MEASUREMENT AND DETERMINANT OF RURAL POVERTY:
A COMPARATIVE ANALYSIS OF THREE VILLAGES

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Measurement and Determinants of Rural Poverty: A Comparative Analysis of Three Villages

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Most of the people in the world are poor, so if we knew the economics of being poor we would know much of the economics that really matters."

(Theodore W. Shultz, on accepting the Nobel Prize, in Economics, 1979)

Abstract

Consumption-based poverty comparison in three rural villages of Region 3 (Dinki, Yetmen, and Shumsha) show that Dinki, the worst hit village in 1984 drought, is still poorer, while Yetmen is relatively well-off. Larger household size is unambiguously a significant cause of poverty in all villages. Interestingly, unlike agricultural technology, "formal education" doesn't seem to have direct impact to avoid poverty in all areas, but indirectly by enabling households to limit household size. Also, male-headed households are not any better positioned than female-headed ones to escape poverty. It seems that only where adoption rate of modern agricultural technology is high (as in Yetmen) that experience and hence age helps. Non farm income is significant determinant of poverty particularly in Dinki where agriculture is largely a hopeless venture, which sharply contrasts with Shumsha where the non farm jobs are despised and left only for those marginalized Falashas/Jews people. Assets are particularly useful where non-farm income is a significant part of income as in Dinki. Land not surprisingly, has a strong poverty reducing effect. This is not the case with Oxen. To reduce the level of poverty in these areas, limiting household size (through expansion of education), expansion of non-farm employment opportunities, credit supply are the major policy recommendations, though the degree of their importance vary among the areas. Yet these econometric results need to be combined with the Participatory Poverty Assessment (PPA) method in order to obtain even a more reliable outcome.

Introduction

The lack of progress on reducing poverty in the third world countries, and infact its growth during the 1980s show that one of the fundamental goals of development has not been met. For most of the developing countries, the main issue particularly in the 1980s were adjustment to internal and external imbalances, resulting in policies that in most cases did not place priority on the poor.

Continued suffering of the poor, thus, eventually called on the attention of Governments and international development agencies to put focuses on poverty reduction. In order for the advantages from the restructuring and more market oriented economic policies to have a trickle-down effect on to the majority of the society, there appear to be a need for a renewed effort for a grassroots development that will reduce poverty.

Cognisant of the fact that backward agriculture is the very root of poverty in Ethiopia -- obviously one of the poorest in the world -- the present Government rightly launched its Agricultural Development Led Industrialisation (ADLI). Development efforts are now rural-focused. But to develop effective policies to attack poverty requires specific knowledge about factors affecting poverty.

The purpose of this paper is to provide this information for three rural villages in Ethiopia which are geographically in one region, (Region 3) but with very divergent characteristics in climate, soil, culture, economic organization, and many other aspects. Thus, the first chapter would provide the basic background information on the changing attitude to the poor world wide and in Ethiopia. The second chapter would focuses on the controversy over the very concept of poverty and its measurement. The third chapter would try to review the major studies on the determinants of poverty, particularly in Africa. The fourth chapter presents the

empirical findings while the last chapter draws conclusion and gives some recommendations for policy and future research to reduce poverty in the areas.

1. BACKGROUND

1.1. The Changing Perception about the World Poor

Until a few decades ago, there was a widely held belief that economic growth is the way to reduce the incidence of poverty, and, economists therefore focused their attention on the modalities of economic growth. Particularly, in the 1950s and 1960s, many, strongly influenced by Sir Arthur Lewis and others. saw "growth" as the primary means of reducing poverty and improving the quality of life.

There were three justifications for the emphasis on growth (Streeten,1981).One justification assumed that through market forces – such as the rising demand for labour , higher productivity , or lower prices – economic growth would spread its benefits widely and speedily , and that these benefits could best be achieved through growth. Secondly, it was assumed that governments are democratic , or at any rate are concerned with the fate of the poor . Therefore, progressive taxation, social services, and other actions would spread the benefits downwards.

The third justification, more hard headed than the previous two, said that the fate of the poor should not be a concern in the early stages of development. It was thought necessary first to build up the capital, infrastructure, and productive capacity of an economy so that it could improve the lot of the poor later.

Another strong influence was the so called Kuznet`s curve, which relates average income levels to an index of equality and suggests that the early stages of growth are (essentially) accompanied by growing inequality. Only at an income of about $1000 per head (1979 dollars) is further growth associated with reduced inequality, measured by the share of the poorest 40 % of the population.

Indeed, since then, some countries have surged ahead in their economic development, attaining a level of prosperity which was unthinkable half a century ago, while many others are still at a very low level of development.

Yet, even in those countries where some growth has been recorded, the situation of the poor has never improved much. Except for a few countries, with special initial conditions and policies, there was no automatic tendency for income to be widely spread, nor did governments always take corrective action to reduce poverty (Streeten, 1981). Thus, the expectation that the benefit of economic development would "trickle-down" to the majority of the poor did not materialize. Indeed, with inequality and the number of the poor growing larger in many developing countries, the previous thinking that favorable distributional effects and reduced level of poverty are the sure outcomes of economic growth had to change (Hassen and Chandra Babu, 1991).

In the early 1970s, therefore, a shift was made towards poverty-focused development strategies such as the "redistribution-with-growth" and "basic needs" approaches. Essentially, attention shifted to the direct provision of such human needs as health, nutrition and educational services, and this was seen as a matter of public policy since it will eradicate the social evils with fewer resources (or sooner) than would the "roundabout" method of raising income (World Bank, 1990). Improvement in the health, education and nutrition of the poor, it was argued, were important not only in their own right, but also to promote growth in incomes, including the incomes of the poor (streeten, 1981).

In the 1980s, there was yet another shift in emphasis. Countries, especially in Latin America and Sub-Saharan Africa, struggled to adjust after the global recession. The constraints on public spending tightened. Many developing countries had to cope with macroeconomic crisis. Many, thus, began to question the effectiveness of public policy and especially policy towards the poor. Thus these countries needed to draw attention to a new

concern -- the need to frame "adjustment policies" that give due weight to the needs of the poor (Lipton & Ravallion, 1993).

The World Bank Report, in fact, drew a depressing picture for millions of the world's poor during this particular period. Many developing countries have not merely failed to keep pace with the industrial countries they have seen their incomes fall in absolute terms. Worse still, for most Sub-Saharan Africa, living standards have fallen to levels last seen in the 1960s. Such facts, extraordinary as they are, exacerbated the plight of the very poorest, whose lives have remained, blighted even as incomes elsewhere in the developing world have risen. For many of the world's poor, the 1980s was a "lost decade" -- a disaster indeed (World Bank, 1990).

Since early 1990s (and indeed since late 1980s), thus, there has been resurgence of interest in poverty reduction by the major multilateral and bilateral aid agencies. Particularly, following the World Development Report 1990, most agencies listed poverty reduction among their overarching objectives (Coulombe and Mckay, 1996, Getahun, 1999) and have opted variants of the Bank's two-pronged anti-poverty strategy; namely: broad-based economic growth which generates efficient income earning opportunities for the poor and improved access to education, health care and other social services. As a matter of fact, the strategy also included a social safety net for the vulnerable.

Consequently, a good deal of research has been undertaken on the meaning and measurement of poverty and on the efficiency of different policy interventions at the national and international level. Many programs got underway in the name of poverty alleviation. Yet, the absolute number of those in poverty continue to rise. In fact, the World Bank's Poverty Reduction Hand Book (1993) estimated that, given current trends, the number of people living on income less than USD 1 a day (the subsistence rate) will rise from 1.1 billion in 1990 to 1.3 billion in the year 2000.

Eradication of poverty has thus eluded economists for decades, and has in fact led to some more in-depth thinking which has culminated in the World Summit for Social Development, at Copenhagen, Denmark, March 1995. Following the Summit, each country was urged to formulate policies and strategies geared to substantially reduce, in the shortest time possible, inequality and eradicate absolute poverty by a target date.

1.2 The Ethiopian Condition

The prevalence of poverty in Ethiopia is very well documented. The poverty condition manifests itself in many ways, including: very low school enrollment ratio, very high rates of infant, child and maternal mortalities, in deteriorating conditions of child nutrition, in limited access to safe drinking water, in crowded housing conditions, etc.

Focusing on welfare indicators of income/consumption expenditure only (welfarist approach as opposed to the one proposed by the composit Human Development Index, see discussion bellow) there are currently various figures indicating the number of people under poverty in Ethiopia (Annex 1). The most recent estimate at the national level (urban+rural) by Mekonen, Bereket and Abebe,1998) based on calorie consumption indicate that as high as 48% of the total population cannot afford for the "minimum food bundle" constructed for a daily caloric intake of 2200 k.cal per day per adult.

However, even this figure seem to be conservative estimate. For example, Dercon & Krishnan (1998) advise that caloric-intake is only a limited part of a healthy diet; other nutrients need to be added, which would result in much more expensive diet. In fact the total consumption poverty line for Ethiopia, calculated in this way (i.e.; based only on calorie intake) is only close to $10 per month per adult, (unusually) much lower than the $30 proposed for Africa and other developing countries by the World Bank. According to

Dercon & Krishnan(1996), using this World-Bank-recommended poverty line, the total proportion of (rural) people under poverty (for 1994) would be as high as 85%.

Interestingly, Mekonen, Breket and Abebe (1998) pointed out that unlike the case in most poor countries, the condition of urban and rural poverty in Ethiopia is that of comparability instead of dichotomy. This is only because, according to them, the famous "settlement" history in Ethiopia (hence urbanization) has been largely associated with the growth of the *administrative services* and *state apparatus*, instead of the expansion of the *modern sector* that (normally) could cause the dichotomy. Consequently, urban areas are not any better than rural areas when it comes to poverty. In 1994, for example, poverty in rural and urban areas was 41.3% and 42.9%, respectively (compare, for example, 47% and 25% for Equador, Lanjouw(1996) and 61.6% and 5.25% for Cote d'voire, Kakwani (1993)).

What is even more depressing is the fact that since the beginning of building modern Ethiopia following the end of Second World War, development in the country seems alien and any progress made since then could at best be leveled "marginal". That is in almost all aspects of development, Ethiopia's present state hardly changed from what prevailed four decades ago. Consequently, the country's problem, development constraints and development priorities remained the same as were four decades ago.

Comparing situations in 1965 and 1992, Jamal Mohammed (1997) clearly indicated the grave realities of the country. Thus, the level of per capita GDP, which was USD 50 in 1965 still stands at USD 110 in 1992, obviously one of the lowest in the world. Other major social indicator also shows similar pictures. Gross enrollment changed between the periods from 11% to just 15%, life expectancy (at birth) changed from 43 years to just 49 years and infant mortality declined from 162 only to 122.

This reflects the presence of widespread poverty, with an economy not only failing to ensure basic needs to the people, but also progressively becoming vulnerable to externalities, making economic management complex and difficult. The existing economic policy thus essentially centered around poverty alleviation. By way of implementing its stated policy, the present government has already undertaken fundamental measures (UNDP/ECA, 1997) including:

(i) devaluation of domestic currency,

(ii) maintenance of a prudent or tight fiscal and monetary policy,

(iii) upward adjustment of interest rate,

(iv) trade liberalization and price deregulation,

(v) transport deregulation,

(vi) labour market liberalization,

(vii) import liberalization, and

(viii) inflation control.

Such measures seem to pay-off. As Jamal (1997) pointed out Macroeconomic development since 1992/93 depicts two important positive outcomes: economic stability and recovery. During the four years (1992/93 - 1995/96) growth in real GDP re-bound to an average record level of about 7%

This, however, doesn't seem to smoothly translate into poverty reduction. As Mekonen, Abebe and Bereket (1998) pointed out, between 1994 and 1995 alone, poverty in Ethiopia showed an increase. That is while about 41.5% of the population in 1994 was living in absolute poverty (defined by local standards) the figure increased to 48% in 1995, registering an increment of 8.8% in just one year.

By any standard, the issue of poverty alleviation is one serious issue for all concerned with Ethiopian development. Indeed, if poverty is the focus of the international community, the challenge can nowhere be more appropriately taken up than in Ethiopia (Picket, 1991).

1.3. Statement of the Problem

Thus, needless to say, poverty in Ethiopia is so serious. But, to design strategies for the alleviation of growing poverty, its root causes need to be investigated closely. Factors associated with the incidence of poverty were identified and analyzed in many countries in a large number of studies. Yet, while there is such a large body of literature on the subject in developing countries in general and particularly in those of South and south-east Asia, very few attempts have been made in their African counterparts.

But given the recent emphasis on relieving food crisis and reducing the sever consequences of famine and malnutrition, as well as deteriorating social conditions of the poor, there is an urgent need for researching poverty problems in Africa. This is particularly so in countries that are often seriously stricken by drought and famine, such as Sudan and Ethiopia (Hassan, 1991; Picket, 1991).

Currently, such professional efforts are increasingly being made towards that end. Yet, they are simply a drop in the ocean, given the nature of poverty in these countries. An enhanced effort still need to be made to understand the "diverse", "local " and "complex" realities of the Ethiopian poor. Whatever limited studies that were undertaken so far, moreover, focused only at national level and little is known about the detail causes of poverty at regional/zonal levels.

In fact, with growing concern of the Ethiopian government to ensure the rapid development of regions, there has now evolved a highly decentralized institutional framework for rural development. And the central issue of development today is how these

regions can become effective actors in designing and shaping their own future (UNDP/ECA, 1997). Given such facts, analysis only at national level, as has been the case so far, can not reveal relevant problems of poverty at lower levels.

Essentially, analysis at such an aggregate level hides many important differences in the nature of poverty that exist in different regions. Dercon & Krishnan (1996) strongly advise that one should be very careful about the implications derived from measurement and factors of poverty at national level , because they are likely to be reliable only for particular weredas and villages . Without doubt, what is needed is a closer look at the correlates of poverty at a lower level.

1.4 Objective and Significance of the study

The recent Household Income and Expenditure Survey conducted by the Economics Department of the Addis Ababa University in collaboration with others provides good basis for poverty analysis and subsequent policy formulations. Some analytical works have already been done using the data. What this paper aims at is, then, to add to the works on poverty analysis on areas not worked on before.

The specific objectives could be summarized as: (i) to measure levels of poverty, (ii) to single out major determinants of poverty in the study areas, (iii) to see similarities and differences in factors that gave rise to poverty in each area, and (iv) to point out some possible measures that need to be taken in order to alleviate poverty in the areas.

