

**DETERMINANTS OF POVERTY IN LESOTHO: A HOUSEHOLD LEVEL  
ANALYSIS**

**BY**

**RAMAELE MOSHOESHOE**

**X/50/8999/2006**

**Research Paper Submitted to the School of Economics, University of Nairobi,  
in Partial Fulfillment of the Requirements for the Award of the Degree of  
Master of Arts in Economics**

**August 2008**

University of NAIROBI Library



0443042 7

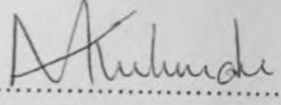
## DECLARATION

This research paper is my original work and has not been presented for a degree award in any other University.

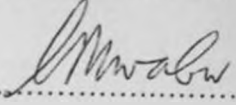
Signed:  ..... Date: 05/08/08 .....

Ramaele Moshoeshoe

This research paper has been submitted for examination with our approval as University supervisors.

Signed:  ..... Date: 5/08/2008 .....

Dr. Damiano Kulundu Manda

Signed:  ..... Date: 6/08/2008 .....

Prof. Germano Mwabu

## DEDICATION

To my mother, Mrs. 'Mamonyane Moshoeshoe, and in loving memory of my father, Mr. Matela Moshoeshoe, to whom I owe so much.

## ACKNOWLEDGEMENTS

This research paper is a product of the collective effort of many people who assisted in various ways and it is great pleasure to acknowledge and thank them, though this will certainly not settle my enormous debt to them. First, I give thanks to the Almighty God who always shows me the way and gives me courage and strength to sail ashore when the currents overpower me. Second, I am very thankful for the generous financial support from the African Economic Research Consortium (AERC), without which I would not have completed my studies. I then pay my sincere gratitude to my supervisors, Dr. D.K. Manda and Prof. G. Mwabu, to whom I am greatly indebted for their invaluable assistance throughout the development of this research paper.

I am also indebted to Dr. Jane Kabubo Mariara and Dr. Anthony Wambugu for their helpful comments and the eye-opening discussions I had with them, and all the School of Economics staff who helped in various ways throughout my study life at the University of Nairobi.

This research would not have kicked off without the indefatigable assistance of Ms. 'Malehloa Molato, Mrs. 'Matsotang Tsietsi and Mr. Kabeli 'Mefane, all of the Lesotho Bureau of Statistics, in providing me with the data used in this research paper, the 2002/2003 Household Budget Survey data, and the commodity prices data. I owe more than just a 'thank you'. I cannot forget my best friend, Mr. Letsie Mohatonyane, who made sure that I received all the data.

I owe great thanks to my family for their moral support and encouragement throughout my challenging academic life. Special thanks go to my mum, Mrs. 'Mamonyane, who taught me not to lose hope and believe in God whenever the road gets tough. "Kea u leboha 'Mè oa ka!"

Last but not least, I would like to thank all my 2006/07 MA classmates (Beatrice Arthur, John Olela, Lazarus Muganda, Mumbi Kimani, Muthoni Ng'ang'a, Njoroge Maara,

Patrick Kamori, Phyllis Machio, Rachael Musitia, Simon Githuku, and Stephen Mutuku), and the graduate computer lab technician, Edward Wainaina, who made my sojourn in Kenya and academic life at the University of Nairobi more interesting even in the face of many difficulties we faced together. You all really enriched my mind with all the arguments and discussions we had to make me a better scholar.

## TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....	IV
TABLE OF CONTENTS.....	VI
LIST OF TABLES.....	VIII
LIST OF FIGURES .....	IX
LIST OF ABBREVIATIONS AND ACRONYMS .....	X
ABSTRACT.....	XI
CHAPTER ONE: INTRODUCTION.....	1
1.0    BACKGROUND.....	1
1.1    POVERTY AND INEQUALITY SITUATION IN LESOTHO .....	2
1.2    LESOTHO’S POVERTY IN A COMPARATIVE PERSPECTIVE .....	4
1.3    RECENT ATTEMPTS TO TACKLE POVERTY .....	5
1.4    PROBLEM STATEMENT .....	5
1.5    OBJECTIVES OF THE STUDY.....	7
1.6    SIGNIFICANCE OF THE STUDY .....	7
CHAPTER TWO: LITERATURE REVIEW.....	8
2.0    THEORETICAL LITERATURE .....	8
2.1    THE CONCEPT OF WELL-BEING AND POVERTY .....	8
2.2    ABSOLUTE VERSUS RELATIVE POVERTY.....	9
2.3    APPROACHES TO POVERTY ASSESSMENT.....	10
2.3.1    The Welfarist approach.....	10
2.3.2    The Non-welfarist approaches.....	12
2.4    EMPIRICAL LITERATURE .....	16
2.5    OVERVIEW OF LITERATURE .....	18
CHAPTER THREE: METHODOLOGY .....	20
3.1    THEORETICAL FRAMEWORK .....	20
3.1.1    Measuring Poverty.....	20
3.1.2    Foster-Greer-Thorbecke (FGT) Measures of Poverty .....	25
3.2    MODEL SPECIFICATION.....	27
3.2.1    The Probit Model.....	27
3.2.2    The Ordered Probit Model.....	30
3.3    DATA TYPE AND SOURCE.....	31
3.3.1    Sampling Procedure for the 2002/03 HBS.....	32
3.3.2    Information Collected .....	32
CHAPTER FOUR: DATA ANALYSIS AND EMPERICAL RESULTS .....	34
4.1    INTRODUCTION .....	34
4.2    DESCRIPTIVE STATISTICS.....	34
4.2.1    Sample Distribution by Region and Zone.....	34
4.2.2    Sample Demographic Characteristics.....	36
4.2.3    Educational Attainment of Household Heads.....	36

4.2.4	Household Heads' Main Economic Activity .....	38
4.2.5	Household Size .....	39
4.2.6	Household Housing and Services .....	40
4.3	THE POVERTY LINES AND POVERTY PROFILES .....	44
4.3.1	The Cost-of-Basic-Needs (CBN) Poverty Lines.....	44
4.3.2	Regional Poverty.....	46
4.3.3	Household Poverty Rates by Gender of Head .....	48
4.3.4	Poverty Rates by Household Head's Marital Status.....	49
4.3.5	Poverty Rates by Head's Educational Attainment.....	50
4.3.6	Poverty Rates by Main Economic Activity of Household Head .....	50
4.4	DETERMINANTS OF POVERTY.....	51
4.4.1	Binomial Probit Model .....	54
4.4.2	Ordered Probit Model .....	61
CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS .....		63
5.1	CONCLUSION.....	63
5.2	POLICY RECOMMENDATIONS .....	64
REFERENCES .....		67
APPENDICES .....		71

## LIST OF TABLES

Table 1: Changes in poverty in Lesotho, 1986/87-2002/03 .....	3
Table 4.1 Urban-Rural Distribution of the Sample .....	34
Table 4.2 Sample Distribution by District.....	35
Table 4.3 Household Heads' Marital Status by Gender .....	36
Table 4.4 Educational Attainment of Household Heads by gender.....	37
Table 4.5 Educational Attainment of Household Heads by Region.....	38
Table 4.6 Economic Activity of Household Heads .....	39
Table 4.7 Households living in rented dwellings .....	40
Table 4.8 Households supplied with electricity .....	42
Table 4.9 Source of Heating the House .....	43
Table 4.10 Household's Source of Water.....	43
Table 4.11: Own and BOS Poverty Figures .....	45
Table 4.12: Household Food and Absolute Poverty Rates by Regions (Districts).....	46
Table 4.13: Household Food and Absolute Poverty Rates by Regions (Rural-Urban) ....	48
Table 4.14: Household Food and Absolute Poverty Rates by Regions (Rural-Urban) using the National Poverty line (M144.24) .....	48
Table 4.15: Poverty by Gender of Household Head.....	49
Table 4.16: Poverty Rates by Head's Marital Status.....	50
Table 4.17: Household Poverty Rates by Head's Educational Attainment .....	50
Table 4.18: Household Poverty Rates by Head's Main Economic Activity .....	51
Table 4.19: Definition of Variables used in the Probit and Ordered Probit Models .....	52
Table 4.20: Marginal Effects of the Binomial Probit for Consumption per Adult Equivalent Model; National Sample.....	55
Table 4.21: Predicted Probabilities of Being Extremely Poor, Moderately Poor or Non- Poor.....	61



## LIST OF FIGURES

Figure 1: Poverty in Selected sub-Saharan Countries .....	4
Figure 4.1 Sample Distribution by Region and Zone.....	35
Figure 4.2: Household Size Distribution .....	40
Figure 4.3: Household's Type of House.....	41
Figure 4.4: Main Roofing Material of the House .....	42

## LIST OF ABBREVIATIONS AND ACRONYMS

BNA	Basic Needs Approach to Poverty
BOS	Lesotho Bureau of Statistics
CA	Capability Approach to Poverty
CBN	Cost-of-Basic-Needs
CPI	Consumer Price Index
DOGEV	Dogit Ordered Generalized Extreme Value
FAO	Food and Agricultural Organization
FEI	Food Energy Intake
FGT	Foster-Greer-Thorbecke
GDP	Gross Domestic Product
GNP	Gross National Product
GoL	Government of Lesotho
HBS	Household Budget Survey
ILO	International Labour Organization
LHWP	Lesotho Highlands Water Project
OGEV	Ordered Generalized Extreme Value
PHC	Primary Health Care
PIH	Permanent Income Hypothesis
PRS	Poverty Reduction Strategy
UN	United Nations
UNDP	United Nations Development Programme
WFP	World Food Programme
WHO	World Health Organization

## ABSTRACT

This paper uses level data from the 2002/2003 Household Budget Survey to provide a detailed analysis of poverty in Lesotho. Poverty lines are calculated using the Cost-of-Basic-Needs approach and are used to identify the poor and to construct poverty profiles for the Kingdom of Lesotho. The regional poverty profiles indicate that poverty is more pronounced in rural than in urban areas. Around 56.1 percent of the rural households are food poor, and 68.7 percent of them are absolutely poor compared with only 27.7 percent and 40.5 percent of urban households who are food and absolutely poor, respectively. The paper reveals that 38.3 percent of the households in Lesotho are extremely poor (i.e. hard-core poor) and 15.9 percent are moderately poor.

