. Modern soil conservation. c. Others (specify).....

7. Why If you prefer traditional soil conservation measures than modern one, why? a. Modern is ineffective to conserve, b.labour shortage, c.Not know how to implement the modern measure, d. Others(Specify)----------

V. Institutional Factors

A. Agricultural Extension Services

1.Have you received any extension services? a. yes b. no

2.If yes to no.1, for what purpose?

a. crop production advice,
b. soil conservation advice
c. animal production advice,
d. to collect tax,
e. to collect other debts,
f. others----------

3.If yes to no.1 how often in 2001? a.monthly, b. quarterly, c. biannually, d.annually, e. other----------
4.How far from your house the Development agent center?_____KMs, ____Hours.
5. For how many years have you used modern agricultural inputs such as pesticeds and herbicieds, fertilizer, high yield variety till now?_____(year).
6.If no to No.1, why? a. No dev't agents near by, b. Unknowingly, c. no need for service, d. others----------

B. Marketing and Credit

1.Have you received any type of credit last year? a. yes. b. no
2.If yes to No. 1, from where? a. service cooperative, b. Friends and relatives, c. local money lender, d. Banks, e.Other----------
3.why you prefer No.2 as sources of credit? a. Low interest rate, b. accessible (near by), c. low procedures, d. other reason----------
4.If no to No.1, why? a. Fear of inability to repay b. High interest rate c. lack collateral d. No one to give credit e. No need for credit f. other----------
5.For what purpose you have obtained? a.purchase of seed, b. purchase of fertilizer, c. Purchase of chemicals, d. purchase of oxen, e. to fill up family requirements, d. to settle debt, e. other----------
6.Where do you sell your agricultural products? a. on farm, b. local markets, c. other-------
7. How far the local market place ?___kms,__Hours
8.At what time did you sell ? a. Just after harvest, b. Later after harvest c. Other----
9.Did you get reasonable price for the sell? a. yes b. no
10.If no to Qs.No.8, why not? a. Lack of storage for latter b. forced to sell during cheap price to settle debt of fertilizer c. supply is greater than demand for the produce d.other----------

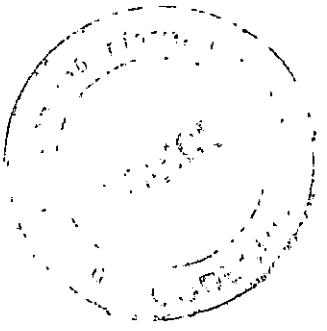
C. Health Services

1.Do you have health facilities in your community? a. Yes b. No
2.If yes to Qs.No.1, how far is the nearest health service in your local community? _____ KMs, ____Hours.
3.What type of facility? a. Hospital b. Health post c. Clinic d. Others____
4.How do you travel to the services center? a. on foot b. by animals c. by bus/car d. Other____
5.When it start to give service? _____year
6.What type of services?_____
7.Has any one in your home been sick last year? a.Yes b.No
8.If yes to Qs.No.7, Specify. a. Who sick_____; b. Cause of sick_____
9.What did you do with the sick person? a. did nothing b. took to the traditional healer c. took the person to health facility d. bought medicine from the shop
10.How many did you paid for Qs.No.9_____birr.
11.Who help did you paid for Qs.No.9?_____
a. mother b. Friend c. Neighbor d. TBA (traditional birth attendant) e. CHA (Community health agent) f. Health assistant g. Others
12.What type of human diseases currently occurs in your area (in rank)?
a. Water born diseases _____b. Intestinal helmenthiasis ___c. Eye infections ___d. Pneumonia____
e. Others (specify)_____

13.How many children would you like to have a. as many as possible b. none c. Others (specify)____
14. Are you aware of family planning? a. yes b. No
15. Have your wife experienced some times any abortion? a. yes b. no
16.If yes to Qs.No.15 how many times----------
17.After a child born when you wash its body. a. weekly b. in two week once c. in three week once d. monthly e. others (specify)
18.After a child born when you start to feed food. a. after weekly b. in two week c. in three week d. after month e. After six month f. After a year g. other (specify)
19. What type of food you feed the child at the beginning before weaning? _____
20. Have you experienced in your family a child born alive but dead with in a year?_____
21. If yes to Qs.No.20, how many children born alive but dead with in a year?_____
22. What is average expected lifespan of a person from born and get to old and finally dead in your family?_____(year).
23. When do you wash your clothes? a. weekly b. in two week once. c. in the three week once d. monthly e. Others (specify)
24.When do you wash your body? a. weekly b. in two week once c. in three week once d. monthly e. others (specify)____
25. Are you using your house only for family residence or with other livestock?
a. only for family residence b. for family residence and other livestock
26. If in Qs. 26 he/she is using for family residence and other livestock, which livestock?
a. Goat b. Sheep c. Poultry d. cattle (specify)