Given the absence of a systematic analysis on correlates of poverty at such a disaggregated level, the importance of this and similar works cannot be exaggerated. A lot of resource is being devoted both by the government and non-governmental organizations in almost all areas of the country in order to "alleviate" poverty. Such efforts have often been

unsuccessful to achieve their objectives (mainly) because they didn't have a good information about the key factors causing the poverty problem.

This study is hoped to furnish such vital information on the study areas. In fact, the areas selected being from varying agro-climatic conditions and resource endowments, the outcome of the study may also be informative for other locations with similar nature.

But, before going directly into investigating the measurement and determinants of poverty in the selected areas, some exposition of vital concepts in this controversial area of poverty seems in order, and it is to this that the next section turns.

2. CONCEPTUAL & MEASUREMENT ISSUES

2.1 Welfarists Vs Non-Welfarists

So far, there appears to be no general agreement on any definition of poverty. It can vary from place to place, depending on the social, economic, and cultural environment as well as on the stage of development of the society. But, broadly poverty can be defined as not having enough to eat, a high rate of infant mortality, a low life expectancy, low educational opportunities, poor drinking water, inadequate health care, unfit housing and lack of active participation in a decision making process, etc. (Schubert R., 1994).

Thus, approaches to the measurement of well-being at the individual level differ in terms of the importance the analyst attaches to the individual's own judgment about his or her well-being. They also differ in terms of the importance attached to the essentially materialist idea of "standard of living" versus less tangible but possibly no less important concepts such as "rights".

Basing ourselves on the materialist idea of ***standard of living*** an important distinction is between "welfarist" and "non-welfarist" approaches (Sen, 1979). While the former aims to base comparison of well-being solely on individual utility levels as measured by the individuals themselves, the later approach pay little or no regard to information on utility.

Economists have often shunned non-welfarist ideas aiming to base assessment of well-being solely on utility information. However, while it is clear that every individual utility gives value to, say, "food" consumption, one need not believe that individuals are themselves good judges of the importance of nutrition to well-being (Ravallion, 1992). After all, commodities are necessary not as an end by themselves , but as means towards enabling the individual to perform well by making him healthy and productive (Mekonen , Bereket ,

Abebe (1998)). In reality, therefore, there are situation where personal judgments of well-being may be considered suspect, either because of misinformation or incapacity for rational choice even with perfect information. Thus, a non-welfarist poverty comparison may deem that the poor are better-off even if the poor do not agree!

The welfarist (economists' favourite) approach , on the other hand, takes account of expenditure on goods and services consumed by the individual, valued at appropriate prices, including consumption from own production and, rarely, leisure time, measured at appropriate wage rate. A basic premise here, once again, is "respect" for the actual consumption behavior of households who are assumed to "rationally" allocate resources in such a way as to maximize basic need fulfillment (Shaffer, 1996).

Thus , economists would prefer to see the concept of poverty in terms of economic deprivation. Poverty can then be said to exist in a society when one or more people fall short of a level of economic welfare deemed to constitute a reasonable minimum , either in "absolute" sense or by a "standard" of that society (Lipton &Ravallion , 1995).

Based on such welfarist perspective , one can interpret the "poverty line" (to be discussed soon) as the minimum cost of achieving a certain level of (money metric) utility , a concept which is essentially derived from the neo-classical theory of consumer behavior . Thus, letting u to be the utility function defined over commodities $x_1,\ldots x_n$ and respective market prices $p_1\ldots p_n$ and a fixed income of a consumer , y , the consumer's maximization problem can be stated as:

$$\text{Max } u(x_1,\ldots.\ x_n)$$

Subject to

$$y \geq \sum_{i=1}^{n} x_i p_i$$

The solution to this problem lead to the indirect utility function V(P,y) , where P is a vector of prices and *y* is the level of income of the consumer . The inverse of the indirect utility function provides the expenditure function given by y = E(P,u). If we define u_r to represent a reference utility level defining poverty, then, the poverty line z is given by $z=E(P,u_r)$ which is defined as the money cost of achieving a certain level of utility.

Apart from *standard of living* (discussed so far) one may think also of other indicators of well-being including household's "opportunity" for consumption (where one need adequate data on, for example, wealth) and even *"rights"* (a right to participate in a society). Such concepts, however, carry more weight in the case of developed countries while in poor ones where greater importance is attached to consumption deprivation (especially food security) greater importance is attached to standard of living (World Bank, 1990). Moreover, preference is given for consumption (on which utility ultimately depends) as welfare indicator, than income.

2.2 Income Vs. Consumption Expenditure Approach

The choice of "income" or "consumption expenditure" has been a source of debate. Most analysts using household data for developing countries in making welfare comparisons, however, have preferred current consumption to income as the indicator of living standards. Variability in income is probably the main reason. Income of the poor (which, ofcourse, need to be net of costs, Lanjouw, 1996) often vary over time in fairly predictable ways (and sometimes in quite unpredictable ways); this is particularly true in under developed rural economies depending on rain-fed agriculture. Typically, there are "consumption smoothing" and insurance opportunities available to the poor, such as through saving and community based risk sharing (Ravallion, 1992).

Friedman's "permanent income hypotheses" (PIH)(1957) also suggests that permanent income which may be represented more accurately by total expenditure, may reflect the *purchasing power* of households better than measured current income because recorded income during a survey may be distorted by transitory (short-run) components, such as windfall income, leading to an incorrect measurement of true income (Kyerem & Thorbeck, 1991). According to the Permanent Income Hypothesis, the Marginal Propensity to Consume out of permanent income is high while transitory income is almost completely saved (Hassan and Chandra Babu, 1991)

This observation therefore, has two distinct implication for welfare measurement: (i) current consumption will almost certainly be a better indicator (than current income) of current standard of living, and (ii) current consumption may then also be a good indicator of long-tern well-being, as it would reveal information about incomes at other dates, in the past and future.

Apart from the conceptual problems that arise in using income as an indicator of household welfare, measurement error is bound to be serious particularly in countries like ours (Mekonen, Abebe and Berket,1998). Underestimated income would lead to a biased (over)estimation of poverty. Current consumption expenditure will therefore be the chosen measure of well-being in this paper.

2.3 Cost of Basic Needs Vs. Food Energy Intake Approaches

To compute poverty lines, two main methods have been used in developing countries: food energy intake (FEI) and the cost of basic needs (CBN) methods. Both methods are anchored in a daily nutritional requirement but they differ in the procedure used to estimate the resources needed to meet this requirement.

Under the FEI method (Greer and Thorbecke, 1986), poverty lines are set by computing the level of consumption or income at which households are *expected* to satisfy the (predetermined) normative nutritional requirement (e.g 2200 k.cal). Under the CBN method, (Ravallion & Bidani, 1994; Ravallion & Sen, 1996) poverty lines are set by computing the cost of the food basket (at regional prices) "*enabling*" (poor)households to meet the nutrition requirement, and adding to this cost an allowance for non-food consumption (again anchored on the consumption pattern of the poor).

As to which method to use has been debated upon, focusing on "consistency" and "specificity". A poverty profile will be deemed consistent when the standard of living embodied in the poverty lines used to construct the profile are the "same" for the various sub-groups the profile attempts to compare (Wodon, 1997a). By contrast, a poverty profile would be deemed specific if it's underlying poverty lines represent local (for the rural to urban comparison) or temporal (for a comparison between years) perceptions as to what constitutes poverty. For example, if there are differences in *tastes* or *consumption patterns* between urban and rural areas, this should be taken into account in constructing specific urban and rural poverty lines.

However, any method for computing poverty lines is likely to make "room" for both consistency and specificity. For example, because no reliable data are available for tracking the price of non-food items "by area" in most developing countries and because there is no consensus on the identification of non-nutritional basic needs, the CBN method has to make room for specificity in the estimation of non-food allowances.

As for the FEI method, it makes room for consistency (in poverty comparisons) in being anchored in an "absolute" nutritional requirement. This is because the stipulated relationship between food energy intake and consumption expenditure will not be the same across sub groups or over time, and will tend to shift due to differences in tastes, relative

prices , activity levels, etc. (Mekonen,1997). If for example, urban areas have comparatively more expensive tastes than rural areas, (for example, preference for white Teff as against black Teff, assuming equal nutrient content) then one would assign a much higher poverty line to urban areas, and therefore overestimate poverty there.

Thus the consistency and specificity of the two methods is a matter of degree. Each method has advantages as well as drawbacks. But the potential drawbacks of the FEI method has been shown to be particularly sever. In particular, Ravallion and Bidani (1994) showed that the FEI yields differentials in poverty lines (such as between urban and rural areas) in excess of the cost-of-living differential facing the poor. Thus, the method, they argue can mislead policy choices aimed at reducing absolute poverty. In contrast, the CBN method is more likely to generate a consistent poverty profile because two persons with the same measured standard of living -- measured by purchasing power -- will be treated the same way (Ravallion & Sen, 1996).

The CBN method is followed in this paper. Detailed procedures are given in the methodological section.

2.4 Poverty Lines

Given the above conceptual exposition on poverty, the basic question to be answered is how to determine whether the individual is poor or not. We need to quantify the various indicators of well-being into a single index – called *poverty lines*. It is undeniable that there exist level consumption of various goods (food, clothing, shelter, ...) below which survival, beyond short period, is threatened. But it is less clear what these levels exactly are for any given individual (Chen, Datt and Ravallion 1994; Mekonen, Breakout and Abebe,1998). And, in most societies (including some of the poorest) the notion of what constitutes poverty

goes beyond the attainment of the absolute minimum needed for survival. Thus, views always differ on the *location* of poverty lines.

Consequently, various approaches have developed in the past. But the main alternatives found in practice could be listed as follows.

2.4.1 Absolute Poverty Line

Much policy discussions in developing countries in relation to poverty has in the past focused on absolute poverty. Simply stated, absolute poverty refers to lack of command over basic consumption needs.

Ravallion (1992) defines the absolute poverty line as one which is fixed interms of the living standard indicator being used, and fixed over the entire domain of poverty comparison. The absolute poverty comparison would thus deem two persons at the same real consumption level to both be either "poor" or "not poor" irrespective of the time or place (e.g urban/rural) of being considered or with or without policy changes within the relevant domain.

The common procedure available for setting absolute poverty line is the Cost of Basic Needs(CBN) method (described above) which proceeds by stipulating a consumption bundle considered adequate for basic consumption needs and then to estimate its cost for each of the sub-groups being compared in the poverty profile. CBN, therefore, is deemed to be a socially determined *normative wage* rate. Consequently, those whose income is below this threshold are simply considered to be in the (absolute) poor category.

2.4.2 Relative Poverty Line

Simply stated, relative poverty means having less than others. It is based on the concept of poverty as a state of relative deprivation taking into account the general level of welfare in society. One way of determining relative poverty line is, for example, to choose the poverty line as a fraction of median or average income in society or as a specific percentile of the income distribution.

Thus, while absolute poverty may be reduced through economic growth, relative poverty will only decrease when income inequality in the society decreases. That is, even a well developed society may have some people in relative poverty, because poverty line simply vary with overall living standard. But, for developing countries where most people live below the subsistence level, the emphasis on relative position of the poor is not very appealing. The main concern -- at least in "measuring" poverty -- should be with absolute, rather than relative, deprivation (Kakwani, 1993).

2.4.3 Subjective Poverty Line

Quite different from the above two, this approach explicitly recognizes that poverty lines are inherently subjective judgments people make about what constitutes a socially acceptable minimum standard of living in a particular society. It is based on responses obtained directly from the individual for such questions as: what income level do you "personally" consider to be absolutely minimal? Obviously, the higher the income level of the individual for whom such questions are posed, the higher will be the "minimal" income necessary for survival. Such methods have been in use in developed countries (mainly in Europe) and not in developing countries.

2.5 Poverty Indices

After a measure of individual well-being and the poverty line is known, the next step will be aggregation into a poverty index. Currently, there is a large literature on poverty measure (See Abebe & Bereket, 1995; Hagennars, 1987; Kakwani, 1980; Kakwani, 1993).

Indeed depending on the purpose or objective of measurement and availability of data we can have a number of poverty indices. A brief review of the major poverty measures is given below (Kakwani, 1993).

Let income x of an individual (or a family) is a random variable with the distribution function F(x), and let z denote the poverty line . Then F(z) is the proportion of individuals (or families) below the poverty line, obtained by dividing the number of poor by the total number of people in the population. This measure is called the Head Count Ratio(HCR) which indicates the "prevalence"of poverty.

The HCR is however a crude poverty index since it does not take account of the income gap among the the poor . If the degree of misery suffered by an individual is proportional to how far short of the poverty line that individual's income falls, then the sum total of these income shortfalls may be considered an adequate measure of poverty. Such a measure is called the Poverty Gap Ratio (PGR) and can be written as :

$$G = \int_0^z g(x) f(x) dx$$

$$= F(z)\left[\frac{z - \mu^*}{z}\right]$$

where g(x)=(z-x)/z, f(x) is the density function, and μ^* is the mean income of the poor.

Assuming that all the poor have exactly the same income , G will indicate the intensity of poverty . In that case, it can be used as an indicator of potential for eliminating poverty by targeting transfer to the poor, where the sum of the poverty gap yields the minimum possible cost.

In reality , however, income is unequally distributed among the poor, and G cannot be an adequate measure of the intensity of poverty. The fact that there is more inequality of income among the poor with the mean remaining unchanged would mean more suffering for the extremely poor in a society. Under such conditions, the degree of poverty should be higher than that indicated by the measure G.

To make G sensitive to the income inequality among the poor, Sen(1976) proposed the following poverty measure:

$$S = F(z)\frac{\left[z - \mu^{*}(1 - G^{*}\right]}{z}$$

where μ^{*} is the mean income of the poor, and G^{*} is the Gini index of income distribution among the poor.

Yet, Sen's index is not free from shortcomings. Supposing that the population is divided into mutually exclusive groups (socio-economic or demgraphic-based), and supposing further that , for some reasons, the poverty measure of a certain group increases while that of the remaining groups is unchanged), one would normally expect poverty measure for the entire population to increase. But Sen's poverty measure violates this simple requirement in certain cases, because it is not additively separable/decomposable(Kakawani, 1993).

An additively decomposable poverty index is one which can be written as a weighted average of the poverty indices for a set of mutually exclusive and collectively exhaustive sub-population (Abebe, 1998) . These measures are useful because they allow the assessment of the effects of changes in subgroup poverty on total poverty , which is of great interest for policy makers.