At district level, Qacha's Nek, Botha-Bothe, Berea and Mohale's Hoek appear to be the most impoverished districts, respectively, while Maseru and Thaba-Tseka, on the other hand, are the least poor districts, in that order. This shows that poverty does not only depend on whether the district is mountainous or lowland. The social poverty profiles indicate that poverty is more concentrated among households that are headed by people who are widowed, uneducated or in subsistence agriculture.

The paper examines the probable determinants of poverty employing both the binomial and polychotomous probit models. The results show that age, gender, marital status, amount of land owned and distance to the essential public services are not important determinants of poverty. However, educational attainment and household size are shown to be strongly correlated to poverty. In general, the results indicate that education reduces the odds of being poor and secondary education has a significant poverty-reducing effect on urban households but its coefficient has an unexpected wrong (positive) sign in rural areas.

Because of the significant negative effect of farming on welfare, the paper recommends the introduction of drip-irrigation farming system and modifications to the current communal grazing system in order to strengthen agricultural sector.

## CHAPTER ONE: INTRODUCTION

### 1.0 Background

Poverty was one of the biggest social problems in the twentieth century and will continue to be in the twenty-first century. There are many poverty reduction programmes that have been developed overtime and across regions to try to tackle this problem. However, poverty is still one of the stylised facts of sub-Saharan Africa and it is pervasive in Lesotho, in spite of the government of Lesotho (GoL) having a long history of anti-poverty initiatives since its independence in 1966. Such pro-poor policies can be traced back to the 1970s when the GoL, with the support of the World Food Programme (WFP), launched large public works schemes such as tree planting, the fruits of which continue to provide firewood to thousands of households, and the adoption of the Primary Health Care (PHC) strategy to avail health care services to the populace (see Wason & Hall n.d.).

Throughout the 1970s, Lesotho was the net exporter of grain to South Africa and wool and mohair were sought-after products and hence predominantly featured in the country's export figures. Given the remarkable performance of the agricultural sector in that period, the economic growth of Lesotho was much higher than that of most sub-Saharan countries. Between the years 1970/71 and 1974/75, the economy grew by an average rate of 8 percent, and between 1987 and 1997, the average year-to-year growth rate of 6 percent was recorded (Kingdom of Lesotho 2004; Wason & Hall n.d.). Therefore, given the land ownership structure in Lesotho whereby almost every household owns a piece of farmland and the fact that it is the rural communities with the largest proportion of livestock, the economic growth of the 1970s and early 1980s was largely being felt in all sectors of the economy.

However, since the 1998 political unrests and the 1999 ending of the giant Lesotho Highlands Water Project (LHWP) which boosted the economy for most of the 1990s, the economy lost its momentum and Gross Domestic Product (GDP) growth rate has started

hovering below 3 percent, with 2005 registering a lacklustre 1.2 percent GDP growth rate according to the Central Bank of Lesotho (2005).

The end of the LHWP only exacerbated the already going on difficult reality facing Lesotho. The rapid decline of rangeland and arable land from 13% to 8% in the 1990s alone due to overgrazing and soil erosion has resulted in a fall in agricultural production, which has also been worsened by frequent natural hazards such as droughts, hailstorms, heavy snowfalls and endemic livestock theft, to the extent that Lesotho is now unable to feed herself. The continuing retrenchment of Basotho (people of Lesotho) mineworkers from the South African goldmines has resulted in massive erosion of the remittances and alarming unemployment. Between 1990 and 1999 alone, the number of Basotho mineworkers had dropped by almost a half from 127, 000 to 56, 000 (Wason & Hall n.d.).

Given that an estimated 82.7 percent of Lesotho population resides in rural areas where 81.1 percent of men and 75.1 percent of women practice subsistence farming (Labour Force Survey, 1999<sup>1</sup>), all of the above factors worsened, and continue worsening, the incidence, depth and severity of poverty in the country. The continuing decline of agricultural share to gross domestic product (GDP) has led to an increase in rural-to-urban migration and hence increases in urban poverty.

### **1.1 Poverty and Inequality Situation in Lesotho**

There is still no more visible characteristic of underdevelopment in Lesotho today than poverty which appears to be an insurmountable challenge as witnessed by current statistics. According to Levine (2006), 58.8 percent of Lesotho's population were living in poverty in 1986/87 and almost the same number, 58.3 percent, were living in poverty in 1994/95 as shown in Table 1 below. By 2002/03, this proportion had declined to 56.61 and this indicates signs of decline in poverty. On the other hand, the severity of poverty

---

<sup>1</sup> Cited in the Central Bank of Lesotho (2005)

had increased by three (3) percent from 1986/87 to 1994/95 but then dropped significantly by about seven (7) percent to 18.73 percent in 2002/03.

**Table 1: Changes in poverty in Lesotho, 1986/87-2002/03**

Poverty (%) \ Year	1986/87	1994/95	2002/03*
Head-count index	58.8	58.3 [66.61]*	56.61
Poverty Gap	33	35 [37.85]	28.97
Squared Poverty Gap	23	26 [25.89]	18.73
Gini index	60	66 [57]	52

Source: May et al (2001) cited in Levine (2006). \*Figures for 2002/03 and those in brackets for 1994/95 come from Lesotho Bureau of Statistics, [www.bos.gov.ls](http://www.bos.gov.ls)

The income inequality in Lesotho is also high as shown by the Gini coefficient of 66 percent and the fact that the poorest 20% of the population only have 2% of the national income (Levine 2006; Elbadawi & Milante 2005). From Table 1, the poverty gap increased from 0.33 to 0.35 implying that by 1994/95, the expenditures of the poor were 35 percent below the poverty line. However, this had improved by 2002/03 to 28.97 percent.

Poverty in Lesotho varies across the four ecological zones (foothills, lowlands, Senqu-river valley and mountains). According to Levine (2006), of the Lesotho's ten administrative districts, the incidence of poverty in 1994/95 was found to be more pronounced in the mountainous districts of Mokhotlong (75.4 percent), followed closely by Mophale's Hoek (74.9 percent), Quthing (72.7 percent) and Thaba-Tseka (72.3 percent) while it is considerably below average in the capital district of Maseru, where only 39 percent of households are poor. All poverty measures are also generally below the national average in mostly lowland/foothill districts of Leribe and Berea.

Given the current poor economic performance, it seems highly unlikely that the country will achieve its objective of poverty eradication. Using the incidence of poverty in 1986/87 and 1994/95 and the gross national product (GNP) per capita data, May et al (2001)<sup>2</sup> calculated the poverty elasticity of -0.12 which effectively means that a 1%

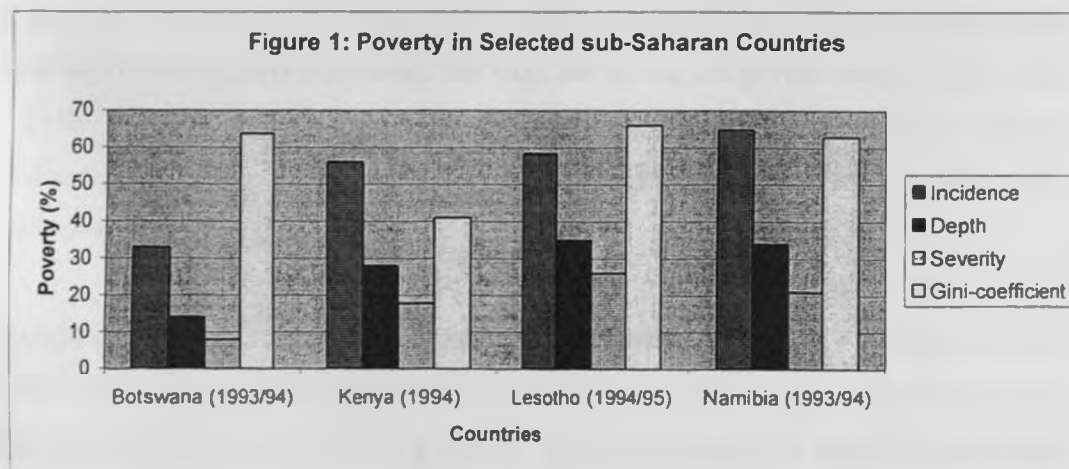
<sup>2</sup> Cited in Levine (2006)

increase in per capita GNP resulted in a 0.12% decrease in poverty during that period. However, with the poverty elasticity of -0.12, May et al (2001) found that no realistic growth rates would allow Lesotho to achieve the Millennium Development Goal of halving poverty incidence by 2015 (Levine 2006). The government has instead chosen the 4 percent economic growth target with -0.5 poverty elasticity therefore pledging to distribute any economic gain more fairly across the board.