D.Others access to services

How far do you travel to get the service
1. All weather road ___KMs ____Hrs
2.Dry weather road ___KMs ____Hrs
3.Telephone Service ___KMs ____Hrs
4.Post Office ___KMs ____Hrs
5.Graain mill ___KMs ____Hrs
6.School ___level____KMs____Hrs



VI. Income

1. Would you please state your annual Non-farm and Off-farm *income* during last year?

Sources	Amount	Total Revenue
A.Off-farm:-		
Water		
Fuel wood		
Charchol		
Timber		
B.Non-farm		
Trade		
: Drinks		
: crop		
: livestock		
:Others		
Weaving		
Milling		
Handcraft		
Wage of hired		
c.Transfer		
Remittance		
Help of relatives or neighbor		
Gov't aid		
Pensions		
d.Rental out income		
Land		
Machiners(farm)		
Houses		
Livestock		
:House		
:Donkey		
:Mule		
:Oxen		
debt collection or credit taking		
Others(Specify)		
Total of(a+b+c+d)		

2. Would please you state your annual Cash income produced from the following sources during last year.

Output Sold	Unit	Total quantity	Unit price(birr)
Of crop produced	Qt,Kg		
Wheat			
Wild oats			
Teff			
Barley			
Lentil			
Peas			
Vetch			
Linseed			
Others			
Animal Product Sold			
Animal slaughtered	No.		
-Milk			
-Butter			
-egg			
-skin&Hides			
-honey			
-Others(Secify)			

VII. Expenditures

1. Would you please state your annual *expenditures* from the following sources during last year.

Source	total quantity(qt,kg)	Total price(birr)
Own product consumed		
Wheat		
Wild Oats		
Teff		
Barely		
Lentil		
Haricot beans		
Peas		
Vetch		
Linseed		
Others		
Crop Purchased		
Barely		
Wild Oats		
Others		
Other food items bought		
Sugar		
Salt		

Coffee		
Cooking oils		
Others		
Livestock & its products bought, and consumed		
-animal slaughtered		
-Milk		
-Butter		
-egg		
-skin&Hides		
-honey		
Livestock & its products owned, but consumed		
-animal slaughtered		
-Milk		
-Butter		
-egg		
-skin&Hides		
-honey		
Other Expenses		
Clothes		
Medical expenses		
Education		
Farm implements		
Drinks		
Taxes		
Social obligation (idir...)		
Household utensils		
Rents		
Transportation		
Marketing		
Farm Oxen		
Breeding		
Miscellaneous(Others)		

Notice: All income earned and expenditure incurred refers to/from viewpoint of whole family.

VIII.Other Status of the Household

1.How do you judge the poverty status of your household in relation to other households?
a.Very poor b. Poor c. Self-sufficient d.Rich e.Very rich
2.Is your living standard is improving over the last ten years or not?
a. improving b. decreasing c. constant
3. If in Qs.No.2 is deteriorating, what do you think the reason?.....
4.Have you exprienced food shortage last year? a=no b=yes
5.If yes to no.4, for how many months_____
6.How did you cover the deficit?_____
7. During which month food shortage severe?---------

8. How did you cope with poverty? a.relief food aid, b. borrow from neighbord, c. Income from off farm, d. gift or remittance, e.migrate, f. Sales of live animals
9. How many times per day you eat during non-food shortage periods? a. Once b. twice c. three times d. other specify----------
10.What type of food you eat in Qs.No.7?_____, _____, _____.
11.How many times per day you eat during food shortage? a. Once b. twice c. three times d. other specify----------
12. What type of food you eat in Qs.No.9?_____, _____, _____
13.Who eat and who didn't?_____, _____, _____, _____.
14.Underline from what materials your house is made up of.
a. roof_____(grass, corrugated sheet of iron) b. Wall_____(Mud with wood, stone with mud, stone with cement)
15.Are you used to practicing cirumcision?
a. yes b. no
16. What do youn think Qs No.1 is beneficial or not? a. beneficial b. Harmful c. Other (specify)
17. If you will be told about Qs.No.1 as it is harmful, are you ready to stop? a. yes b.no
18.How many days you have not been work per month regularly through out the month or year?_____days/month.
19. What is the reason of not working? a. holidays b. no job c. Others
20. What you think the consequences if you work through out the month or year? a. storm of rain b. church forbid me c. others_____
21. What type of activities you are restricted?_____, and allowed to do_____
22.What is your source of water for drinking? a. spring b. river c. pond d. others____
23. If spring (protected or un protected)
24. Who construct the spring..... ,when.....(year).
25. How long it takes to fetch water in full trip_____(hours)
26. Who fetch the water a. wife b. children c. husband d. others.....
27. By what means do you transport water? a. human b. animal c. Others.....
28.As you now this country is poor and poverty is overwhelliming from time to time. So what you think the cause and what you suggest to overcome this problem.

For your Patience and provision of necessary information thank you.

Declaration

I, the undersigned, declare that this thesis is my original work and all reviewed materials and used for the thesis have been duly acknowledged.

Name : Adane Nabso

Signature : 

Place : Alemaya University

Date of Submission: January, 2003