A class of additively separable poverty measures is given by:

$$P = \int_0^z \theta(z,x) f(x) dx$$

where θ(z,x) is a function of poverty line z and income x .

But to make this poverty measure operational, we need to specify θ(z,x).

For example the Clark, Hemming, and Ulph(CHU)(1981) poverty measure can be obtained by letting

$$\theta(z,x) = \frac{1}{\beta}\left[1 - \left(\frac{x}{z}\right)^{\beta}\right]$$

Thus, we get,

$$C_{\beta} = \frac{1}{\beta}\int_0^z \left[1 - \left(\frac{x}{z}\right)^{\beta}\right] f(x) dx$$

where β is a parameter to be specified. These measures clearly satisfy Sen's monotonicity axiom (see below) if and only if β>0. Both the transfer and transfer sensitivity axiom will be satisfied for all β<1. Thus for the axioms to be satisfied β must lie in the range 0<β<1.

Similarly , Watt's (1968) poverty measure can be obtained by substituting

$$\theta(z,x) = \log z - \log x$$

we get

$$W = \int_0^z (\log z - \log x) f(x) dx$$

This measure satisfies Sen's monotonicity and transfer axioms and Kakwani's transfer sensitivity axioms.

Finally, the Foster, Greer and Thorbeck (1984) class of poverty measure can be obtained by substituting

$$\theta(z,x) = \left[\frac{z-x}{x}\right]^{\alpha}$$

which give us

$$P_{\alpha} = \int_0^z \left[\frac{z-x}{x}\right]^{\alpha} f(x) dx$$

where α is a parameter to be specified. These measures are so popular in poverty literature because they satisfy all the key desirable axioms of a poverty measure (Hagennars,1987, Ravallion 1992, Wodon,1997). That is:

-- when $\alpha>0$, $P\alpha$ satisfies Sen's monotonicity axiom which simply states that given other things ,a reduction in the (mean) income of the poor individual (others' income unchanged) must increase the poverty measure;

-- when $\alpha>1$, $P\alpha$ satisfies Sen's weak (strong) transfer axiom which states that given other things , a pure transfer of income from a poor individual, others' income unchanged, but

with income below z (above z), to any other richer individual must increase the poverty measure (Sen, 1976);

--when $\alpha>2$, $P\alpha$ satisfies Kakwani's transfer sensitivity axiom which states that if a transfer of income takes place from a poor person with income x to a poor person with income (x+h), then for a given $h>0$, the magnitude of increase in the poverty measure decreases as x increases (Kakwani,1993).

In fact there are other additional axioms which a poverty index is supposed to satisfy (for details , see Abebe,1998). However, no single poverty index can meet all the desirable properties simultaneously . In this paper, we apply the FGT class of poverty measurement because while capturing the most desirable properties , they are also decomposable and subgroup consistent (Hagennars,1987; Ravallion,1992;Wodon,1997).

Having exposed some discussions on the concepts of poverty measurements, we shall now turn to the discussion which in various studies have been identified to be ***"causes"*** of poverty.

3. LITERATURE REVIEW (Empirical)

As explained elsewhere in this paper, factors associated with the incidence of poverty in many countries were identified and analyzed in a large number of studies. Yet, while there is a large body of literature on the determinants of poverty (for programs and projects) even in many developing countries including South and south-east Asian countries, very few attempts have been made in their African counterparts.

Methodologically, however, all studies follow either of the two models of analyzing determinants of poverty --- *levels regression* or *binary response* model. There are advantages and disadvantages of using either method, and this shall be discussed in detail in the Model Specification section.

In the following exposition of relevant studies on the correlates of poverty , focus is made on studies in developing countries, particularly on Africa. Many are at national level while some studies are at regional or even district level within a country.

For example, Kakawani (1993) used per capita adjusted consumption for Cote d'Ivoire (constructed by Glewwe (1988) as a measure of household's economic welfare. His major objective was to test whether the observed difference in poverty level between the regions or between socio-economic groups within the same region are statistically significant.

The empirical result show that poverty varies widely among the (five) regions that he developed for analytical purpose, and particularly between urban and rural. For example, only 5.25% of the population in Abidjan (urban) is poor whereas in the Savannah (rural) regions as much as 61.62% of the population is poor. Such difference in poverty between regions, however, are statistically significant even within rural and urban sub-regions, showing that geographical location of a household has a sizeable effect on its poverty level.

He also found that large households have significantly higher poverty than small and medium-size households, and incidence of poverty is highest amongst households in which the head is over age 65; and the age group 46 - 65 also has fairly high incidence of poverty -- leading to the conclusion that the age of household head, when it exceeds 45 years becomes an important determinant of poverty.

Further comparing poverty among households classified according to the employer of the head, he found that poverty is zero among households whose head is employed by government corporation while households whose head is self-employed are most susceptible to poverty. Interestingly, he observed that households whose heads are "not" working have lower poverty level than those whose heads are self-employed. He, thus, pointed out that an employment defined as *not working and actively looking for work*, is more common among the non-poor households and some of such households according to Glewwe (1988) may be composed entirely of retired persons living on pensions or other sources of transfer income.

As expected, with the highest education level reached by the household head, poverty decreases monotonically, implying that education even upto elementary school can substantially reduce poverty.

The study by Grootaert, Kanbur and Taik Ch (1997), on the other hand, aimed to see factors which play important role to welfare "changes" in Cote d'Ivoire using the living standard survey (CLISS) which was conducted from 1985 - 1988. For them, particularly in rural areas, physical capital, especially the amount of land and farm equipment are most important endowments to explain welfare changes. Small holders were more prone to suffer welfare losses. Households with diversified sources of income managed better, especially if they had an important source of non-farm income. Again, the size and composition of households were key factors in affecting welfare changes -- larger households suffered larger welfare losses.

Their *regression* results also confirmed earlier observation (Grootaert & Kanbur, 1995) that region of residence and socio-economic status of the household were important determinants of welfare changes. For example, for equal levels of endowments (and for equal changes), households whose heads worked in the public sector maintained better their welfare levels than households working in other sectors; and residents of interior cities suffered greater welfare declines than those in Abidjan.

Interestingly, migrant non-Ivorian households tended to be better at preventing welfare losses than Ivorian households, while households headed by women did better than those headed by men. And, particularly in rural areas, households with heads younger than 45 years are more likely to experience welfare increases. Like in the Kakwani study (1993), education was found to be not only associated with higher welfare levels, but it also helped people cope better with economic declines of the 1987-88.

Another study on an African nation, by Coulombe & Mckay (1996) focused on the socio-economic determinants of living standards, in Mauritania; where not withstanding its per capita GNP of around USD 510 (1993) (higher than many African countries), a significant proportion of the people find itself below the lower of the two poverty lines proposed by the World Bank (1990) in its World Development Report.

The identification of the key contributory causes of poverty has been considered at two levels: first looking at the factors which influence the socio-economic group to which a household belongs as well as its standard of living within a particular socio-economic group. Within this framework, poverty can arise if either (a) a household does not have the characteristic to enable it to be in one of the more favoured socio-economic groups; or (b) whichever socio-economic group the household belongs to it does not posses the characteristics which make it more likely for it to achieve a high standard of living within that group.

They, therefore, found that lack of education (especially at the primary level) and high level of dependency ratio were the major constraints for many households, and reducing the extent of impact of these problems was a clear priority in the longer term. They also pointed out that attention need to be paid to the reduction of urban-rural inequalities, given that poverty in Mauritania was disproportionately a rural phenomenon, with households engaged in small scale agricultural cultivation being the highest priority group.

Infact, earlier World Bank Study (1990 a) clearly indicated how important it was to examine social characteristics (in addition to economic characteristics) of the poor. For example, income based poverty measures showed significant progress in poverty reduction in Pakistan in the late 1980s. With a per capita GNP of USD 350 in 1987, Pakistan's income per capita was well above the USD 290 average for low income countries at that time. However, Pakistan's demographic and social indicators (health, education, etc.,) were comparable only to those of the "lowest" income countries (World Bank, 1990).

As mentioned in their report, the Coulombe & Mckay study followed broadly similar approach of earlier work of Kyerem & Thorbeck (1991) in modelling the determinants of food poverty in Ghana. The latter used a *multiple regression* analysis by functionally relating calorie gap to a set of explanatory variables which influence them (such as: set of purchasing power variables, demographic variables, geographical location variable, etc....).

They, therefore, found that fertility and mortality indices, age, education and sex significantly explain household calorie gap. For them, variables negatively related to the calorie gap include: the maturity index, age and level of education of household head. However, the fertility index is positively related to the calorie gap while lower gaps are associated with male-headed households. They pointed out that the positive effect of the fertility index and the negative impact of the mortality index imply more children per adult is

significantly associated with high calorie gaps, while lower children relative to adults is associated with lower calorie gaps.

Rashid M Hassan & Suresh Chandra Babu (1991) also focused on food poverty in Sudan but not at national level. They rather concentrated their study of food poverty in the "Rahad Scheme", the second largest irrigation scheme in Sudan. Regression procedures were used to estimate the Engle curve parameters; and wealth, family size, dependency ratio and source-of-income ratio were used to explain composition of household consumption. But as land was publicly owned and its use was equally allocated among tenant farmers, the wealth variable did not include land.

From their *logit analysis*, they found that 34% of tenant households in the Rahad could not afford a nutritionally adequate diet. The larger the size of the household and the lower the share of non-farm earnings, the higher the probability of absolute poverty for the family. Better access to productive assets and larger farming experience, on the other hand, reduce the chance of falling below the poverty line, and the larger the number of active adults, the higher the cost of minimum nutrition and thus the higher the probability of poverty.

Their analysis seems to suggest that since Rahad tenants have better access to institutional services such as schools, extension, roads and market than other rural population in Sudan, poverty among farmers where these services are lacking (e.g., rain-fed small holders) must be even more sever. Also, given the nature of the sample households analyzed, the study results remarkably indicate that assuring equal distribution of land and water through "*land reform*" and irrigation schemes does not guarantee improved standard of living if not supported by proper poverty-based socio-economic policies and an appropriate institutional environment.

Landlessness also does not explain poverty in Palanpur (Rural India). Infact, Peter Lanjouw and Nicholas Stern (1991) studied poverty in Palanpur in three ways: by measuring current income (from large scale survey of 1983/84); by measuring "permanent income" from an average of current incomes over four interviews spanning 25 years; and by measuring "apparent income" based on the observation of resident investigator (who also discussed with villagers) over one year. Their chosen explanatory variables included the 4 castes in Palanpur as well as landlessness, possession of outside job and the presence of fit adult male.

From their *probit analysis*, they found that without the cast dummies and when poverty is measured using the conventional "current income" criteria and the permanent income criterion the landlessness variable becomes insignificant.

By contrast, and in accordance with one's expectation Wodon's (1997a) study proved that within the rural and urban sectors, not only were large variations in poverty rates observed by geographical area but also land ownership as well as education and occupation appear to be the main determinants of poverty. Particularly in the rural sector, lack of land ownership appear to be the chief determinant of poverty.

Andrew Mason (1996) also takes up the case of "districts" in Java (Rural Indonesia). He examined the extent to which it is possible to target the consumption of poor in rural Java by analyzing the regional and socio-economic characteristics of poor households. His analysis of official household sample survey data shows that there are important geographical and spatial features to rural poverty in Java. The proportion of households with expenditures below the official poverty line is, for example, substantially higher in upland and dryland regions and rises as distance from economic and administrative centers increases.

However, geographical and spatial descriptions of poverty tell only part of the story: 43% of the Javanese rural poor live in relatively prosperous wet land and mixed farming

regions. Consumption poverty in these regions is characterized by, as expected, lack of access to land, credit and formal education.

Interestingly, however, this anatomy of rural poverty indicates that regional targeting "alone" will be insufficient to eradicate rural poverty in Java. An effective anti-poverty strategy for rural Java should then combine continued, broad-based growth with judicious uses of geographic targeting and special efforts to enhance the "poor's'" access to productive assets regardless of where they live!

Lipton & Ravallion (1993) similarly argue that regional targeting may not always be a good policy instrument. Indeed, since substantial regional disparities in living standards are common in developing countries, backward areas can often be readily identified, and regional targeting of transfers has attraction. Infact, it has already been exploited in many developing counties. For example, the allocation of central government disbursement across states of India has been determined in part by regional disparities in poverty. But, they advice that while regional targeting of transfers can help to reduce poverty in developing countries, it may be a relatively blunt policy instrument on its own.

Whether such regional targeting can ever be effective in reducing poverty in a country requires regional (or even lower) level analysis as did Mason(1996) for rural Java (above).

Such efforts are lacking in Ethiopia . For example, Dercon & Krishnan (1998) , attempting to see the contribution of household endowments and characteristics to the decline in rural poverty in Ethiopia between 1989—1994/5, did their "decomposition" analysis only at national level. The impact of the chosen "few" factors (education , sex, ownership of land /oxen , distance to main road/town) has been reported to be as expected, taken at national level. In fact ,the authors themselves warned that such indicators are

reliable only for lower administrative levels such as "weredas" or "villages" (Dercon & Krishnan ,1996).

Finally, a study focussing on determinants of poverty in Ethiopia is that of Mekonen(1997). He focussed on the determinants of poverty dynamics in urban Ethiopia. According to him, between 1994 and 1997, 14.8% of his sample households slipped into poverty while 15.2% moved out of poverty giving rise to a 0.4% decline in the incidence of poverty. Given such a decline, urban poverty incidence in Ethiopia still lingers at a considerably high level of 46% with Addis Ababa -- the capital -- taking the lion's share of urban poverty concentration. He pointed out that the key determinants that accounted for going out of poverty are education, the existence of few number of children and elderly in the household.

This concludes the major works undertaken on poverty determinants in developing countries, particularly in Africa. The next section is on the methodology of analysis.

4. EMPIRICAL ANALYSIS

4.1 The Data

The data source for this study is the recent Rural Household Income and Expenditure Survey conducted by the department of Economics, Addis Ababa University.

This survey was undertaken in a total of 15 rural sites (villages) distributed throughout the country. The sample was designed to capture the major socio-economic groups, agro-ecological zones and farming systems by spreading the sites in the most important regions of the country. However, while the sites are so selected to represent the diversity of the rural economy, households in each site are selected randomly, the sample size in each site being proportional to the population in each area (see Mekonen, Bereket and Abebe, 1998).