## 1.2 Lesotho's Poverty in a Comparative Perspective

Figure 1 below shows poverty in Lesotho in comparison to other sub-Saharan countries.<sup>3</sup> Among the four countries, Lesotho appears to be the second poorest country after Namibia, when using the poverty head count measure of poverty. However, using the poverty gap and the poverty severity, Lesotho emerges the most poorest, with Botswana emerging as the least poor. This is because income distribution in Lesotho is highly unequal. This is indicative of the fact that both per capita income and income distribution are important determinants of poverty. Therefore, for Lesotho to effectively combat poverty, she must promote both growth (to enable the poor individuals to cross the poverty threshold) and fair income distribution.

**Figure 1: Poverty in Selected sub-Saharan Countries**



<sup>3</sup> Data sources: Alemayehu et al (2005), for Kenya poverty measures; Buthali (1997), for Botswana; Levine (2006), for Lesotho and Namibia; Elbadawi and Milante (2006) for the Gini coefficient of Kenya

### **1.3 Recent Attempts to Tackle Poverty**

In an attempt to address all these challenges, the GoL launched the Poverty Reduction Strategy (PRS) 2004/05-2006/07, a three-year medium term development framework outlining national priorities and strategies for promoting economic growth and alleviating poverty. The 2004 PRS was an outcome of extensive consultative and participatory process and limited technical analysis of poverty that helped the government to identify the characteristics of the poor, set growth targets and hence design policies to help the poor.

### **1.4 Problem Statement**

The elaboration of poverty alleviation policies requires a thorough knowledge of the phenomenon as well as an understanding of the efficiency of implemented programmes. In Lesotho there is a limited number of studies on poverty which have been used to inform the government's anti-poverty initiatives recently, many of which are descriptive in nature (see Omole 2003; Wason & Hall n.d.) while some, mostly UNDP-sponsored, are limited in their technical analysis.

The study by May et al (2001) gives the poverty profiles, poverty elasticities and income inequality measure, which provided the basis for setting the growth targets in the 2004/5 – 2006/7 PRS and poverty monitoring in Lesotho (see Levine 2006). However, all these studies only give the poverty profiles without any further robust technical analysis of the determinants of poverty.

Though the 2004 PRS is a much informative document, it has many fundamental flaws which are the likely hindrances to the government's efforts to fight poverty effectively. The strategies aimed at addressing poverty in this document are based on the poverty profiles which only provide information on poverty correlates. Although poverty profiles provide essential clues to the underlying determinants of poverty, they can also be



misleading because they beg the obvious question of the effect of a particular variable conditional on the other potential determinants (Datt & Jolliffe 1999).

The poverty profile is a bivariate analysis which simply compares the poverty status of households to a range of proximate determinants of poverty and shows how poverty levels are correlated with household characteristics, one characteristic at a time. This however simplifies the complex relationship between household characteristics and welfare since it does not infer the causality of household characteristics on household welfare (The National Economic Council of Malawi et al 2001). Knowing why some people are poor is essential in tackling the roots of poverty.

Due to its sole reliance on the poverty profile, the 2004 PRS's main focus is on identifying the deficiencies of the poor disregarding their livelihood activities. Therefore policy prescriptions from this PRS are mainly designed just to address the immediate needs of the poor, rather than enhancing their capabilities to better carry out their livelihood activities. The PRS aims to reduce unemployment through development projects which are unlikely to be sustained by the poor and these include projects such as building of new garment factory sites, the operation of which depends on foreign capital. As argued by Mwabu (2006), such policies which do not target to strengthen the livelihood activities of the poor, and aim at projects which can not be sustained by the poor, are likely to fail.

Moreover, the strategies outlined in the 2004 PRS are holistic in nature and hence given the spatial differences in the incidence of poverty across the country and with limited knowledge of poverty determinants, such strategies are likely to yield minimal results. The lack of information on the national and spatial determinants of poverty denies the government the opportunity to identify and adopt those policy interventions which have the higher potential of enhancing the living standards of the poor. The research questions that arise are therefore, to know the factors that affect poverty in Lesotho and whether these factors vary across the four ecological zones<sup>4</sup> of the country.

---

<sup>4</sup> The four ecological zones are; Lowlands, Foothills, Senqu River Valley and the Mountains

## **1.5 Objectives of the Study**

The general objective of this study is to investigate the nature and determinants of poverty in Lesotho. Specifically, the study seeks to:

1. Explore the nature and determinants of poverty in Lesotho.
2. Explain why some population sub-groups are non-poor, poor, or extremely poor.
3. In the light of the results of the study, give policy recommendations.

## **1.6 Significance of the Study**

The object of this study is to investigate the nature of the determinants of poverty in Lesotho. In Lesotho, while there have been some studies on the descriptive analysis of poverty, to my knowledge, there is no precursor to an empirical modelling of the determinants of poverty using a nationally representative household level data. Hence, this paper contributes to the literature on poverty in Lesotho as it is an early attempt to analytically identify the fundamental determinants of poverty in Lesotho. Moreover, understanding both the poverty determinants is critical for policy analysis including the design of effective poverty reduction strategies in Lesotho.

## CHAPTER TWO: LITERATURE REVIEW

### 2.0 Theoretical Literature

Currently poverty reduction is ranked number one in the development agenda in both the developed and the developing countries. However, while poverty reduction is the key objective of anti-poverty policies, there is still no uniform approach for defining, identifying or measuring poverty, nor there is consensus on what “poverty reduction” really means (Munujin et al 2005). This is largely because of the multifaceted nature of poverty which manifests in different ways. Hence there are various approaches used to study and understand poverty in and across societies and overtime. This part of literature, therefore, presents a panoramic overview of poverty and well-being concept and approaches to defining and measuring poverty and inequality.

### 2.1 The concept of well-being and poverty

The definition of poverty plays an essential role in the formation of antipoverty policy initiatives. However, as mentioned earlier, different people define, view and experience poverty in various ways. In economics, an individual’s well-being is tightly linked with the level of utility that that individual derives from the consumption of various food and non-food commodities. The higher the level of consumption, the greater the level of well-being an individual attains. However, both food and non-food consumption commodities are priced hence, for an individual to attain a given level of well-being, she or he must have certain level of income.

Economists, therefore, use income and consumption as proxies for well-being. The World Bank (2000)<sup>5</sup> defines poverty as “pronounced deprivation in well-being”. The concept of economic well-being stems from the issue of whether one has adequate income to acquire a basic level of consumption or human welfare (Wagle 2002). Hagenaars (1991)<sup>6</sup> holds that the notion of individual welfare, using the underlined utility function, includes

---

<sup>5</sup> See the World Bank Institute (2005)

<sup>6</sup> Cited in Wagle (2002)

consumption goods, such as food, clothing, and housing, as well as non-consumption goods, such as recreation and leisure, that are fundamental to human well-being.

The World Bank Institute (2005) defines well-being as the command over commodities in general, such that people are considered to be better off if they have greater command over resources. Therefore, the classic definition of poverty sees it as lack of command over basic consumption needs (Ravallion & Bidani 1994). As cited in Dukuley (unpub.), Lipton and Ravallion (1995) postulate that a person is regarded as poor when she or he falls short of a minimum level of economic welfare deemed to constitute a reasonable minimum, either in some absolute sense or relative sense (i.e. by the standards of a specific society).

## **2.2 Absolute versus Relative Poverty**

Poverty may be defined in absolute or relative terms by drawing one or more lines in the poverty data which separate the “poor” from the “non-poor”. According to Foster (1998), an absolute poverty line is a fixed cut-off level that is applied across all potential resource distributions, below which a person is classified as “poor” and “non-poor” otherwise. Hence absolute poverty measures the number of people who fall below a certain fixed income threshold and unable to afford a certain level of basic needs. For poverty comparisons overtime, Foster (1998, p. 336) states that “the standard is unchanged even in the face of economic growth, though changes in price levels are taken into account”. This therefore means that absolute poverty is independent of current data.

On the contrary, relative poverty depends on current data. Relative poverty is dependent on the standard of living of the society, which changes overtime in response to changes in economic growth and changing norms of the society. As argued by Levine (2006), the relative poverty line is determined from the percentage cut-off point in the welfare distribution such that relative poverty is when one cannot attain a bundle of basic commodities available to a reference social group such as people within the mean, median, or some other quintile, income level (Kimalu et al 2001; Foster 1998). Relative

poverty therefore indicates whether the household's income is low relative to the society's median income and does not imply that the basic needs are not being met by the household. For this reason, it is also considered as an indicator of social inequality (Boltvinik 1998;<sup>7</sup> Levine 2006). However, Foster (1998) cautions against using this as a measure of inequality though there is an important link between the two.