In order to see how factors of poverty differ between sites within the same region, three sites from Region 3 (Amhara) are selected. The sites are:

- shumsha (North Wollo)
- Dinki (North Shewa)
- Yetmen (East Gojjam)

The three sites represent highly differing agro-climatic condition and varying resource endowments. Thus, one can expect varying levels of poverty per site as well as different causes to it. Before trying to provide the measurement and correlates of poverty, a general background information about each site is given. The information in this section is largely drawn from reports of The Ethiopian Village Studies, by the Department of Sociology (AAU) and Centre to the Study of African Economies Oxford University, June 1996.

4.1.1. Dinki

Dinki is a peasant association situated in North Shewa, near Ankober. It is 43 kms. from Debre Berhan and about 8 kms. from Aliyu Amba, a very small town. The total population of Dinki PA is about 1000. The Amharic speaking population are dominant with only few Argoba people. Almost three quarters of the population are Muslims and the remainder are Orthodox Christians.

The site is connected to Aliyu Amba by a feeder road, and the area is 7 km. from the Dulecha Junction. The nearest primary school (1-6) is at Chibete which is about two hours walk away. There is also a primary and junior secondary school (1-8) at Aliyu Amba. The only high school is at Debre Berehan. There is no health facility in the village. The nearest government clinic is at Aliyu Amba, and the nearest hospital is again at Debre Berehan. The area is one of the malaria-prone sites.

The altitude near Dinki river is 1400m and this increases as one goes up in the PA. The zone is generally Kolla (lowland) and the site is hilly. The economy is almost entirely agricultural. Cultivation, mainly during Meher, is dominated by cereals and pulses, the major crops being Sorghum and Teff. Dinki area is known for growing various fruits, the main ones being banana, papya, tirnigo and sugarcane. The main livestock kept in Dinki are oxen, cows, sheep, goats and mules. However, given the hilly topography, there is a lack of grazing land. Modern agricultural inputs such as fertilizer are rarely used. Weaving is the second most important occupation, carried out mostly by Muslims (from Argoba).

The area is generally food deficit. There were serious crop failures in 1977 and 1984, and in fact the area is one of the worst affected sites of the 1984/85 famine (IFPRI, 1992). During this time, people were said to be reduced to eating wild food items, locally known as "enkoy" sholla, kulkual, as well as plants such as wof-zerer, fenchek'o, alma, and ant'aria

which in fact were consumed during the war between Italy and Ethiopia in the late 30's and 40's.

4.1.2. Yetmen

Yetmen Peasant Association is situated at the southern end of Enemy wereda, in East Gojjam zone, Region 3. It is located about 248 kms. north-west of Addis Ababa between the town of Dejen and Bichena.

The total population of Yetmen PA is estimated to be about 2500 (1995), of which 52% are women. The Amhara's are the most prominent ethnic group in the area comprising 87.4% of the total population. Orthodox Christianity, likewise, is the dominant religion.

Agriculture is the main occupation. The area is generally suitable for agriculture with 87% of it being under cultivation, and 9.2% communal grazing. None of the land is uncultiveable, and there is an insignificant amount of erosion, since Yetmen is located on a flat plain.

The principal subsistence crops grown in the area include maize, wheat, teff, guaya and chickpeas, with teff and wheat accounting for 55% of cultivated area. Most crops are grown during the Meher season. The common livestock found in the village are oxen, cows, sheep, donkeys and horses, and play an important role in the economic activity of the society alongside crop cultivation. Most farmers are used to practising modern agricultural techniques.

Yetmen PA is located in an all weather road to major towns of Region 3. There is an elementary and junior school, while the nearest secondary school is in Dejen, some 8-10 kms away. The nearest clinic is in the neighbouring PA of Zebch, some three kms from the middle of the village, while the nearest hospital is in Debremarkos, at a distance of 72 kms. It is reported that there has been no drought in the PA for the last 30 years except for the 1985

drought which affected only a few households who were forced to eat chickpeas instead of teff.

4.1.3. Shumsha

Shumsha is located in Bugna woreda, North Wollo administrative zone, 630 kms north of Addis Ababa, about 110 kms. from Woldia (the zonal town), 335 kms. from Bahir Dar, and 12 kms. south of the woreda town, Lalibela.

The population of Shumsha is estimated to be about 6000 (1995). Socially, all the residents of the PA belong to the same ethnic group, the Amhara, though an insignificant number of Fellashas, "black-Jews" also live in the area. More than 95% of the people are Christians, with some Muslims and Jews.

The 80 kms. dry-weather road linking Lalibela with the Woldia-Woreta all weather road cuts across 6 of the 9 sub-village of Shumsha. Moreover, a dry weather road connects Shumsha to Ayna, the former capital. There is one elementary school in Shumsha, established in 1988, though parents are generally not willing to send their children. The nearest health centre is in Lalibela (12 kms away), and the nearest hospital is in Woldia. But for most illness people prefer traditional treatment.

The PA is situated on a plain (at an altitude of between 1500m and 2000m with mainly Kolla weather that is surrounded by a chain of mountains that are bare and devoid of plant life. In fact, there is no place in the whole woreda that is covered with trees except some churchyards. Moreover, the general quantity of the land is teuf (infertile). About 40% of the total area of the woreda is not arable and only 10% of the total area is cultivated.

Obviously, agriculture is the main economic sector. Crop production, mainly in Meher, include teff, sorghum and chickpeas, with an insignificant amount sold in the market. Livestock is very rare because of the severe shortage of grazing land. The site being situated in

one of the drought-prone areas in the country, with frequent rain failure, it is generally a food-deficit area.

Farmers use traditional farming system, and almost no modern agricultural input. Also off-farm activities supplementing the income of the peasants are very few, and are not viewed favourably by peasants. Trade, blacksmithing, pottery, tannery, etc., are occupations despised by the society and are exclusively the work mainly of the Fellasha who had no right to own land until the 1974 revolution.

4.2. Measurement of Poverty

As outlined earlier, here absolute poverty is measured which is appropriate in this kind of analysis. Accordingly, households whose per capita income is below a certain cut-off point, Z, called "poverty line" are considered to be absolute poor.

Setting the poverty line is an important issue in poverty measurement and comparisons. Local poverty lines are typically anchored to a similar nutritional cut-off point of around 2100-2300 calories per person per day in developing countries (Chen, Datt and Ravallion, 1994).

In turn, to construct the poverty line generating such calorie requirements, the cost of Basic Needs (CBN) approach, discussed previously has been adopted. The choice of this approach over and above what is known as the Food Energy intake (FEI) approach is also discussed in detail by Ravallion and Bidani (1994), Wodon (1997) and Ravallion and Sen (1996).

Two steps are followed in constructing the poverty line:

First: a "representative" diet normally consumed by the poor need to be developed. Such a diet has already been developed for Ethiopia (Dercon and Krishnan, 1998). (The list of food items is given on Annex 2). The amount of these food items is then adjusted to a level that can

provide the nutritional requirement of 2,300 k. calorie per adult per day which is recommended by the Ethiopian Nutrition Institute as a minimum to allow an adult to lead a normal life.

The same list of items is used for all villages as the food culture between them is not basically different. However, the food items have been valued by the prevailing local price in each village which was simultaneously collected during the survey. Such a valuation, using prices in each locality, provides a suitable yardstick for "comparison" of poverty across village (Dercon and Krishnan, 1998).

Second: The food poverty line thus obtained has again been rescaled to establish the Total poverty line which would serve as a cut-off point to differentiate the poor from the non-poor in each locality. A simpler and widely used procedure known as Orshansky method has been followed. Thus, the total poverty line has been set by dividing the food poverty line obtained above by the average share of food in total consumption of those households whose total expenditure is just equal to the food poverty line. This is based on the assumption that such households, though their income level would only permit them to buy just enough food (as stipulated in the food poverty line), they would nevertheless spend part of their income on items which are non-food. The poverty lines[1] are given on Table 4.1.

[1] Inflation rates has been very low in recent years(between 2-3%, UNDP, 1998) to necessitate further adjustments.

Table 4.1. Food Poverty Lines and Total Poverty Lines (in Br/Adlt/Mnth)

	Food Poverty Lines	**Total Poverty Lines**
Dinki	32.21	39.28
Yetmen	38.00	53.52
Shumsha	41.85	51.66

Source: Own calculation.

The poverty line obtained above will enable us to categorise households into poor and non poor depending on household's standard of living. Once again "consumption expenditure" is the chosen indicator of standard of living in the household. Thus, all consumption expenditures including purchased food consumption, consumption from own harvest (valued at local prices) and non-food expenditures by households have been included (Hetschel and Lanjouw, 1996, Dercon and Krishnan, 1998).

The total consumption level thus obtained at the household level should be converted into an individual level in order to account for differences in household size. Thus, adjustments are made for differences in household size, and consumption is expressed at a per capita level, dividing total household consumption by household size.

Comparing this monthly per capita consumption of households against the chosen total poverty line enabling the acquirement of the 2300 k. calorie per day per adult reveal which households are poor. Once again to distinguish which households are poor, the FGT (1984)

poverty measure are used, given by:

$$P_\alpha = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{z - yi}{z}\right)^\alpha$$

where $\alpha \geq 0$

z = Total Poverty Line

y_i = Per capita consumption of household i.

The computation provides the head count index, P_0,(when $\alpha = 0$), the poverty Gap Index, P_1(when $\alpha = 1$), and the Foster, Greer and Thorbeck measure, P_2 (when $\alpha = 2$) in each locality. The results are given on Table 4.2.

Table 4.2. Poverty Measures

	1997			1994		
	P_0	P_1	P_2	P_0	P_1	P_2
Dinki	.39	.099	.043	.39	.13	.06
Yetmen	.05	.0149	.0089	.12	.01	.00
Shumsha	.16	.055	.031	.14	.03	.01

Source: 1997, own calculation. The 1994 result is adopted from Dercon and Mekonen (1997).

As expected, the head count index is highest in Dinki, the resource poor and isolated village, and lowest in Yetmen. The P_1 and P_2 measures, interestingly provide roughly similar pictures. Moreover, the poverty picture is consistent with previous works as shown in the above table, though that of Yetmen has shown relatively marked decline in P_0 measure. This may have to do with increased productivity level in the area through the use of modern agricultural technology.

4.2.1. Poverty Comparisons: Stochastic Dominance Test

In order to prioritise interventions in each area, actual cardinal numbers of the level of poverty, as given in the above table, are not enough. It is important to establish how robust these comparisons are. One is interested to know whether, for example, Dinki can be regarded as poorer than Shumsha regardless of the precise location of the poverty line.

One has to show this by varying the poverty line, because there are always uncertainties about a number of aspects: there are likely to be errors in the living standard data, unknown differences in needs between households at similar consumption levels, uncertainty and arbitrariness about the poverty line and the poverty measure(Chen, Datt, Ravallion, 1994). Advances in the measurement of poverty have in recent years yielded very simple techniques for robust poverty comparison, drawing on the theory of Stochastic Dominance.

This is a simple graphical test. On the horizontal axis, different poverty lines, Z, (ranging from 0 upto a "reasonable" maximum, Z^{max} say minimum wage rate) are plotted, and on the vertical axis the proportion of population consuming less than the poverty line(also the poverty gap) are plotted. For each site, curves known as the "poverty Incidence curve" (PIC) and the Poverty Deficit Curve (PDC) are traced. From the theory underlying these techniques, if the two curves (representing PIC and PDC for two sites) do not intersect at any point in the graph, poverty in the population represented by the curve lying everywhere above the other is greater.

From Table 4.3 and Figures 4.1 therefore, one can see that the PIC for Yetmen is everywhere below that of either Dinki or Shumsha confirming the measurements that poverty in Yetmen is "unambiguously" lower than in either of the other two villages. On the other hand, although at some higher level of poverty lines Shumsha looks better off than Dinki, at very low level of Z, (about Br. 15) one can see that their PIC intersect and PIC for Dinki lie below that of

Shumsha indicating re-ranking occurs in favour of Dinki. In this case one can not then say that Shumsha is unambiguously better off than Dinki. The PDCs on figure 4.2 give quite similar information. Such comparison thus provides good information for prioritising efforts (resources) for the sites.

Table 4.3: Poverty Comparisons: % poor and the poverty gap ratio at different poverty lines.

Poverty Lines (Br/Adult/month)	Dinki		Yetmen		Shumsha	
	%poor	pg	%poor	pg	%poor	pg
0	0	0	0	0	0	0
10	0	0	0	0	1.36	.002
20	7.22	.015	1.64	.004	4.79	.013
30	19.28	.052	1.64	.008	5.48	.026
40	39.375	.105	1.64	.010	8.22	.037
50	6.63	.177	3.27	.013	15.0	.052
60	75.908	.249	4.92	.018	23.2	.076
70	6.75	.330	9.83	.025	26.7	.101
80	91.57	.400	16.4	.038	34.2	.126
90	97.59	.462	22.9	.055	39.7	.153
100	100.0	.515	24.5	.072	47.2	.182
110	100.0	.559	24.5	.088	58.2	.212
120	100.0	.596	26.2	.102	67.1	.247