### **2.3 Approaches to Poverty Assessment**

In the poverty literature, there are three broadly construed, definitional and measurement, traditional approaches to the assessment of the well-being of the populace. These are the economic well-being, capability and social exclusion approaches (Wagle 2002). Traditionally, these are classified as the welfarist and the non-welfarist approaches. The non-welfarist approach is subdivided into two approaches; the basic needs approach (BNA) pioneered by Rowntree and developed by Streeten et al (1981) and Stewart (1985) among others, and the capability approach (CA) pioneered and developed by Amartya Sen (1985) (see Ravallion & Bidani 1994; Clark 2007; Duclos & Araar 2006). Both the welfarist approach and the BNA are part of the economic well-being approach of Wagle (2002). The social exclusion approach is part of the non-welfarist approach.

#### **2.3.1 The Welfarist approach**

This approach concentrates mainly on the comparisons of "economic well-being" or "standard of living" of different households by comparing their income levels. This approach is strongly anchored in classical microeconomics where "welfare" or "utility" are key in accounting for the behaviour and well-being of economic agents. According to this approach, given their initial endowments (time, land, financial and human capital, etc.), rational economic agents will maximize their utilities/welfares and the outcome of this maximization process will be Pareto efficient in a perfectly competitive world. Hence this approach uses individuals' revealed preferences to classify them as "poor" and "non-poor" (see Duclos & Araar 2006).

---

<sup>7</sup> See Minujin et al (2005)

However, as argued by Duclos and Araar (2006), the assessment of any individual's well-being should be consistent with the ordering of preferences revealed by that person's free choices. For instance, by the total consumption or income standard, a person could be considered to be poor but that same person could nevertheless be able (i.e. have the working capability) to be non-poor and hence the welfarist approach would consider that person as non-poor. By using revealed preferences, the welfarist approach considers the person who freely chooses to work less (possibly in exchange for more leisure) and earn and consume little while still has the capacity to work more and consume more, as not poor, although by non-welfarist poverty analysis standards such a person could be considered poor.

Although this approach has a firm basis from economic theory, it faces a number of problems in practice when applied in its pure form. These limitations are well articulated by Duclos and Araar (2006). First, there is a problem in assessing levels of utility of "psychic happiness". Second, comparing the level of utility across individuals is extremely difficult because individuals' preferences are heterogeneous, personal characteristics, needs and enjoyment capabilities are diverse, households differ in size and composition, and prices vary across time and space. For short, because utility is a subjective concept, interpersonal utility comparisons are difficult. Moreover, even if all of these limitations were to be resolved, the welfarist approach would still give senseless poverty analysis by classifying as poor individuals who are materially well-off but not content, and as non-poor individuals who are materially deprived but nevertheless content. That is, the grumbling rich would be considered to be poor while the contented peasant would be considered as rich. In this case, individual's satisfaction or dissatisfaction with the status quo is the main determinant of whether that individual is poor or not poor.

Because of these problems, the welfarists use the objectively observable proxies for utilities, such as income or consumption, in spite of their inability to take full account of the role of utility from public goods and non-market commodities in welfare. Therefore,

the working definition of poverty for the welfarists is 'lack of command over commodities' measured by low income or consumption (Duclos & Araar 2006). This approach is also referred to as the *Monetary Approach* since it uses the money-metric indicators to measure poverty.

### **2.3.2 The Non-welfarist approaches**

As mentioned earlier, there are three non-welfarist approaches; the BNA which is closely linked to the concept of functionings and is part of Wagle (2002)'s economic well-being approach, the CA and the social exclusion approach.

#### **2.3.2.1 Basic Needs Approach (BNA) and Functionings**

According to Minujin et al (2005), the basic needs approach is the multidimensional measurement of poverty that regards poverty as the inability to satisfy a socially defined set of needs that allow an individual to be able to actively participate in society. The basic needs are physical inputs (such as health care, education, shelter, sanitation, etc.) that are usually required for individuals to achieve functionings (such as good health, adequate nourishment, long life expectancy, etc.). Hence basic needs are defined as means rather than outcomes. However, there are enormous disagreements as to what the basket of basic means of survival should contain (Wagle 2002). Following the basic needs-oriented absolute consumption approach, the International Labour Organization (ILO) defines the poverty line in terms of the minimum requirements for food, shelter, clothing, and other essential services such as transportation, sanitation, health, and education (ILO 1976; cited in Wagle 2002).

The functionings approach focuses on the need to attain some basic multidimensional outcomes that can be observed and monitored relatively easy. Functionings are therefore considered as constitutive elements of well-being such that one is considered to be well-off if she or he enjoys a sufficiently large level of functionings. Nevertheless, they are not

synonymous to basic needs. Streeten et al (1981)<sup>8</sup> argue that basic needs may be interpreted in terms of minimum specified quantities of such basic commodities as food, shelter, water and sanitation that are necessary to prevent ill health, undernourishment, etc. (Duclos & Araar 2006). In this way, BNA enable poverty analysts to go beyond the more traditional unidimensional monetary approach and measures nutritional poverty, educational poverty, etc. (World Bank Institute 2005). The general consensus in this literature is that the specification of basic needs must depend on the characteristics of individuals and societies in which they live and should be sufficiently flexible to adjust to different country and culture/norm specific contexts (Minujin et al 2005).

The BNA does face a number of problems though. Like all other approaches, it does not recognize the role of heterogeneity in characteristics and in socio-economic environments in achieving well-being. Nevertheless, the argument is that it is less abstract than the welfarist approach in recognizing the role of heterogeneities (Streeten et al 1981 cited in Duclos & Araar 2006). The other underlying problems include the degree of nutritional adequacy to be used in poverty assessment, and the ambiguity in the depth and width of concept of basic needs and functionings as there are degrees of functionings which make life enjoyable above just making it purely sustainable or satisfactory (Duclos & Araar 2006).

### **2.3.2.2 Capability Approach (CA)**

The second dimension of poverty definition and measurement is the capability approach (CA), pioneered and advocated by Amartya Sen, which focuses on factors other than income, consumption, and welfare. This falls under the non-welfarist approach. According to Alkire (2007), the CA, whether in welfare economics, development or poverty reduction, is a normative framework for assessing alternative policies or states of affairs or options. This approach defines poverty as a deprivation of capabilities, such as

---

<sup>8</sup> Duclos and Araar (2006)



lack of multiple freedoms<sup>4</sup>, inability to make informed decisions, etc, that people value and have reason to value (Alkire 2007).

The CA classifies people as “poor” and “non-poor” by measuring the capabilities that enable one to achieve certain crucially important “functionings” or “achievements” up to certain minimally adequate levels needed to improve or sustain a higher level of well-being. Wagle (2002) holds that one’s capability can take a number of dimensions, such as education, health, sanitation, etc, that produce stronger impacts on well-being, including on generating incomes necessary to increase consumption of goods and services.

Therefore, an individual is considered to be poor if she or he lacks certain capabilities to participate with dignity in society, but not necessarily if the person is unable to achieve functionings per se. The United Nations Development Programme (UNDP) measures capability poverty in terms of illiteracy, malnutrition, life expectancy, poor maternal health, and illness from preventable diseases (UNDP, 2000 cited in Wagle 2002). The CA therefore imparts more value to freedom of choice. Hence a person will not be judged as poor if she or he chooses not to achieve some functionings as long as she or he would be able to achieve them if she or he so chose (Duclos & Araar 2006).

The CA has a number of advantages over other approaches because it encompasses large number of issues such as freedom and democracy. However, this approach has been criticized on grounds that it is difficult to convert a set of basic capabilities into a set of measurable indicators. Furthermore, the approach does not clearly recognize the role of individual preferences in welfare, thus it takes the opposite extreme to the welfarist approach (see Streeten et al 1981 cited in Dukuly unpub.). The other limitation of the approach is that it downplays the roles of social orders and relationships. Wagle (2002) posits that it is not only one’s capability that determines her/his well-being but also the institutional mechanisms that impose barriers or offer opportunities in transforming capability into human well-being.

---

<sup>4</sup> The argument that capability is directly related to freedom is grounded on the “positive” concept of freedom to choose from enough basic resources out of desire rather than out of necessity (Stone 1997, p.129; cited in Wagle 2002, p.159).

### 2.3.2.3 Social Exclusion<sup>10</sup>

Other social scientists, particularly sociologists and anthropologists, focus on social, behavioural and political underpinnings of well-being in defining poverty. Sociologists argue that it is the aberrant behaviour and attitude of the poor and isolation from the society that cause poverty, though there are diverging arguments as to whether it is the institutions or the individuals themselves that the poor deviant or isolated from the rest of the society (Wagle 2002).

In the words of the European Foundation (1995)<sup>11</sup>, social exclusion is “the process through which individuals or groups are wholly or partially excluded from full participation in society in which they live”. Wagle (2002), therefore, argues that people may be poor despite having adequate incomes or adequate means of survival, and being generally capable of producing certain functionings. This will happen when one is excluded from the mainstream economic, political, and civic or cultural activities which are essential for human well-being.