Source: Own calculation

Fig. 4.1

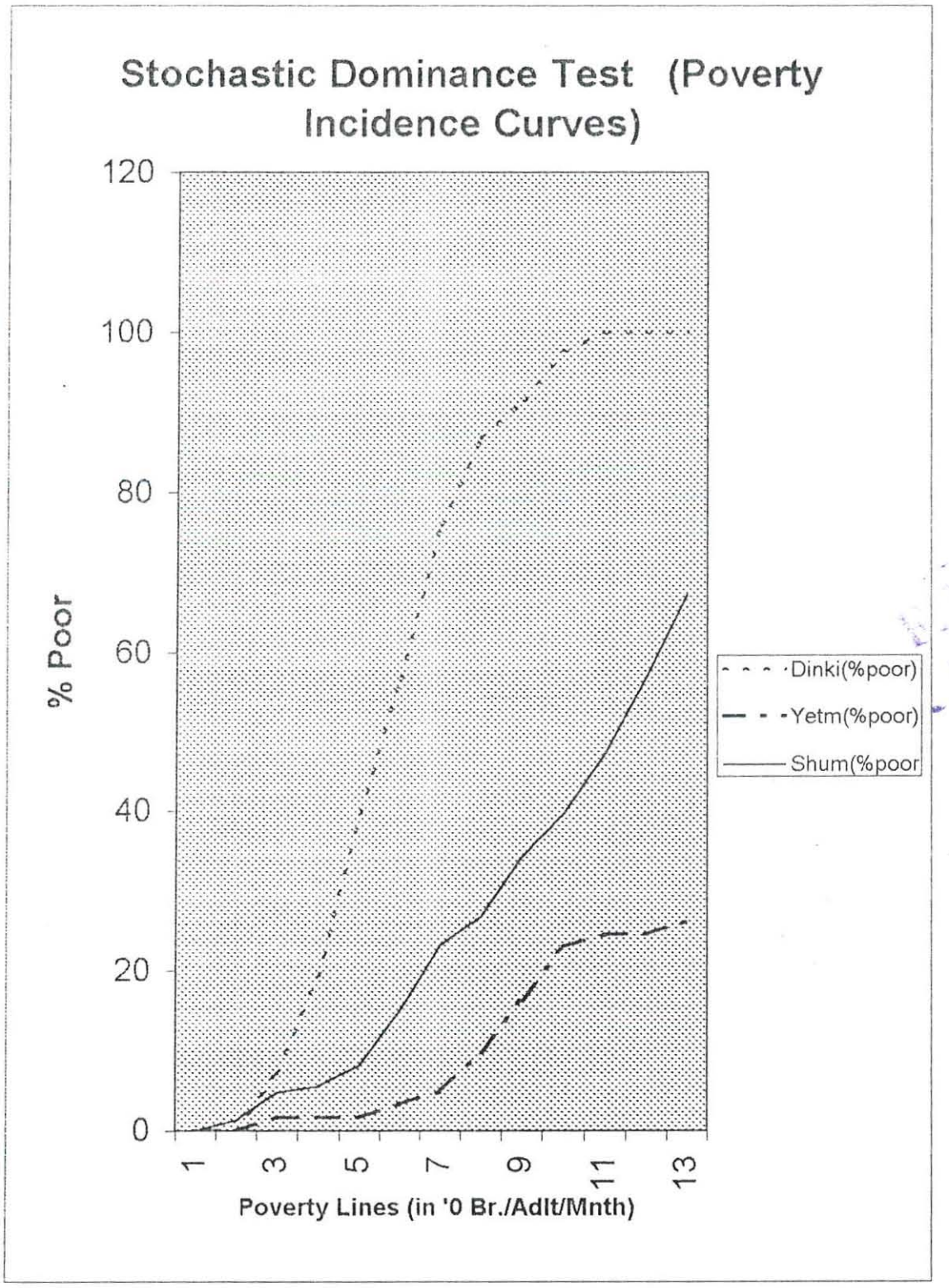
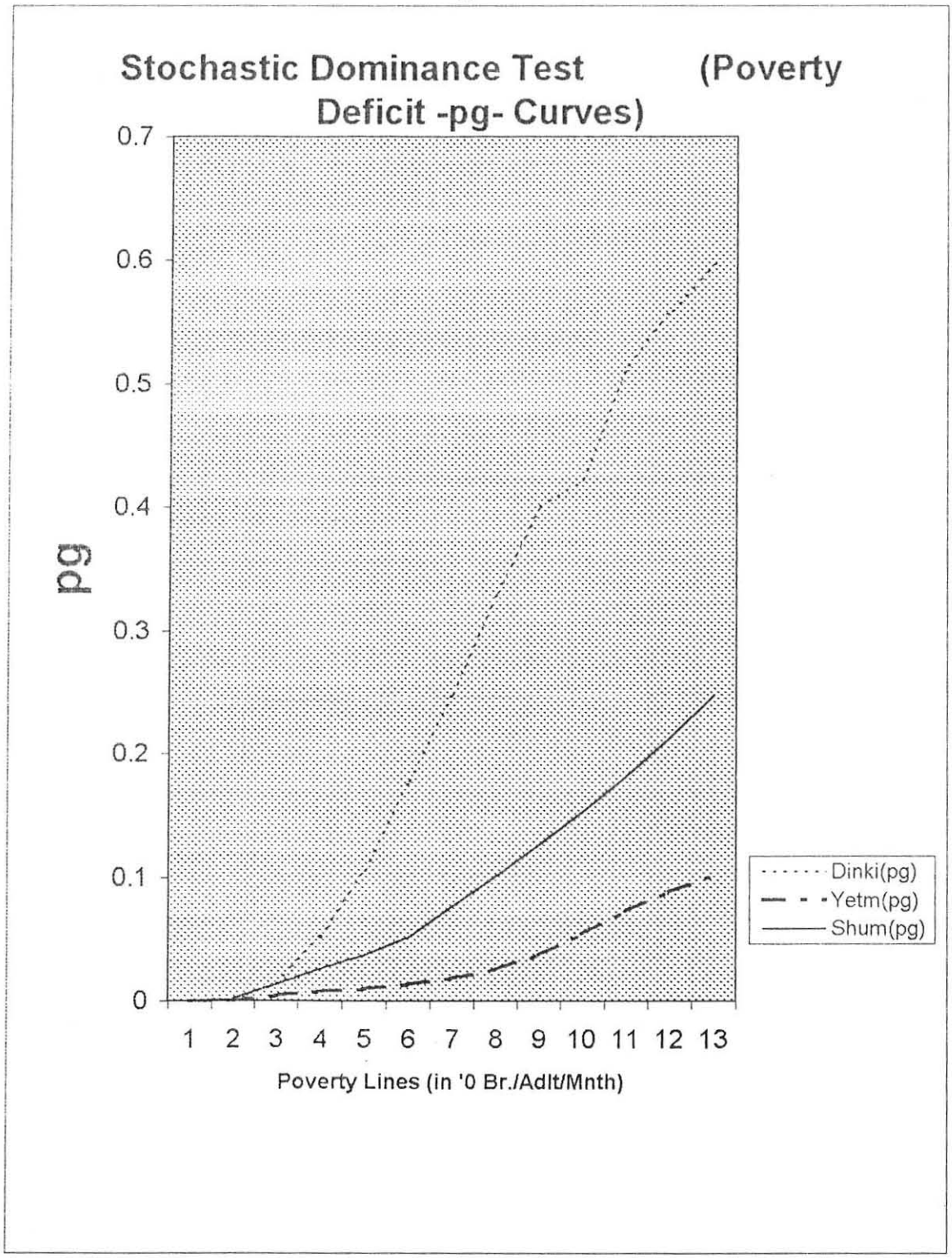


Fig 4.2


Stochastic Dominance Test (Poverty Deficit -pg- Curves)
pg
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1 2 3 4 5 6 7 8 9 10 11 12 13
Poverty Lines (in '0 Br./Adlt/Mnth)
Dinki(pg)
Yetm(pg)
Shum(pg)

4.3 Determinants of Poverty

4.3.1. Explanatory Variables and the Problem of Endogenity

Having thus measured the level of poverty, and having the information as to which locality is more poor, the next step would be to investigate what "causes" poverty in each area. But before going directly into this issue, it would be advisable to raise one other related issue which can be rightly asked: whether using this cross section data, and focusing on a relatively short-period, one can have enough information about the causes of poverty over a longer time perspective.

This is important as the alleviation of chronic (long-term) poverty is clearly an important objective of redistributive policy. To this effect, Chaudhuri and Ravallion (1991) investigated how well the most commonly used cross-sectional indicators do in identifying chronically poor households in three villages in dryland poor areas of rural India, based on an observed eight year mean income and six year mean of consumption. The finding was that cross-sectional observations of consumption or income can correctly identify roughly three-quarters of the chronically poor in terms of either long-term income or consumption. Thus, from factors identified here one can be sure to get sufficient information about the long-term poor.

Yet, while using cross-sectional data, one still has to identify only those factors which are the real "causes" of (and not caused by) poverty. Indeed, the problem of specifying exogenous variables is both important and difficult (Lanjouw and Stern, 1991). Exogenous variables are those factors whose presence is unrelated to household's current economic position. In other words, such variables must represent community and household characteristics determined "prior" to the present level of household welfare (Glewwe, 1991).

Therefore, maximum care is taken in order not to include variables which are endogenous. For example, the demographic variables include sex and age of the household head and household size. Sex and age are obviously exogenous. Household size, in the long run, can be endogenous to the extent that the number of children is a "choice variable,": due for example, to the use of contraceptives by women. For such periods, demographic variables may be influenced by household's living standards, but in the short run, the direction of influence is more reasonably considered as operating from demographic variables to living standards (Glewwe,1991; Coloumbe and Mckey, 1996).

The human capital variable contains the education level of the household head - whether the head (the main bread-winner) has completed primary education. Educational attainment is exogenous in the sense that past education is "irreversible" (Glewwe, 1991) or cannot be influenced by the current economic position of the household.

In the physical capital category, such key variables as land, oxen, value of livestock and tools are included. Ownership of land is clearly exogenous to the household as it is allocated by the government. Other physical assets could be endogenous, in the long run because they reflect successive choices of "savings" and "accumulation" by the household. For a one year analysis, the amount of such assets is largely given (Grootaert, 1997).

To capture the occupational characteristics of the household, a continuos variable (ratio of farm income to total income) is included which reflect how diversified household income is. Such occupational characteristics are the conditions that qualify a person's labour market participation (Rodriguez and Smith, 1994). Also included here is the number of tree crops which supplement income. Another apparently exogenous variables included for analysis is birth place of the head (to see whether migrants are disadvantaged or marginalized).

These "explanatory" variables affect the poor and the non-poor quite differently, and their presence in each locality cannot be the same. In fact for some variables, we observe a sizeable divergence between the villages. Below therefore, an attempt is made to highlight how they feature in each locality and between the poor and the non-poor.

In terms of the demographic variables, household size is perhaps the most important one, as it determines the per capita consumption. But in this case, as Table 4.4 shows, one observes a similar picture of about 5 people (on average) per household with only a slight difference between localities. Regarding the sex of the household head, in all the 3 areas, households are dominantly headed by male. However, while the proportion of male-headed households stand at 86% and 83% for Dinki and Yetmen respectively, that of Shumsha, where marriage is reportedly "an extremely flexible institution" (Ethiopian Village Studies, 1996) the figure goes as low as 71%.

Interestingly, the average age of household heads in the three areas ranges only between 46-48 years. Details of these variables are given on Table 4.5. Further details are also given on Table 4.6 and 4.7 for key household asset such as land and oxen, where one can easily observe the proportion of each village population at different level of these assets.

Table 4.4: Major Household Characteristics

No.	Description	Dinki	Shumsha	Yetmen
1	Average household per capita consumption (Br/Adult/month)	48	99	184
2	Average household size	4.8	5.0	5.2
3	Average land holding (ha.)	1.13	1.51	1.35
4	Proportion of households with at least 0.5 ha. (%)	60	62	72
5	Proportion of households with at least 0.5 ha. (fertile) %	39	51	70
6	Average number of oxen per household (Livestock units)	0.87	0.92	1.19
7	Proportion of households with at least 1 ox (%)	58	54	70
8	Average value of livestock (Br.)	502	477	713
9	Proportion of households using modern Agr. Technology (%)	24	33	77
10	Proportion of HH, whose head completed pr.sch.(%)	2.4	5.7	6.6
11	Average HH expenditure on Agr. Tech.(Br.)	4.3	9.7	294.5
12	Proportion of HH, male headed (%)	86	71	83
13	Average age of HH head	46	46	48
14	Average share of farm income in Total Income (%)	33	89	85
15	Average value of HH tools (Br.)	122	75	331

Table 4.5: Major Household Characteristics(poor + Nonpoor)

No	Description	Dinki		Shumsha		Yetmen	
		Poor	non poor	poor	Non poor	poor	non poor
1	Average household per capita consumption (Br/Adult/month)	29	61	34	112	37	191
2	Average household size	6.18	4	5.1	5.1	7	5.1
3	Average land holding (ha.)	1.08	1.17	1.3	1.57	1.17	1.35
4	Proportion of households with at least 0.5 ha. (%)	58	63	62	74	33	63
5	Proportion of households with at least 0.5 ha. (fertile) %	32	51	45	52	33	72
6	Average number of oxen per household (Livestock units)	1.15	0.69	0.8	0.95	0.66	1.22
7	Proportion of households with at least 1 ox (%)	72	48	37	57	33	70
8	Average value of livestock (Br.)	628	417	259	521	316	734
9	Proportion of households using modern Agr. Technology (%)	33	18	17	36	33	79
10	Proportion of HH, whose head completed pr.sch.(%)	3.0	2	9.5	5.1	0	7
11	Average HH expenditure on Agr. Tech.(Br.)	5.92	3.3	5.3	10.5	128	303
12	Proportion of HH, male headed (%)	90	84	58	73	100	82
13	Average age of HH head	49	44	50	48	59	45
14	Average share of farm income in Total Income (%)	30	35	-	-	66	86
15	Average value of HH tools (Br.)	121	122	63	78	377	329

Table 4.6: Total land ownership by households (including Lem, Teuf, Lem-teuf)

Total land ownership	Dinki	Yetmen	Shumsha
HHs owning land ≤ 0 ha.	20(24.1%)	14(22.9%)	35(24.1%)
HHs owning 0 < land < 0.5 ha.	6(7.2%)	12(19.7%)	7(4.8%)
HHs owning 0.5 ≤ land < 1 ha.	7(8.4%)	7(11.5%)	28(19.3%)
HHs owning 1 ≤ land M 1.5 ha.	18(21.7%)	4(6.5%)	23(15.9)
HHs owning 1.5 ≤ land < 2 ha.	16(19.3%)	5(8.2%)	19(13.1%)
HHs owning 2 ≤ land < 2.5 ha.	4(4.8%)	11(18.0%)	8(5.5%)
HHs owning 2.5 ≤ land < 3 ha.	7(8.4%)	5(8.2%)	6(4.1%)
HHs owning 3 ≤ land < 3.5 ha.	2(2.4%)	2(3.3%)	7(4.8%)
HHs with land ≥ 3.5 ha.	3(3.6%)	1(1.6%)	12(8.1%)
Total Households	**83**	**61**	**145**

Table 4.7: Oxen Ownership

Total land ownership	Dinki	Yetmen	Shumsha
HHs owning 0 oxen	35(42%)	19(31%)	68(47%)
HHs owning 1 oxen	26(31%)	14(23%)	33(22.6%)
HHs owning 2 oxen	20(24%)	26(43%)	39(26.7%)
HHs owning 3 oxen	2(2%)	1(1.6%)	2(1.4%)
HHs owning 4 oxen	0(0%)	1(1.6%)	2(1.4%)
HHs owning 5 oxen	0(0%)	0(0%)	0(0%)
HHs owning 6 oxen	0(0%)	0(0%)	0(0%)
Total Households	**83**	**61**	**145**

In terms of human capital, one can observe that education levels are generally low in both areas. Yet the difference between the areas is not so small. For example, considering the proportion of households whose head has completed primary education, one can see that it is about 2.4% in Dinki, 5.7% in Shumsha and 6.6% in Yetmen.