There are three social exclusion paradigms. First, there is the solidarity paradigm which is conceived as the withering away of social bonds between individuals and society. Second, we have the specialisation paradigm which is related to individual behaviour and exchanges and lastly, we have the monopoly paradigm which relates to attempts by various and often competing groups to maximize benefits to their members (Wagle 2002).

Wagle (2002) maintains that the process of social exclusion impacts poverty economically, politically and civically or culturally. First, economically, social institutions and orders that act as agents for social exclusion impose barriers on certain individuals or groups in carrying economic activities, such as labour market participation and entrepreneurship development. This may happen through racial, gender, spatial and

---

<sup>10</sup> In explaining this approach, one draws much from Wagle (2002).

<sup>11</sup> Cited in Wagle (2002, p.160)

other forms of discrimination. Second, some individuals or groups are barred from participation in political activities and processes such as political organization, party formation, and voting.

Third, denying some individuals or groups access to civic or cultural activities such as joining civic associations, membership organizations, social networks, etc, is tantamount to social exclusion and this impoverishes such groups or individuals. This is because such individuals or groups miss out the benefits of social capital formation through the process of organization, mobilization, and empowerment, which help to combat inequalities and social exclusion (White 1997 cited in Wagle 2002).

## **2.4 Empirical Literature**

There is lot of analytical work done on the determinants of poverty in different countries but none exists on Lesotho. Datt and Jolliffe (1999) used the 1997 Egypt Integrated Household Survey to analyse the determinants of poverty in Egypt. The study employed the household welfare function, approximated by household per capita consumption expenditure. Household real consumption per capita was regressed on potential explanatory variables, and then the estimated model was used to infer implications about poverty.

Datt and Jolliffe (1999) justified the choice of their approach against the other approaches that employ the discrete choice models on the following grounds. First, they argue that given the household consumption, the household's poverty level is completely determined but not vice versa. Second, using the discrete choice models, e.g. the logit/probit model, involves unnecessary loss of information in transforming household consumption expenditure into binary variables. Thirdly, employing the binary response model involves arbitrariness in setting the absolute poverty line. Lastly, the approach avoids strong distributional assumptions that are needed in binary response models.

The welfare function approach has some flaws though. Unlike the discrete choice models, the expenditure approach does not directly give probabilistic statements about poverty.

Second, this approach assumes that consumption expenditures are negatively related with absolute poverty at all expenditure levels, hence factors that increase consumption expenditure should reduce poverty. However, increasing the welfare of households who are already non poor does not affect poverty level as measured by the headcount index (Alemayehu et al 2005).

In spite of these limitations, the approach is still widely used and Datt and Jolliffe (1999) found that education is critical to poverty alleviation. They found that increasing the average years of schooling as well as the parents' education level proved to have large impacts on average living standards and poverty levels.

In Malawi, the study by the National Economic Council et al (2001) also utilized the expenditure approach and identified the following factors as essential determinants of poverty: education, region specific factors, place of residence (urban versus rural), employment and occupational status, agricultural land size, crop density (i.e. the number of different types of food and cash crops that are cultivated other than maize and tobacco), and infrastructure.

Alemayehu et al (2005) used the household level data from the 1994 Kenya Welfare Monitoring Survey and employed both the binomial and polychotomous logit models to examine the probable determinants of poverty and why some population groups are non poor, poor or extremely poor. The study identified the following as crucial determinants of poverty: education level, household size, and engagement in agricultural activity, both in rural and urban areas. Factors that were found to be closely related with overall poverty appeared to be even more essential in tackling poverty.

Meng et al (2007) utilized the Urban Household Income and Expenditure Survey (UHIES) 1986-2000 to examine factors associated with household poverty in China and whether the importance of these factors has changed over time. They employed the probit model and found that large households and households with more nonworking members are more likely to be poor and that price increases were a contributing factor to poverty

over the years 1986-1993, while from 1994-2000, the worsening economic situation of state sector employees contributed to poverty increase.

Fissuh and Harris (2004) used the Eritrean Household Income and Expenditure Survey 1996/97 data to analyse the determinants of poverty in Eritrea, employing the Dogit Ordered Generalized Extreme Value (DOGEV) model which nests the Dogit and the Ordered Generalized Extreme Value (OGEV) models as its variants. The study found that education impacts welfare differently across poverty categories and that there are pockets of poverty in the educated population sub group. Household size was also found to affect poverty differently across poverty categories. Age of household head was found to be insignificant. Regional unemployment, remittances, house ownership and access to sewage and sanitation facilities were identified as crucial determinants of poverty.

As a discrete choice model, the DOGEV model has an added advantage over the multinomial/ordered logit, utilized by Alemayehu et al (2005), in that it tries to capture any heterogeneity between the moderate poor, non poor and absolute poor with a possibility of weak test of any captivity or “poverty trap” in static sense in each group (see Fissuh & Harris 2004).

## **2.5 Overview of Literature**

The above theoretical literature highlights the multifaceted nature of poverty as argued by the welfarists and the non-welfarists. The welfarist approach views poverty as lack of endowments such as time, land and physical, financial, and human capital which constraint an individual in making their consumption choices to maximize utility. Hence the welfarists use the proxies of utility such as consumption or income to measure poverty such that an individual is considered to be poor if s/he lacks command over commodities.

The non-welfarist approaches look at poverty as a multidimensional rather than the unidimensional phenomenon that can be measured by utility. The functionings which are

constitutive elements of well-being include being healthy, enjoying consumption of certain commodities, being literate, etc. According to the CA therefore, poverty is lack of multiple freedoms such as the inability to achieve certain crucial functionings up to a minimum adequate level. The social exclusion approach on the other hand looks at poverty from the social point of view such that an individual is considered to be poor if s/he is barred from full participation in the economic, social, and political processes in the societies in which they live. These approaches highlight the fact that there is no universally accepted measure of poverty that captures its entire multiple dimensions.

The imposition of barriers on certain individuals to participate in the economic sphere of the society increases inequality. The widening gap between the rich and the poor will eventually entrench poverty in such a society. This calls for the need to understand the factors that affect poverty and indentifying those factors that bar some individuals to fully participate in the economic sphere. In analysing the determinants of poverty, the studies reviewed above have used consumption per capita as a measure of welfare. Though the above-reviewed studies (Datt & Jolliffe 1999; Alemayehu et al 2005; the Malawi National Economic Council et al 2001; Fissuh & Harris 2004), have followed different approaches, they all seem to agree on the major determinants of poverty such as education, household size etc.

The literature has shown that inequality can help worsen the poverty situation but there are no studies which look at whether poverty levels and determinates vary depending on inequality indexes in various clusters of the population. Most studies that analyse the determinants of poverty either leave inequality altogether without any mention or at least give the inequality measure without any attempt to find its likely impact on poverty in different clusters of the population.

## CHAPTER THREE: METHODOLOGY

### 3.1 Theoretical Framework

This section of the study seeks to outline the theoretical aspects of poverty. It specifically outlines both theoretical and practical issues of setting the poverty line and then goes on to specify the models to be used in the analysis of poverty.

#### 3.1.1 Measuring Poverty

Sen (1976) posits that there are two fundamental problems that one must confront in measuring poverty. First, how does one identify the poor among the total population? Second, how does one construct a scalar measure (an index) of poverty by using the available information on individuals and households? The former question has two components, viz, how do we measure individual's welfare and, using this same metric, how do we determine the threshold that separates the poor from the non-poor? (Sen 1976; Simler & Arndt 2007).

It is frequently argued that consumption is better suited than income as an indicator of living standards, particularly so in developing countries. This is because consumption is believed to vary more smoothly than income, both within a given year and across the life cycle as argued by the Friedman's Permanent Income Hypothesis (PIH), income is subject to seasonal variability, particularly in developing countries (Duclos & Araar 2006). The PIH predicts that individuals will try to smooth their consumption across their low- and high-income years (in order to equalize the marginal utility of consumption across time), through appropriate borrowing and saving behaviour (see Branson 1989).

For the non-welfarists interested in outcomes and functionings, consumption is also preferred over income because it is deemed to be a more direct indicator of achievements and fulfilments of basic needs. Moreover, consumption is more readily observed, recalled

and measured than income, and suffers less from underreporting problems (Duclos & Araar 2006)<sup>12</sup>.

The most widely used measure of welfare in economics is a utility function defined over a consumption of commodities, such that the function reproduces consumer preferences over alternative consumption bundles. The basic theoretical framework for this study is therefore premised on the concept of indirect utility maximization. Hence, the poverty line can be interpreted as a point on the consumer's expenditure function that gives the minimum cost to a household with given characteristics of attaining a given level of utility at the prevailing prices (Ravallion 1998).

Following Ravallion (1998), consider a household with characteristics  $\mathbf{x}$  (a vector) consuming a bundle of goods in quantities  $\mathbf{q}$ . The utility function  $u(\mathbf{q}, \mathbf{x})$ , which assigns a single number to each possible  $\mathbf{q}$  given  $\mathbf{x}$ , is assumed to represent the household's preferences over all affordable bundles. The consumer's expenditure function is  $e(\mathbf{p}, \mathbf{x}, u)$  which is the minimum cost to a household with characteristics  $\mathbf{x}$  of the level of utility  $u$  when facing the price vector  $\mathbf{p}$ . When evaluated at the actual utility level,  $e(\mathbf{p}, \mathbf{x}, u)$  is the actual total expenditure,  $y = \mathbf{p}\mathbf{q}$ , for a utility-maximizing household.

Let  $u_z$  denote the reference utility level needed to escape poverty or just to reach the poverty level. The poverty line is then given as

$z = e(\mathbf{p}, \mathbf{x}, u_z)$ , which is the minimum amount of money required to achieve utility (welfare) level,  $z$ , at prices,  $\mathbf{p}$ , and social characteristics,  $\mathbf{x}$ .

This implies that the poverty line is the minimum cost of the poverty level of utility at prevailing prices and household characteristics. This shows how to move from poverty in terms of utility to poverty in terms of money.

The reference level of utility needed to escape poverty is a function of the value of Sen's capabilities needed to escape poverty. Therefore, the poverty line can be interpreted as

---

<sup>12</sup> See Duclos and Araar (2006) for the limitations of the use of consumption as the measure of welfare.



the minimum cost to a household, with given characteristics, of attaining the minimum value of capabilities needed to escape poverty at given prices (Ravallion 1998).

There are two mostly used methods of constructing the poverty line and these are briefly explored below.

### **3.1.1.1 The Cost-of-Basic-Needs (CBN) method**

Since poverty is defined as lack of command over basic consumption needs, the poverty line is therefore defined as the cost of those needs. This method stipulates a consumption bundle considered adequate for basic consumption needs, and then estimates its cost for each of the subgroups being compared in the poverty profile (Ravallion & Bidani 1994).

Operationally, the following steps were followed in constructing the CBN poverty line (see Ravallion & Bidani 1994). First we pick a nutritional requirement for good health, such as 2250 kilo calories (Kcal) per adult equivalent per day. This is the amount of calories recommended by the World Health Organization (WHO) and the Food and Agricultural Organization (FAO) of the United Nations (UN) (see Mwabu et al 2000). Second, we specify a reference food bundle. This is a food basket made composed of 15 food items commonly consumed by households in the first quintile of the food expenditure per month per adult equivalent distribution (i.e. the poorest 20 percent of the Lesotho's population).

Third, we specify a reference household deemed to be typical of the poor. We chose that household to have the average calories per month per adult equivalent per each food item in the reference basket. Fourth, we set the food poverty line  $z^f$ , which is the cost of buying the reference food bundle. A person is therefore deemed food poor who lives in a household that cannot afford the cost of the basic food basket. The judgement about whether or not the household can afford the reference food bundle is based on the household's consumption expenditure on all goods and services.

Fifth, we make allowance for non-food goods by examining the consumption behaviour of those households who can just afford the reference food basket in order to get the absolute poverty line. The non-food share of total expenditures is estimated by regressing the food share ( $s$ ) of each household  $i$  on the log of the ratio of total spending (food plus non-food) to the food poverty line  $z^f$ :

$$s_i = \alpha + \beta \log \left( \frac{y_i}{z^f} \right) + \varepsilon_i \quad (3.1a)$$

where  $s_i$  is the share of total expenditure,  $y_i$ , devoted to food;  $\alpha$  and  $\beta$  are parameters to be estimated. For those households whose expenditures are just equal to the food poverty line ( $y_i = z^f$ ), the food share is  $\alpha$ , and consequently the non-food share of expenditures is  $(1 - \alpha)$ . Thus the absolute poverty line is

$$z = z^f (2 - \alpha) \quad (3.1b)$$

The advantage of this method is that there is no need for detailed data on household consumption but only requires data on prices and the caloric content of food items. The implementation of this approach poses a number of problems, however. There is some degree of arbitrariness in defining basic needs and there is usually no cross sectional price data that is complete and/or reliable hence achieving consistency may be difficult (Ravallion & Bidani 1994).

### 3.1.1.2 Food Energy Intake (FEI)

This is the main alternative to the CBN method and proceeds by finding the consumption expenditure or income level at which a person's food energy intake is just sufficient to meet a predetermined food energy requirement, 2250 Kcal. This is analogous to the cost of producing a given level of output in production theory (Mwabu et al 2000). This method basically measures consumption poverty rather than undernutrition (see Ravalliion and Bidani 1994).

This method proceeds by estimating the following cost-of-calories function:

$$\ln X_j = \alpha + \beta C_j + \varepsilon, \quad (3.2a)$$

where  $X_j$  is the food expenditure for household  $j$  and  $C_j$  is the caloric consumption for household  $j$ , both per adult equivalent per month.  $\varepsilon$  is the error term. The above equation gives the expected value of caloric intake at a given value of total consumption and can be estimated for different homogeneous groups or regions. The log-linear specification for equation (3.2a) gives increasing costs per calorie at an ever-increasing rate, as suggested by the Engel's law (Greer & Thorbecke 1986).

Estimation of equation (3.2a) poses the serious econometric problem of endogeneity as calories may be correlated with the error term and this may lead to biased parameter estimates if not taken care of. To avert this problem we assume a household utility function that is weakly separable in food and other goods such as housing, education and clothing (see Mwabu et al 2000; Varian 1992). This assumption weakens the feedback relationship between calories and food expenditure such that food budgets are set to achieve optimal calorie intake which does not change from one budgeting period to the next (Mwabu et al 2000).

If  $R$  is the recommended calorie requirement, which is the same for all groups or regions, then inverting this line produces the total consumption expenditure at which a person typically attains the stipulated food energy requirement within each group or region. The food poverty line is therefore given as

$$z_f = e^{(\hat{\alpha} + \hat{\beta}R)} \quad (3.2b)$$

where  $\hat{\alpha}$  and  $\hat{\beta}$  are the estimated coefficients from (3.2a). A person is identified as food poor if that person's food expenditure is less than the food poverty line (see Ravallion & Bidani 1994; Greer & Thorbecke 1986, cited in Dukuly unpub.). The advantages of this method are that data requirements are modest, there is no need for prices and does not require estimation of food and non-food poverty lines separately. The problem with this

method however, is that it does not generally deliver consistent comparisons (Ravallion & Bidani 1994).

To estimate the overall poverty line, we use the following quadratic equation;

$$\ln C_j = \phi_0 + \phi_1 \ln TE + \phi_2 \ln TE^2 + \xi \quad (3.2c)$$

where

$\ln C_j$  = natural log of Kcal per adult equivalent per month;

$\ln TE$  = natural log of total household expenditure per adult equivalent per month;

$\xi$  = the disturbance term and  $\phi$ 's are parameters to be estimated.

Equation (3.2c) is a quadratic Engel curve from which we derive the overall poverty line after estimation of its parameters. From this equation, we get the level of income required to reach 2250 Kcal per adult equivalent per day which automatically include an allowance for non-food items (Ravallion & Bidani 1994; Mwabu et al 2000).

In estimating the poverty line using either the CBN or the FEI method involves inherent value judgements and hence there is no perfect poverty line as argued by Bidani et al (2001). So in this study we opt to estimate the poverty lines using the CBN approach mainly because this method gives consistent poverty estimates and hence preferable when the poverty profile is intended to inform policies aimed at reducing absolute poverty (see Ravallion & Bidani 1994).

### 3.1.2 Foster-Greer-Thorbecke (FGT) Measures of Poverty

Having estimated the poverty lines, the poverty measures are then estimated for each region and then aggregated to the national level. The widely used measure is the FGT measure proposed by Foster, Greer and Thorbecke (1984). The general form of the FGT measure for household  $j$  can be written as

$$P_{\alpha, j} = \left( \frac{z - y_i}{z} \right)^\alpha \cdot I, \quad \alpha \geq 0 \quad (3.3)$$

where  $I$  is an indicator function that takes the value 1 if  $y_i < z$  and the value 0 if  $y_i \geq z$ . Poverty in a population of  $n$  households with  $q$  poor households (having income no greater than  $z$ ) is calculated as

$$P_\alpha = \frac{1}{n} \sum_{i=1}^q \left( \frac{z - y_i}{z} \right)^\alpha \quad (3.4)$$

This measure satisfies the following axioms;

- a) *Monotonicity axiom*: Ceteris paribus, a reduction in the income of a poor household must increase the poverty measure.
- b) *Transfer axiom*: Ceteris paribus, a pure transfer of income from a poor household to any other household that is richer must increase the measure
- c) *Transfer sensitivity axiom*: If a transfer  $t > 0$  of income takes place from a poor household with income  $y_i$  to a poor household with income  $y_i + d (d > 0)$ , then the magnitude of the increase in poverty must be smaller for larger  $y_i$ .