Likewise, considering any use of modern agricultural inputs (during the previous year) such as fertilizer, pesticides, improved seeds, and others, one can see that the proportion of households who did so amounts to 24% in Dinki, 33% in Shumsha and as high as 77% in Yetmen. Variations are observable between the poor and the non poor.

Considerable differences are observable between location and between the poor and the non-poor on the ownership of physical capital. For example, total land ownership stands at an average figure of 1.51 ha per household in Shumsha, 1.13 ha. in Dinki and about 1.35 ha in Yetmen. However, considering the "lem" (fertile) land only and using a cut-off point of 0.5 ha. per household one can see that the proportion of households with at least 0.5 ha. lem land is only 39% in Dinki, compared to 51% in Shumsha and 70% in Yetmen (detail, Table 4.4). Variations are also considerable between the poor and non-poor (Table 4.5).

Interestingly similar pictures are observed in terms of oxen ownership. Thus, the mean "livestock unit" is only 0.87 per household in Dinki, 0.92 in Shumsha and 1.9 in Yetmen. Analogously, the proportion of those who have one or more oxen amount only to 54% in Shumsha, 58% in Dinki and nearly 70% in Yetmen. In both areas, however we hardly observe households with more than 3 oxen (Table 4.7).

Livestock however serves not only as means of production but also as an "insurance" mechanism for rural households in case of crisis. Thus, considering the estimated value of livestock other than oxen (cows, bulls, sheep, goat, chicken ...) we can see that the average estimated value of livestock per household is Br. 502 in Dinki, Br. 477 in Shumsha and about

713 in Yetmen, with again sizeable differences between the poor and the non-poor. Roughly similar pictures are obtained on the value of tools (ploughs, axe, weaving equipment ...) possessed by households.

The impact of each explanatory variable on the probability of the household to fall into or get out of poverty will have to be confirmed with some econometric models, to which the next section turns.

4.3.2. Model Specification

4.3.2.1. Background

In order to identify the key determinants of poverty in general, there are principally two models: (1) To use real household (consumption) expenditure per capita as dependent variable in a regression with exogenous household endowments and characteristics as explanatory variable ("levels" regression); and (2) To use a "binary" response model (poor/ non-poor as the dependent variable) which can be estimated by a probit or logit.

The "levels regression" is a reduced form equation of the various structural equations which express consumption (and income earning) behaviour of the household (see Glewwe, 1991; Appleton, 1995; Alwang, Siegel and Jorgenson, 1996). The obvious advantage of the levels regression is that it utilises the information on the distribution of (consumption) expenditure in its entirety, while the binary model collapses this information to just two values (Grootaert, 1997). There is thus a loss of efficiency in using probit/logit because one does not use all the information in the sample. They are also more sensitive to specification errors than levels regression. They can yield biased estimates if the error terms are not normally distributed (Wodon, 1997a).

At the same time. however, there is a gain in using probits/logits rather than consumption (levels) regression. First, while levels regression yield unbiased estimates of (usually) "log" mean "consumption", they do not necessarily yield unbiased estimates of "poverty" because of the non-linearity involved in using the cumulative normal (ϕ) distribution for estimating poverty.

Second, probits/logits relax the assumption of first order dominance embedded in levels regression. The linearity in levels regression constrains the impact of household characteristics to remain the "same" at various levels of per capita consumption (of poor or non-poor) (Wodon, 1997a). That is it imposes "constant parameters" over the entire distribution and thus assumes that the impact of, say, education, physical capital ownership and other household characteristics on welfare is constant over the whole sample -- it assumes that the poor are not fundamentally different from the rich other than just being "people with less money" (Grootaert, 1997).

But, in reality, the average returns to assets differ for the poor and non-poor because the poor face different constraints to the households maximisation process -- to borrow, to ensure against risks, etc. For example, education, occupation, or land ownership may have less impact at low levels of consumption if poor households are not able to take advantage of them (Rodriguez and Smith, 1994). With probits/logits, the estimation of β parameters by maximum likelihood does not impose such first order dominance (Similar parameter). Thus, if one is interested in the impact of variables on "poverty" rather than "consumption" in general, probits/logits make sense (Wodon, 1997).

The Probit/Logit models are thus increasingly used in the analysis of poverty determinants (see Grootaret, 1997). Similar steps are followed here. In fact, the probit and logit specifications are used alternatively. The logistic distribution is similar to the normal except in the tails, which are considerably heavier. There are practical reasons for choosing one

or the other; but it is difficult to justify the choice of one distribution or the other on theoretical grounds. In most applications, however, the choice of the distribution does not make much of a difference. (Green, 1993, Gaiha, 1996). Assuming a normal (rather than logistic) distribution of the error term, the PROBIT model is used.

4.3.2.2 The Model

To specify the relationship between household (consumption) expenditure and household characteristics, one can consider a household with per capita consumption "y" and characteristics x, where x is an mx1 vector. Denote the poverty line by "z", define y*=z-y, and assume that consumption is determined by the model.

$$y^* = \beta x + \varepsilon$$

where β is a 1xm vector of returns to characteristics and ε is an error term with zero mean. With a representative sample of the population, x can be used to predict poverty.

When one runs a probit (or logit) of y* on x, one pretends not to observe the y*'s. One acts as if one only observed a dummy variable h which takes the value 1 if y*>0 and 0 if y*<0(Wodon, 1977b). The probability that a household is poor is:

$$\begin{aligned} \text{Prob}\ [h = 1] &= \text{Prob}\ [y^* > 0] \\ &= \text{Prob}\ [\beta x + \varepsilon > 0] \\ &= \text{Prob}\ [\varepsilon > -\beta x] \\ &= 1 - F\ (-\beta x) \end{aligned}$$

But if the distribution is symmetric, as are the normal and the logistic (Green, 1993), one can write

$$\begin{aligned} \text{Probe}\ [\varepsilon > -\beta x] &= \text{Prob}\ [\varepsilon < \beta x] \\ &= F\ (\beta x) \end{aligned}$$

where F is the cumulative distribution. The parameter vector β can be estimated by maximum likelihood. For PROBIT:

$$\text{Prob } [\, h = 1 \,] = \int_{-\infty}^{\beta x} \phi(t)dt$$

$$= \Phi(\beta x)$$

where Φ is the cumulative normal density.

In estimating such a binary choice model by a maximum likelihood, each observation is treated as a single draw from a Bernoulli distribution (Green 1993).

Thus, the model with success probability [F(βx)] and independent observation leads to the joint probability or likelihood function:

$$L = \Pi [F(\beta x_i)]^{hi}[1-F(\beta x_i)]^{hi}$$

(Green,1993, Maddala, 1983, Kementa, 1972). The parameters ((β coefficients) of the model (like those of any non-linear model) are not necessarily the marginal effects. Denoting

$$E(y^*_i) = F(\beta x_i)$$

The marginal effects of a one unit change (Wodon, 19997b) in the explanatory variables (x's) on the probability of being poor are given by:

$$\frac{\partial E(y_i^*)}{\partial x} = \left\{ \frac{dF(\beta x_i)}{d(\beta x_i)} \right\} \beta = f(\beta x_i)\beta$$

where f(.) is the density function that correspond to the cumulative distribution, F(.) (Gaiha, 1996, Green 1993,) . For the normal distribution, this is

$$\frac{\partial E(y^*_i)}{\partial x} = \phi(\beta x_i)\,\beta$$

where ϕ t is standard normal density.

4.3.3. The Hypothesis

The list of variables described in previous section will have different impact on households likelihood of falling into or out of poverty. Their level of impact vary from locality to locality, and, most importantly their direction of influence may also differ. Thus from the model specified above the discussion below presents what impact each variable is expected to have on the likelihood of households well-being:

DUMSEX: dummy for sex of the household head; 1 if the head is male, 0 otherwise. Male–headed households are expected to have a better chance to escape poverty than female-headed ones.

AGEHHH: age of the household head. Age is supposed to represent accumulated work experience, either in farming or other occupations. More experience is therefore expected to help the household get out of poverty.

DUMAGE: dummy for the age of household head; 1 if beyond year 60, and 0 otherwise. Given rural circumstances in Ethiopia, elderly household heads may not be able to work longer hours and thus the likelihood of poverty in the household would increase.

HHSISE: Household size representing the total number of individuals in the household. The expectation is that with large households, the number of dependents would be high and, where there is limited chance for full employment, the likelihood of poverty would increase.

EDHHH: dummy for the education level of the household head, 1 if head has completed primary school or more. Education increases the ability to understand and better utilize modern agricultural technologies, and help to escape poverty.

DTECH: dummy for use of agricultural technology, 1 if the household uses such inputs as fertilizer, pesticides, improved seeds etc., which enhances productivity and

help escape poverty. Like education, decision on technology is made "prior" to current economic status (Glewwe, 1991).

DLAND: Dummy for land ownership, 1 if the household has at least 0.5 ha., and 0 otherwise. Land being one of the main asset and means of production, more land is expected to reduce the likelihood of poverty.

LNDRATIO: Ratio of lem (fertile) land to total land. As the ratio increases, (representing more fertile land) the chance of falling into poverty is expected to decline

DOXEN: dummy for oxen ownership; 1 if the household has at least 1 oxen, and 0 otherwise. More oxen would mean that the household can work his land more effectively and doesn't have to depend on other people's oxen which represent a cost. Thus, households with more oxen are expected to have a better chance of averting poverty.

VLVSTK: value of livestock other than oxen and including cows, bulls, sheep, goat, chicken, etc., which in rural areas are meanness of savings, sale of which would be sources of income during economic hardship. It serves a function of income smoothing over time and avoid poverty.

VTOOLS: total value of tools (plough, axe, weaving equipment, etc.). Their value represent the chance of the household to fully employ its members, earn better, and reduce the chance of being poor.

IRATIO: The ratio of farm income to total household income, it represents the level of income diversification. Lower IRATIO would mean more diversified income source, less dependence on "risky" farm income and better chance to escape poverty.

TNOTREE: Total number of tree crops, as one important source of income, more of them is expected to reduce probability of poverty.

DPBIRTH: dummy for birth place of the household head, 1 if birthplace is within the village, and 0 otherwise. It is used to see if migrants are disadvantaged in terms of say, employment, etc. The expectation is that the natives have better chance to escape poverty.

However, the above variable list may not be exhaustive; and misleading parameter estimates are still possible due to the "missing variable" problem. Thus in a preliminary regression (not reported here) some additional variables were tried to control for missing variables. These include religion ethnicity, parental education, distance to road /hospital/ market, wage rate, agro ecology, etc. Whereas these variables are truly exogenous to the households current decision, they could not be used here either because they have little explanatory power or because they apply "invariably" to all households. Also not all variables apply to every PA.

4.3.4. Econometric Results

Using the above variables, the econometric result obtained is presented below on Table 4.8, and details with marginal effects on Annex 3-6. The values of each explanatory variables used in the regression are given at their mean, on Table 4.4. A separate regression is run for each locality, and then, as a check, a pooled one with a dummy for each village.

A slight adjustment has been made for the regression on Yetmen, where only few households (about 5%) have been obtained in the poor category. In such a setting, the prediction rule fails every time to predict when the dependent variable takes a value equal to 1, i.e., for poor households (Green, 1993). Here, therefore, instead of "absolute poverty", "relative poverty" has been considered in which case households below the mean income in

that area are considered relative poor. Results are quite indicative of possible policy directives needed to raise well-being in the area.

To assess goodness of fit of these models, one of the criteria was the Likelihood Ratio (or model chi-square) test which is analogue to the F-test in an OLS regression that all the slope coefficients in the probit model are zero (Green, 1993). From this test (comparing chi-square with critical table value), it has been confirmed that the joint hypothesis that the coefficients on all explanatory variables are all zero is rejected for all regressions (statistically significant at 10% for Yetmen, at 5% for Shumsha and at 1% for Dinki and pooled). The goodness of fit is also assessed by the Pseudo R square which is good for a cross-section data (Rodriguez and Smith, 1994). The significance of individual variables is determined using Z-test. In order to see if there is any serious multicollinairity among the explanatory variables, a correlation matrix has been developed, which helped to drop some variables.

Table 4.8 Probit Estimates of Poverty Determinants

Variable	Dinki	Yetmen	Sumsha	Pooled
CONSTANT	-2.607(1.052)	.154(1.272)	-.803(.709)	-3.686(1.047)
DUMSEX	.569(.544)	-1.004(.767)	.539(.463)	.221(.302)
AGEHHH	.021(.019)	-.015(.016)	.001(.011)	005(.011)
DUMAGE	.188(633)	-	-	.328(.379)
HHSIZE	.328(.095)***	.312(.128)**	.079(.085)	.196(.052)***
EDHHH	1.364(1.117)	-	.452(.613)	.643(.471)
DTECH	-	-.618(.889)*	-.509(.385)	-.234(.244)
DLAND	-.175(.424)	-.268(.577	-.758(425)*	-.556(.242)**
LNDRATIO	-	.104(.497)	.210(.371)	-
DOXEN	.478(.419)	.843(.773)	-.199(.410)	-.045(.255)
VLVSTCK	.000(.000)	.000(.000)	-.000(.000)*	-.000(.000)
VTOOLS	-.008(.004)**	-	.002(.003)	-.001(.001)
IRATIO	-.798(.448)*	-.289(/725)	1.334(.638)**	.084(.289)
TNOTREE	.007(.004)*	.003(.001)**	.060(.052)	.004(.002)**
DPBIRTH	-.090(.362)	-.141(.419)	.945(.361)***	-.325(.215)
DDINK	-	-	-	2.602(.804)***
DSHUM	-	-	-	1.839(.874)***
NO.of Obs.	82	59	129	269
Model chi-squ.	34.43	17.98	22.80	63.15
Sign. Level	0.0006	0.0821	0.04441	0.0000
Pseudo R-sq.	0.3115	0.2199	0.2049	0.2295
Log likelih.	-38.051	-31.897	-44.244	-106.026

* Significant at 0.10 level. ** Significant at 0.05 level.

*** Significant at 0.01 level. Standard Errors in Parentheses.

Starting with ***demographic variables***, household size appears to be one of the most important determinant of poverty in these areas. As expected, households with larger family size have a higher probability of being trapped into poverty (significant at 10% in Yetmen, and at 1% in Dinki and the pooled regression). This is consistent with previous findings, among others, of Dercon and Krishnan(1998) at national level for Ethiopia, and also Keyrem and Thorbeck (1991) for Ghana, Coloumbe and Mckay(1996) for Mauritania, Kakwani(1993) for Cote d'Ivoire. Clearly, therefore, there is no evidence in these villages that larger families are more able to diversify their sources of income and protect their consumption level. This seems quite justifiable since in rural areas the employment opportunities, asset endowments, capital and others which are needed to fully employ the additional manpower are extremely limited.

Age of the household head, another important demographic variable, has the expected sign only in Yetmen, and not in others. It seems that farming experience as such (which age of the household head is supposed to represent) doesn't help much except in this village of Yetmen where (as we shall see below) households' adoption rate of new agricultural technology is higher. The regression result also show that the household being male-headed doesn't bring in any special advantage to escape poverty except in Yetmen where again it is not significant. Aggregated analysis (Dercon and Krishnan, 1998) and simple descriptive analysis (Dejene, 1994) hint that women tend to be disadvantaged. Ours suggests that in the two very poor villages male heads are not any better positioned than women heads when it comes to escaping poverty. In fact other works (e.g; Grootaert and Kanbur, 1995 for Cote d'Ivoire) indicated that women did "better" to escape poverty than men heads.

Turning to the ***Human Capital*** category, it is interesting to note that "formal" education doesn't seem to have importance to escape poverty in these areas. This is against

the expectation that education enables households to better apprciate, adopt and effectively manage the use of modern agricultural technology and lead better life as hypothesized by Theodore Shultz. In fact similar weak relationship between education and "rural" poverty have been observed by some great authors such as Glewwe(1991) for Cote d'Ivoire. The result, thus, may be indicating that the curriculum contained in the formal education is not geared towards addressing agricultural problems or towards better managing the agricultural technology at that lower level.

On the other hand, the result show that technology adoption as such has an impact on poverty alleviation. Adoption of such technologies clearly reduces the chance of being poor in Shumsha and Yetmen. In Yetmen in particular, the impact of technology on reducing the probability of being poor is statistically significant (10% level). This is perhaps not surprising given that extension systems are very well developed in this area, even during the Derge period which gave priority in technology dissemination to such fertile areas as Yetmen under its area specialization programme.[2]

From the descriptive statistics (discussed earlier), we can also see that the proportion of technology adopters in the whole village of Yetmen (77%) is considerably higher than in either Dinki (24%) or Shumsha (33%). As a result, households in this village of Yetmen improve their living standards from time to time as they gain experience from newly acquired techniques. It is no coincidence therefore that, as discussed above, age of the household head matters in this village and not in others where age-old agricultural techniques is still the dominant system.

Of the ***physical capital*** variables, land is perhaps the most important asset for the households in these areas. The econometric result confirms that the smaller the land holding, the greater the chance of being poor, (significant at 10% for Shumsha, and at 5% for

[2] The area specialization programme has been used by the previous regime in order to concentrate efforts and resources(both domestic and external) towards raising productivity in priority areas whose agricultural potential is promissing.

the pooled regression). While the relationship between land and poverty is as expected in all the PAs, its lack of significant impact may be explained particularly in the case of Dinki by the fact that the land available there is already of very poor quality (see descriptive statistics) to have any strong impact on reducing the chance of falling into poverty. The variable on the share of "fertile" land in total land holding (which is usually subject to measurement problem) doesn't appear to explain poverty.

Related to land, oxen is another important household asset in rural Ethiopia. In this case, the expected sign is obtained for Shumsha and pooled regression. In other PAs, though the relationship between oxen and poverty is not as expected, it is not significant. But one may note that the unexpected sign for Dinki is not surprising because given the fact that land is in short supply as well as infertile, the availability of oxen "alone" could not have much significance as a "productive" asset. In Yetmen where, one should note, we considered relative poverty, the significant impact of oxen may not be so clearly seen.

The value tools, though relatively of smaller magnitude as an asset, have the expected sign in this PA of Dinki and in the pooled regression. That brings an additional information to the above discussion. That is, in this very poor village, those households who manage to have more tools can somehow reduce the chance of falling into poverty by working the land more intensively as well as through diversifying source of income.

Apart from oxen, value of other livestock has a role in rural areas mainly as an income source. Livestock are "means of saving" for rural households and are often sold when the household faces economic problem. Farm animals serve a function of income smoothing. The expectation therefore is that the collective value of livestock at household level would have the effect of reducing the chance of the household to consume below the absolute poverty line. The result indicates that this is so for Shumsha (significant at 10%) and the pooled regression. In the case for Dinki and Yetmen, though the direction of

relationship is not as expected, it is (like in the above case) not significant. Their relatively small sample size, as against Shumsha and pooled, one may argue, can also hide some information.

One important strategy in rural areas to reduce vulnerability is by ***diversifying income*** into other useful household employment including weaving, handicraft, etc. One can therefore expect that as the share of farm income in total household income declines (implying more diversification), the likelihood of falling into poverty declines. Interestingly, the result show that this is significantly so for Dinki where farming is already a hopeless enterprise. Weaving, the second most important occupation in the area (Ethiopian village studies, 1996), seems to be helping to escape poverty.

Also in Yetmen, diversifying households seem to be better off (though not significantly) than others. But we observe a sharp contrast in Shumsha, where the opportunity for off-farm employment (such as blacksmithing, pottery, tannery ...) is very much limited, despised and left only to those "Fellashas" who had no land right until 1974 (Ethiopian Village Study, 1996). In this PA, therefore, those people whose income is mainly composed of non-farm income are very likely to be poor.

Not surprisingly, thus, although being a non-native increases the chance of being poor in all the three areas, it is only in this PA that it is significant indicating a serious marginalization of migrants into the areas. This has a strong implication which suggest that reliance on such self-employment income sources is caused by more of a "push" than, "pull" factors (Grootaert, 1997). Peoples' inability to obtain farm work pushes them into self-employment activities where the returns are not high enough (because assets, equipment, capital are already low) to yield a level of living above the poverty line.

Another income diversifying mechanism is through tree crops (Mainly eucalyptus). They are supposed to be important in Dinki in particular where they are practiced by many

households. But the result doesn't show that they do reduce the chance of poverty. In all three areas, tree crops are positively associated with the likelihood of poverty, implying that while tree crops may be important from the environmental perspective they don't have important roles in safeguarding the households from falling into poverty. It may be that tree crops cultivation is not yet very well commercialized (as the areas are far away from major marketing areas) for them to have an impact on poverty alleviation.

Finally, the ***locational dimension*** of poverty has been taken up, using Yetmen as a control variable in the pooled regression. The result indicates that households living in either Dinki or Shumsha have a higher chance of falling into poverty (singnificant at 1% for Dinki and 5% for Shumsha). This actually re-affirms the descriptive statistics and the stockhastic Dominance Test disccessed on section 4.2.1 as well as capturing the impact of factors (eg. poor infrastructure ...) which have been dropped due to multicolinianty problem.

5. SUMMARY AND RECOMMENDATIONS

5.1. Summary

The estimation of the previous section accounts for a "substantial" proportion of the variations in household consumption expenditure in the three villages. As emphasized in the previous section, however, these estimates should be thought of as attempts to measure the determinants of poverty conditional on "past" decisions to accumulate human and physical capital (Glewwe, 1991). Thus, although they can provide tentative answers to the question of why some households are worse-off than others, they do not explain why households have in the first place, accumulated particular household assets. That obviously requires wider, historical study.

Given this cautionary notice, the following results stand out. From the measurement of poverty level, we can conclude that Dinki, one of the worst hit village in 1984 drought, (IFPRI, 1992), is the poorest of all the three areas, while Yetmen is unambiguously considerably better off.

Turning to the household characteristics, the impact of household size, controlling for other variables, on increasing the chance of the household to be under poverty appears to be quite strong, in all PAs. The idea that more people represent more labour force doesn't seem applicable in these areas where the household asset (including land, oxen, tools) endowment limits the employment opportunity.

Education of the head, however, doesn't seem to have any direct impact on reducing the chance of being poor in all PAs. This may be showing that *"formal education"* is of less relevance to the living conditions in such rural areas. But unlike formal education, the use of modern agricultural technology (and hence agricultural extension) have a poverty reducing

effect on the two (Shumsha and Yetmen) PAs and significantly so in Yetmen. In fact, it seems that it is only when there are some new technologies to be learnt and accumulated over time (as in Yetmen) that age would have any advantage. On the other hand, where age-old traditional practices are the norms (and adoption rate low) particularly as in Dinki, age (as well as the household head being male) is of no importance.

Land, not surprisingly, has a poverty reducing effect every where, and significantly so in Shumsha. Oxen ownership doesn't seem to help, except in Shumsha, and the same is true in case of value of livestock. On the other hand, special importance of value of tools is observed in the poorest area of Dinki where non-farm income have greater share in household income. As an income diversification mechanism, however, tree crops do not seem to be playing important roles, may be lack of commercialization of these activities hinders households from reaping the benefit.

5.2. Recommendations

The results obtained above underline the fact that poverty is complex and multifaceted and that several-pronged approaches are needed. With respect to policy to combat poverty, generally there are three major policy thrusts. They are (1) direct transfer (2) Changed relative prices or wage rates to raise income and (3) policies to change the income earning capacities, such as education, job training, new agricultural techniques, or credit access.

The first, direct transfer of income or food directly to the poor is beset with problems of screening the beneficiary and of leakage of benefits to the non-poor because people have a strong incentive to provide false information and present themselves as poor. Glewwe and Van der gaag (1988) provide serious problem faced by Sri Lanka's "food rationing" and

"food stamp" schemes in early 1980. More important, however, such programs as "food aid" and "food-for-work" play an important role in making the people in areas such as Dinki non-creative and totally dependent only on such assistance's (Ethiopian Village Studies, 1996). Such programs are actually non-recommendable, unless under very special circumstances.

The second, "changing relative prices" to benefit the poor doesn't seem feasible because there are no crops particularly grown only by the poor. Also, and more importantly, the idea of giving increased prices for crops grown by the poor and/or provision of agricultural inputs (eg. Fertilizer) at lower prices is a source of price distortion and market inefficiency, which is directly against the free market policy of the country. The only possibility for changing relative prices is to offer low-wage employment to the poor in these rural areas (e.g. road maintenance) particularly in the off-farm season. Yet this one, like the first, would be of immediate effect, and would only be a short term measure.

The third has a long-term impact, and has many advantages. For example, policies that succeeded in changing the characteristics of the poor are in large part removing the "causes" of poverty, not just reversing its effects, and many of these policies are less costly in the long-run, since they aim to raise the productivity of the poor. Furthermore, although such policies benefit both the poor and non-poor, Glewwe and Van der gaag (1988) argue that raising the productivity of the non-poor is not necessarily a waste of government revenue. Thus, efforts need to be directed toward them.

Turning, then to one important household characteristic, education, the previous econometric analysis show that "formal education" does not help escape poverty in these rural areas. This may raise the issue of appropriateness of formal education as a way to enhance "current well-being". Yet low returns to rural areas do not imply low returns to education, since educated people in rural areas can reap returns by moving to the cities,

which appear common (Glewwe and Van der gaag, 1988).

On the other hand, education may have an "indirect" effect on poverty, and that is through its impact on household size which is an important determinant of poverty in these areas. That is, more educated households (particularly women) are likely to have fewer children (Roderiguez and smith, 1994), because they would be more able to use, eg. Contraceptives and also work outside the home both of which will help limit household size. Thus, it is imperative that the quality and access to education facility should expand in all areas.

Unlike education, agricultural technology adoption has a direct impact to guard against poverty, more so particularly in Yetmen. Thus, appropriately designed agricultural technology dissemination need to expand. It was also observed that non-farm employment has a strong poverty reducing impact in Dinki, which is quite consistent with the low agricultural potential of this area. It seems therefore that development efforts that create non-farm employment opportunities (including job-training programmes) are quite urgently required in the area.

Given the limited supply of land in all three villages, such diversification away from farm income seems to be the feasible way out of poverty also in the other villages. Also helpful however is the better management of existing land, operating it with modern technology to enhance productivity. Those who happen to devote part of their land to tree crops stand to get no obvious advantages in all areas as far as poverty is concerned, suggesting the need for a more effort to facilitate its commercialization..

In order for these households to diversify as well as to use better technology both agricultural and non-agricultural, credit facilities would play a key role. As Lipton and Ravallion (1993) pointed out, credits are very important because in agriculture, especially field-crop production, input requirements are concentrated into few critical, climate-related

periods months before output arrive. Also poor rural people with few own-resources appear to need credit to smooth consumption, and to obtain current and capital inputs well before farm income become available.

The discussion above provide the possible intervention areas in order to reduce the level of poverty in each area. Yet we do not claim to provide the only best advice. It is worth mentioning the fact that the above is based entirely on econometric result – which again is based on just one (though very important) feature of poverty, namely consumption expenditure. This is based on the assumption that food consumption is the most important part of human needs. The best advantages of such econometric analysis is that though based on a snap-shot feature of poverty, it facilitates "comparison" across space and over time.

Unfortunately, poverty is not just "short fall" of consumption. It has many dimensions which are too many to list. Most importantly, the list depends on the very people who suffer from them – and not on the so-called "analysts" who after all is an "outsider". Those people have their local, diversified definitions and, in the extreme, may not even include "consumption" in their list, giving priority to other items which are (often) qualitative and not measurable. There are thus authors who argue that attention must turn to the participation of the people in poverty assessment (hence the Participatory Poverty Assessment (PPA) approach), which require different skill of an outsider – that of "facilitating" people's participation in poverty assessment (Chambers, 1997). The main problem here is that results from such local assessments are not suitable for comparison across space and over time.

The choice of which technique to use seem not to be an "either or" one. Both have advantages and disadvantages. The consensus presently gaining wider acceptance in development researchers is thus a "combination" of both methods. Such a methodology, unfortunately is developed neither in our country, nor anywhere else. Thus, the development

and practical application of such appropriate methodologies should be a priority in any future poverty assessment effort in Ethiopia.

BIBLIOGRAPHY

Abebe Shimeles (1998); Poverty Measurement and Analysis: A Guide to the Litrature, (Unpublished)

Abebe Shimeles and Bereket Kebede (1995); Issues in the Mesurement and Dynamics of Poverty: A Survey ; Paper Prepared for the Fifth Annual Conference on the Ethiopian Economy, Nazaret.