Equation (3.4) is additively decomposable with population share weights (Foster, Greer & Thorbecke 1984). If the population is divided into  $J$  sub groups or regions of households  $j = 1, \dots, J$  with ordered income vectors  $y_j$  and population sizes  $n_j$  then the poverty level in each sub-group or region is calculated as

$$P_{\alpha, j} = \frac{1}{n_j} \sum_{i=1}^{q_j} \left( \frac{z_j - y_i}{z_j} \right)^\alpha \quad (3.5)$$

where

- $P_{\alpha, j}$  = poverty measure for a given value of FGT parameter in subgroup/region  $j$ ;
- $y_i$  = total expenditure of household  $i$  per adult equivalent  $i = 1, \dots, n_j$  in subgroup/region  $j$ ;
- $z_j$  = poverty line for subgroup/region  $j$ <sup>13</sup>;
- $n_j$  = total number of households (poor and non-poor) in subgroup/region  $j$ ;

<sup>13</sup> If the poverty line is fixed over space, the  $j$  subscript is not required as the line is the same in all regions. Similarly, in the case of social groups, the  $j$  subscript is valid only if the profile is region specific, otherwise the poverty line would be constant across subgroups.

$q_j$  = total number of poor households in subgroup/region j.

The regional/subgroup poverty measures,  $P_{\alpha,j}$ , can be added up to get the original poverty measure,  $P_\alpha$ , using the following expression

$$P_\alpha = \sum_{j=1}^J \left( \frac{n_j}{N} \right) P_{\alpha,j} \quad (3.6)$$

where N is the overall population; and all other notations are explained as before. Equation (3.6) states that the national poverty measure,  $P_\alpha$  (the headcount index for example), is the weighted sum of headcount indexes for all the subgroups/regions, with weights being population shares of respective regions/subgroups of the overall population (Mwabu et al 2000).

The poverty headcount index and the poverty gap are obtained when  $\alpha = 0$  and 1, respectively. The headcount index gives the proportion of individuals or households below the poverty line. The poverty gap measures the shortfall of the average income of the poor relative to the poverty line and estimate the amount of resources needed to bring the poor out of absolute poverty. The poverty severity is obtained when  $\alpha = 2$  and measures inequality among the poor themselves.

## 3.2 Model Specification

### 3.2.1 The Probit Model

This study adopts the methodology utilized by Alemayehu et al (2005) and employs the probit model<sup>14</sup>, to explain why some households are poor and others are not.

We assume that the probability of an individual being poor or non-poor is determined by an underlying response variable that captures the true economic status of an individual. The logit and probit models can be derived from an underlying *latent variable model* that

---

<sup>14</sup> The probit and logit models generally give similar results in practice (Greene 2003).

satisfies the classical linear model assumptions. Let  $y^*$  be an unobserved, or *latent*, variable that captures the true economic well-being of an individual, determined by

$$y^* = \mathbf{x}'\beta + e, \quad y = 1[y^* > 0], \quad (3.7)$$

where the notation  $1[\cdot]$  is used to define the binary outcome and is called the *indicator function*, which takes the value one if the event in brackets occurs (i.e. if an individual is poor), and zero otherwise (i.e. if the individual is not poor).

We assume that  $e$  is independent of  $\mathbf{x}$  and that it follows the standard normal distribution.  $e$  is symmetrically distributed about zero. Therefore from (3.7) and the assumptions given, we can derive the response probability for  $y$ :

$$\begin{aligned} P(y = 1 | \mathbf{x}) &= P(y^* > 0 | \mathbf{x}) \\ &= P(e > -\mathbf{x}'\beta | \mathbf{x}) \\ &= 1 - G(-\mathbf{x}'\beta) \\ &= G(\mathbf{x}'\beta) \end{aligned} \quad (3.8)$$

where  $G$  is the standard normal cumulative distribution function for  $e$ .

The outcome of the binary response models is Bernoulli distributed, the binomial distribution with just one trial, with probabilities given in (3.8). To obtain the maximum likelihood estimator, conditional on explanatory variables, we need the probability mass function of  $y_i$  given  $\mathbf{x}_i$ , which is given by:

$$f(y_i | \mathbf{x}_i) = [G(\mathbf{x}_i, \beta)]^{y_i} [1 - G(\mathbf{x}_i, \beta)]^{1-y_i}, \quad y_i = 0, 1 \quad (3.9)$$

The log-likelihood function for observation  $i$  is given by

$$\ln L_i(\beta) = y_i \ln[G(\mathbf{x}_i, \beta)] + (1 - y_i) \ln[1 - G(\mathbf{x}_i, \beta)] \quad (3.10)$$

For a random sample of size  $n$ , the log-likelihood function is given as

$$\ln L_n(\beta) = \sum_{i=1}^n \{y_i \ln[G(\mathbf{x}_i, \beta)] + (1 - y_i) \ln[1 - G(\mathbf{x}_i, \beta)]\} \quad (3.11)$$

Since the study is going to use the probit model, the relevant specification is

$$P(y = 1 | \mathbf{x}_i) = G(\mathbf{x}_i' \beta) = \Phi(\mathbf{x}_i' \beta) = \int_{-\infty}^{\mathbf{x}_i' \beta} \phi(z) dz \quad (3.12)$$

where  $\phi(z)$  is the standard normal density function of  $G(\cdot)$ ,  $\phi(z) = (1/\sqrt{2\pi}) \exp(-z^2/2)$ .

The  $\mathbf{x}_i$  are the characteristics of the households/individuals and these include household size, age of the household head, gender of the household head (a dummy variable that takes the value 1 if male and zero otherwise), highest level of education completed by household head (no education, primary, secondary, vocational, teacher/technical training, and university or higher education). The other variables will include the household head main income source, the proportion of working household members, time taken to fetch drinking water, source of drinking water, time it takes to reach the nearest public transport, the nearest primary school and the nearest health clinic or hospital.

We are going to estimate equation (3.11) with the maximum likelihood (ML) technique and therefore use equation (3.12) to get the probabilities of a given household being poor. The effect of the explanatory variables on the probability of being poor (marginal effects) will be calculated as follows:

$$\frac{\partial P(y = 1 | \mathbf{x}_i)}{\partial x_j} = \phi(\mathbf{x}_i' \beta) \beta_j, \quad (3.13)$$

where  $x_j$  is a continuous variable.

$$\frac{\partial P(y = 1)}{\partial x_1} = \Phi(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k) - \Phi(\beta_0 + \beta_2 x_2 + \dots + \beta_k x_k), \quad (3.14)$$

where  $x_1$  is the binary regressor.

$$\frac{\partial P(y = 1)}{\partial x_k} = \Phi(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k (c_k + 1)) - \Phi(\beta_0 + \beta_2 x_2 + \dots + \beta_k c_k) \quad (3.15)$$



where  $x_i$  is a discrete variable (such as the number of household members in a given household).

### 3.2.2 The Ordered Probit Model

To explain why some population sub-groups are non-poor, poor or extremely poor, the ordered probit model is favoured over the DOGEV to estimate the relevant probabilities because we do not have a software program or a command to estimate it in STATA 9. As argued by Alemayehu et al (2005), this approach is justifiable because we explicitly make the ordering of the population sub-groups using total/absolute and food poverty lines as cut-off points in a cumulative distribution of expenditure. Our poverty identification process is displayed in Appendix Figure 1.

Let  $y$  (the observed economic status of the household) be an ordered response variable taking on values  $\{0,1,2\}$ . The ordered probit model can be derived from latent variable model,  $y^* = \alpha + \mathbf{x}_i\beta + e$ , where also  $\alpha_1, \alpha_2$  are unknown cut-off points (or threshold parameters). For a 3-alternative ordered model, we define

$$\begin{aligned} y = 0 & \text{ if } y^* \leq \alpha_1 \text{ (Hard-core poor)} \\ y = 1 & \text{ if } \alpha_1 < y^* \leq \alpha_2 \text{ ("Moderate" poor)} \\ y = 2 & \text{ if } y^* > \alpha_2 \text{ (Non poor),} \end{aligned} \tag{3.16}$$

where  $\alpha_0 = -\infty$  and  $\alpha_3 = \infty$ .