Alwang, Jeferey, Paul B Siegel and Steel L Jorgensen (1996); Seeking Guidelines For Poverty Reduction in Rural Zambia ; World Development Vol.24, No.11

Appleton, Simon (1995); Woman-Headed Households and Poverty: An Empirical Deconstruction for Uganda, Centre for the Study of African Economies, WPS/95-14.

———————— (1995); "The Rich Are Just Like Us Only Richer" : Poverty Functions or Consumption Functions; Centre for the Study of African Economies, WPS/95-4.

Atkinson, A.B (1987); On The Measurement of Poverty, Econometrica, Vol.55, No.4

Baker, Judy and Margaret E Grosh (1994); Poverty Reduction Through Geographic Targeting: How Well Does It Work ? World Development, Vol.22 No.7

Bevan, P and Bereket Kebede (1995); "Measuring Wealth and Poverty in Rural Ethiopia", A data-based discussion. A paper presented on the 5th annual conference on the Ethiopian Economy, Nazreth.

Chambers, Roberts (1997); Whose Reality Counts?: Putting the First Last, IDS, UK.

Chen, Shaohua, Gaurav Datt and Martin Ravallion (1994); Is Poverty Increasing I In The Developing World ? Review of Income and Wealth, Series 40, No 4.

Coulombe, Harold and Andrew Mckay (1996); "Modelling Determinants of Poverty in Mauritania", World Development, Vol. 24, No.6.

Dejene Aredo (1994), Female Headed Farm Households in Two Contrasting Regions in Ethiopia: Access to and Management of Resources ; Ethiopian Journal of Development Research, Vol.16, No.1.

Demery, Lionel and Lyn Squire (1996); Macroeconomic Adjustment and Poverty In Africa: An Emerging View, World Bank Research Observer Vol.11, No.1

Dercon, Stefan and Mekonen Tadesse (1997) ; A Comparison of Poverty in Rural and Urban Ethiopia; paper prepared for the Workshop on "Poverty And Income Distribution Issues in Ethiopia During Adjustment," Addis Ababa.

Dercon, Stefan and Pramila Krishnan (1996); "A Consumption Based Measure of Poverty in Rural Ethiopia", A Paper Presented on the Fifth Annual Conference on Ethiopian Economy, Nazreth.

Ethiopian Village Studies (1996); AAU, CSAE.

Foster, James, J.Greer and E.Thorbecke (1984); "A Class of Decomposable Poverty Measures", *Econometrica*, Vol.52, No.3, 1984.

Getahun Taffesse (1997); Poverty Situation In Ethiopia, Minstry of Economic Development & Cooperation, Addis Ababa.

Ghaiha, Raghav(1996), How Dependent Are The Rural Poor On The Employment Guarantee Scheme in India? Journal of Development Studies, Vol.32, No.5.

Glewwe, Paul (1991); Investigating The Determinants of Household Welfare in Cote d' Ivoire, World Bank, LSMS Working Paper No.71.

Glewwe, Paul and Gillette Hall (1998); Are Some Groups more Vulnerable to Macroeconomic shock than others ? Hypothesis tests based on Panal data From Peru: Journal of Economics, Vol.56

Glewwe, P and J.Van der Gaag (1990); "Identifying the Poor in Developing Counties: Do Different Definitions Matter?, World Development, Vol.18, No.6.

———————————— (1988): Confronting Poverty In Developing Countries; World Bank, LSMS Working Paper, Number 48.

Green, (1993); Econometric Analysis, Second Edition.

Grootaert, Christian (1997); "The Determinants of Poverty in Cote d'Ivoire in the 1980s", Journal of African Economies, Vol.6, No.2.

———————————— (1994); Poverty and Basic Needs Fulfilment in Africa During Structural Change: Evidence from Cote d' Ivoire, World Development, Vol. 22, No.10.

Grootaert, Christiaan and Ravi Kanbur (1995); The Luky Few Amidst Economic Decline: Distributional Change in Cote d'Ivoir as Seen Through Panel Data Sets, 1985-88; The Journal of Development Studies Vol.31; No.4.

Grootaert, Christian, Ravi Kanbur and Gi Taik Oh (1997); "The Dynamics of Welfare Gains and Losses: An African Case Study", London.

Grosh, Margaret (1993) ; Five Criteria for Choosing among Poverty Programmes, World Bank, WPS, 1201.

Hagenaars, Aldi (1987); A Class of Poverty Indices : International Economic Review, Vol.28, No.3

Hassan, Rashid, and Suresh Chandra Babu (1991); "Measurement and Determinants of Rural Food Poverty", Food Policy.

Hentschel, Jesko and Peter Lanjouw (1996); Constructing an Indicator of Conumption for the Analysis of Poverty : Principles and Illustrations with Reference to Equador, World Bank , LSMS , Working Paper 124.

IFPRI (1992), Famine in Ethiopia: Policy Implications of Coping Failures at National and Household Level, Report No.92.

Jamal Mohamad (1997); "Issues of Economic Growth and Macroeconomic Policies in Ethiopia", Paper Presented at Workshop on "Poverty and Income Distribution Issues in Ethiopia During Adjustment", Addis Ababa.

Kakwani, N (1993); "Measuring Poverty: Definitions and Significance Tests with Application to Cote d'Ivoir", in Michael Lipton and Jacques Van Der Gaag, "Including the Poor", The World Bank, Washington DC.

kakwani, N (1980); "On a Class of Poverty Measures", Econometrica, Vol.48.

Kyereme, Stephen and Erik Thorbecke (1991); "Factors Affecting Food Poverty in Ghana", The Journal of Development Studies, Vol.28, No.1.

Lanjouw, Peter (1996) ; Equador Poverty Report, World Bank.

Lanjouw, Peter and Nicholas Stern (1991); "Poverty in Palanpur", The World Bank Economic Review, Vol.5, No.1.

Lipton M. and Ravallion M. (1993); "Poverty and Policy", World Bank Working Paper, No.1130, The World Bank, Washington DC.

Maddala, G (1993); "Limited Dependent and Qualitative Variables in Econometrics", New York, Cambridge University Press.

Masson, D. Andrew (1996); "Targeting the Poor in Rural Java", IDS, Vol.27, No.1

Mekonnen Tadese (1997); "Determinant and Dynamics of Urban Poverty in Ethiopia", Paper Presented on a Workshop on "Poverty and Income Distribution Issues During Adjustment", Addis Ababa.

Mekonnen Tadese, Bereket Kebede and Abebe Shimeles (1998); "Economic Reform, Growth and Poverty in Ethiopia", Paper Presented to the AERC Bi-annual Workshop, Nirobi.

Pickett, James (1991); "Economic Development in Ethiopia: Agriculture, the Market and the State", OECD, Paris.

Ravallion, Martin (1993) ; Poverty Alleviation Through Regional Targeting : A Case Study for Indonesia, in "The Economics of Rural Organization: Theory, Practice and Policy, World Bank.

———————— (1992); Poverty Comparisons, A Guide to Concepts and Methods; World Bank, LSMS Working Paper 88

Ravallion, Martin and Jyotsna Jalan(1998), Determinants of Transient and Chronic Poverty: Evidence from Rural Chaina, World Bank Policy Research Working Paper, No.1936.

Ravallion, Martin and Benu Bidani (1994); "How Robust is a Poverty Profile?", The World Bank Economic Review, Vol. 8, No.1.

Ravallion, Martin and Binayak Sen (1996); "When Methods Matter: Monitoring Poverty in Bangladesh", Economic Development and Cultural Change, Vol.44, No.4

Ravallion, Martin and Monika Huppi (1991); "Measuring Changes in Poverty: A Methodological Case Study of Indonesia During Adjustment Period", The World Bankd Economic Review", Vol.5, No.1.

Rodriguez, Adrian and Stephan Smith (1994): A comparison of Determinants of Urban, Rural and Farm Poverty in Costa Rica, World Development Vol.22; No.3.

Schubert, Renate (1994); Poverty in Developing Countries: Its Definitions, Extent And Implications; Economics, 49/50.

Sen, Amartya (1976); An Ordinal Approach to Measurement of Poverty, Econometrica, 44.

Sen, Amartya (1981); Poverty and Famines: An Essay on Entitlement and Deprivation; ILO.

Shaffer, Paul(1996), Beneath the Poverty Debate: Some Issues, IDS, Vol.27, No.1.

Streeten, Paul (1981); First Things First: Measuring Basic Human Needs In Developing Countries, World Bank.

Turufat Bekele (1996); Poverty in Ethiopia, Unpublished MSc Thesis.

UNDP(1998); Ethiopia: Human Development Report.

UNDP/ECA (1997); "Policy Directions and Institutional Arrangements for the Implementation of the WARDIS Programme by the National Regional States of Ethiopia", Project ETH 94/001/01/99, Addis Ababa.

Wodon, Quentin (1997a); "Food Energy Intake and Cost of Basic Needs: Measuring Poverty in India", London.

_____ (1997b): Targeting The Poor Using ROC Curves, World Development, Vol.25, No.12.

World Bank (1990a); "Selected World Bank Poverty Study", Working Paper WPS 552.

————————(1990b) "World Development Report: Poverty", Washington DC.

ANNEX 1

Recent Estimates of Poverty in Ethiopia

Agency or Individual	Data Used in the Study	Year	% Poor
RRC	Rural drought affected areas	1987	21%
World Bank	Total Population	1988	46%
Ethiopian Nutrition Institute	Total Population	1990	64%
IFAD	CSA's 1981/82 Rural Household Survey	1989	50%
IGAAD	Total Population	1989/90	60%
IFPRI	Total Population	1991	67%
World Bank (AEDD)	Total Population	1992	50%
MOPED	Total Population	1992	51.7%
Stefan Dercon and Psrmila Krishnan	Rural HH Survey of Selected 15 sites	1995	27%
Mekonnen Tadesse	Urban Socio-Economic	1995	38.9
Turufat Bekele	Urban and Rural Socio-Economic Survey of Selected area	1995	49%
Mekennen, Bereket, Abebe	Urban and Rural Socio-Economic Survey of Selected area	1995	48%

Source: Mekonnen (1996) and Turufat (1996), Mekonnen, Bereket and abebe (1998)

ANNEX 2

Diet Used for Poverty Lines (per month/Adult)

(Minimum food requirement for poverty line giving 2300 k. cal. per month/adult)

teff	1.70 kg
barley	4.85 kg
wheat	3.15 kg
maize	4.48 kg
sorghum	2.67 kg
horse beans	1.29 kg
cowpeas	0.23 kg
chick peas	0.69 kg
milk	0.55 litters
coffee	0.10 kg
sugar	0.10 kg
salt	0.70 kg
oil	0.15 litres
spices (karia)	0.25 birr
potatoes	1.51 kg
onions	0.20 kg
cabbage	0.38 kg

Source: Ethiopian Rural Household Survey (1994), diet to achieve 2300 k.cal per month per adult, using diet of Poorer half of sample; Dercon and Krishnan,(1998).

ANNEX 3

Dinki: Probit Estimates with Marginal Effects

Variables	Coefficient	Standard Error	dF/dX
DUMSEX	.569	.544	.198
AGEHHH	.021	.019	.008
DUMAGE	.188	.633	.073
HHSIZE	.328***	.095	.125
EDHHH	1.364	1.117	.479
DTECH	-	-	-
DLAND	-.175	.424	-.067
LNDRATIO	-	-	-
DOXEN	.478	.419	.178
VLVSTCK	.000	.000	.000
VTOOLS	-.008**	.004	-.003
IRATIO	.798*	.448	-.304
TNOTREE	.007*	.004	.003
DPBIRTH	-.090	.362	-.034

* Significant at 0.10. ** Significant at 0.05 level

*** Significant at 0.01 level.

ANNEX 4

Yetmen: Probit Estimate WITH Marginal Effects

Variables	Coefficient	Standard Error	dF/dX
DUMSEX	-1.004	.767	-.359
AGEHHH	-.015	.016	-.006
DUMAGE	-	-	-
HHSIZE	.312**	.128	.124
EDHHH	-	-	-
DTECH	-1.618*	.889	-.530
DLAND	-.268	.577	-.106
LNDRATIO	.104	.497	.042
DOXEN	.843	.773	.323
VLVSTCK	.000	.000	.000
VTOOLS	-	-	-
IRATIO	-.289	.725	-.115
TNOTREE	.003**	.001	.001
DPBIRTH	-.141	.419	-.056

* Significant at 0.10 level. ** Significant at 0.05 level.

ANNEX 5

Pooled: Probit Estimates with Marginal Effect

Variables	Coefficient	Stand-Error	dF/dX
DUMSEX	.221	.302	.045
AGEHHH	.005	.011	.001
DUMAGE	.328	.379	.078
HHSIZE	.196***	.052	.043
EDHHH	.643	.471	.184
DTECH	-.234	.244	-.050
DLAND	-.556**	.242	-.131
LNDRATIO	-	-	-
DOXEN	-.045	.255	-.009
VLVSTCK	-.000	.000	-.000
VTOOLS	-.001	.001	-.000
IRATIO	.084	.289	.018
TNOTREE	.004**	.002	.000
DPBIRTH	-.325	.215	-.070
DDINK	2.602***	.804	.734
DSHUM	1.839***	.874	.420

* Significant at 0.10 level. ** Significant at 0.05 level.

*** Significant at 0.01 level.

ANNEX 6

Shumsha: Probit Estimates with Marginal Effects

Variables	Coefficient	Stand-Error	dF/dX
DUMSEX	.539	.463	.083
AGEHHH	.001	.011	.000
DUMAGE	-	-	-
HHSIZE	.079	.085	.014
EDHHH	.452	.813	.101
DTECH	-.509	.385	-.082
DLAND	-.758	.425*	-.157
LNDRATIO	.210	.371	.037
DOXEN	-.199	410	-.036
VLVSTCK	-.000	.000*	-.000
VTOOLS	.002	.003	.000
IRATIO	1.334	.638**	.409
TNOTREE	.060	052	.010
DPBIRTH	-.945	.361***	-.189

* Significant at 0.10 level. ** Significant at 0.05 level

*** Significant at 0.01 level.

DECLARATION

The thesis is my original work, has not been presented for a degree in any other university and that all sources of material used for the thesis have been duly acknowledged.

Declared by:	Confirmed by:
Getaneh Gobezie	Dr. Mulat Demeke
Candidate	Advisor
June 15, 1999	June 15, 1999