Given the standard normal assumption for  $e$ , the response probabilities are (see Wooldridge 2002; Greene 2003).

$$\begin{aligned} P(y = 0 | \mathbf{x}) &= P(y^* \leq \alpha_1 | \mathbf{x}) = P(\mathbf{x}_i\beta + e \leq \alpha_1 | \mathbf{x}) = \Phi(\alpha_1 - \mathbf{x}_i\beta) \\ P(y = 1 | \mathbf{x}) &= P(\alpha_1 < y^* \leq \alpha_2) = \Phi(\alpha_2 - \mathbf{x}_i\beta) - \Phi(\alpha_1 - \mathbf{x}_i\beta) \\ P(y = 2 | \mathbf{x}) &= P(y^* > \alpha_2) = 1 - \Phi(\alpha_2 - \mathbf{x}_i\beta) \end{aligned} \tag{3.17}$$

To derive the likelihood function for the ordered probit model, define  $M$  selection variables  $z_{im} = 1(y_i = m)$ , for  $m=1, \dots, M$ . Then, the likelihood contribution for the  $i$ th observation in the sample can be written as;

$$\begin{aligned}
l_i &= \prod_{m=1}^M \Pr(y_i = m | \mathbf{x}_i)^{z_{im}} \\
&= \prod_{m=1}^M [\Phi(\alpha_m - \mathbf{x}_i\beta) - \Phi(\alpha_{m-1} - \mathbf{x}_i\beta)]^{z_{im}}
\end{aligned} \tag{3.18}$$

and the likelihood for n observations therefore becomes

$$l = \prod_{i=1}^n \prod_{m=1}^M [\Phi(\alpha_m - \mathbf{x}_i\beta) - \Phi(\alpha_{m-1} - \mathbf{x}_i\beta)]^{z_{im}} \tag{3.19}$$

Finally, taking logarithms, we come to the log-likelihood function which can be maximized to estimate the ML coefficients,  $\alpha_1, \alpha_2$  and  $\beta$ :

$$l = \sum_{i=1}^n \sum_{m=1}^M z_{im} \ln[\Phi(\alpha_m - \mathbf{x}_i\beta) - \Phi(\alpha_{m-1} - \mathbf{x}_i\beta)]. \tag{3.20}$$

The marginal effects of changes in the regressors are

$$\begin{aligned}
\frac{\partial P_0(\mathbf{x})}{\partial \alpha_k} &= -\beta_k \phi(\alpha_1 - \mathbf{x}_i\beta) \\
\frac{\partial P_1(\mathbf{x})}{\partial \alpha_k} &= \beta_k [\phi(\alpha_1 - \mathbf{x}_i\beta) - \phi(\alpha_2 - \mathbf{x}_i\beta)] \\
\frac{\partial P_2(\mathbf{x})}{\partial \alpha_k} &= \beta_k \phi(\alpha_2 - \mathbf{x}_i\beta)
\end{aligned} \tag{3.21}$$

### 3.3 Data Type and Source

The study uses the household level, cross sectional data from the Lesotho Household Budget Survey (LHBS) 2002/03. The 2002/03 Household Budget Survey is a nationwide income and expenditure survey, which was conducted under the National Household

Survey Capacity Program (NHSCP) over a 12-month period to capture seasonal variations.

### *3.3.1 Sampling Procedure for the 2002/03 HBS*

The 10 administrative districts of Lesotho are always regarded as the sampling frame of the study in the surveys conducted by Bureau of Statistics (BOS). Within districts there are agro-ecological zones which experience different climatic conditions and are regarded as strata. Stratification is also done by urban and rural.

The Sample design for the 2002/2003 Household Budget Survey is a two-stage sample design. The first stage sampling units or the Primary Sampling Units (PSU's) are the Enumeration Areas (EA's) and were selected with probability proportional to size (pps). The number of households within the psu serves as a size measure. The Second Stage Sampling units (SSU's) are the households. They are selected systematically within the selected PSU.

A total of 253 EA's were selected; 105 from the rural areas, selected from different ecological zones in each district, and 148 from the urban areas in each district, and an additional 25 EA's were included, making a total of 278 EA's. From these EA's, a sample size of 6882 households were sampled, 1260 of them from the Lowlands, 630 from the Foothills, 846 from the Mountains and 378 from the Senqu River Valley.

### *3.3.2 Information Collected*

The HBS 2002/03 collected information on the household characteristics; such as the number of household members, the place of residence, age, sex and marital status of the household head, education of the household head; the economic activities of the household head such as main occupation; the main source of income of the household; household related business; type of house of the household; household access to services; possession of durable goods and land and farm assets; household expenditures and income and transfers.

The data for 2002/03 food prices proved difficult to get in time so we resorted to the 2008 average prices for the month of April, which were collected by the Lesotho Bureau of

Statistics (BOS). We then used both the April 2003 and February 2008 national Consumer Price Index (CPI) data for food and non-alcoholic beverages commodities, all from the BOS, to estimate their prices as of April 2003<sup>15</sup>.

The information on calorie contents of foods consumed by households (which we used to derive monthly calorie-intake per adult equivalent) was obtained from various sources; West et al 1988, Mwabu et al 2000, and <http://www.csudh.edu/oliver/chemdata/food-comp.htm>. The equivalence scales used were adopted from Anzagi and Bernard as cited in Greer and Thorbecke (1986) and Mwabu et al (2000). The scales do not distinguish between males and females nor adjust for economies of scale. Persons aged 0-5 years have been assigned a weight of 0.24, those aged 6-14 a weight of 0.65 and those aged 15 years or more have been assigned a weight of 1.00.

---

<sup>15</sup> April 2003 was arbitrarily chosen to best estimate prices for the 12 months during which the data was collected

## CHAPTER FOUR: DATA ANALYSIS AND EMPERICAL RESULTS

### 4.1 Introduction

In this chapter, we analyze the HBS data at household level. The analytic national sample consists of 5992 households because some households were deleted from the original sample of 6882 households due to missing data or outlier data. The chapter starts by giving some descriptive statistics of the sample and then proceeds by giving the poverty profiles and determinants.

### 4.2 Descriptive Statistics

#### 4.2.1 Sample Distribution by Region and Zone

From Tables 4.1 and 4.2, it can be seen that, of the 5992 households sampled, 48.9 percent of them were selected from the rural areas and 51.1 percent form the urban areas due to the high representation of the mostly urban Maseru district (17.8 percent), compared to all other districts in the sample. About 11.8 percent of the sampled households come from Maseru urban region while all other urban regions are represented by 39.3 percent, as indicated in Figure 4.1 below.

**Table 4.1 Urban-Rural Distribution of the Sample**

Urban/Rural	Frequency	Percent (%)
Rural	2,929	48.9
urban	3,063	51.1

Source: 2002/03 HBS Data

Though the data does not give the proportions of urban households living in different zones, Figure 4.1 shows that about 18.9 percent of households reside in rural lowlands, 15.3 percent in rural mountains, 9.7 percent in rural foothills and only 5 percent reside in rural Senqu River valley.

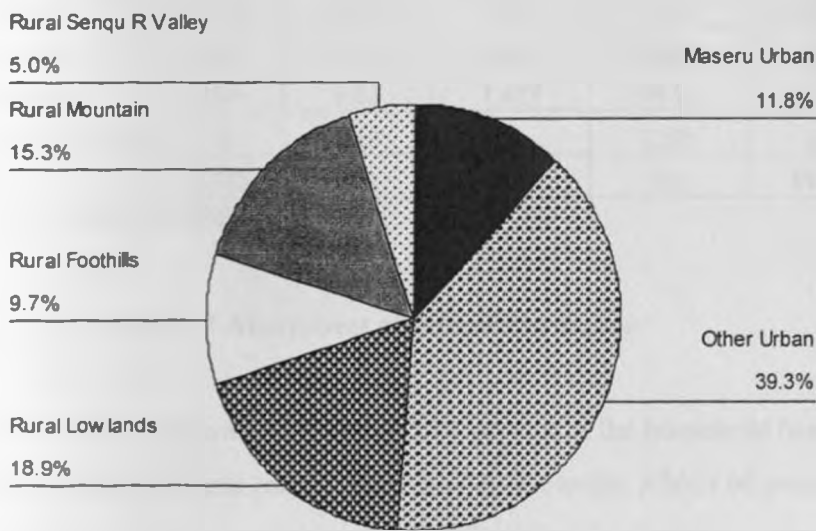
**Table 4.2 Sample Distribution by District**

	Frequency	Percent	Cumulative Percent
Butha-Buthe	567	9.5	9.5
Leribe	848	14.2	23.6
Berea	620	10.3	34.0
Maseru	1069	17.8	51.8
Mafeteng	656	10.9	62.8
Mohale's Hoek	536	8.9	71.7
Quthing	514	8.6	80.3
Qacha's Nek	341	5.7	86.0
Mokhotlong	410	6.8	92.8
Thaba-Tseka	431	7.2	100.0
Total	5992	100.0	

Source: 2002/03 HBS Data

**Figure 4.1 Sample Distribution by Region and Zone**

**Distribution of Household Heads by Region & Zone**



Source: Computed from 2002/2003 HBS Data

#### 4.2.2 Sample Demographic Characteristics

Table 4.3 below shows that men constitute 64.3 percent of the sample compared to 35.7 percent for women. This means that most households are male-headed. The Table also indicates that, of all the household heads, 7.1 percent of them have never married, 54.9 percent are married, 9.3 percent are divorced, 28.1 percent are widowed and only 0.6 percent of them are living together, that is those who are cohabiting. Most of male household heads, 81.37 percent, are married while 5.76 percent and 6.83 percent of them are divorced and widowed respectively. On the other hand, only 7.25 percent of all female household heads are in marriage and a majority (66.53 percent) are widowed. This shows that in Lesotho, most of the household decisions are made by men since they are mostly household heads.

**Table 4.3 Household Heads' Marital Status by Gender**

Marital Status	Male		Female		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
<i>Never married</i>	214	5.55	214	10	428	7.1
<i>Married</i>	3,135	81.37	155	7.25	3290	54.9
<i>Divorced</i>	222	5.76	333	15.57	555	9.3
<i>Widowed</i>	263	6.83	1,423	66.53	1686	28.1
<i>Living together</i>	19	0.49	14	0.65	33	0.6
<b>Total</b>	<b>3,853</b>	<b>100</b>	<b>2,139</b>	<b>100</b>	<b>5992</b>	<b>100</b>

Source: 2002/03 HBS Data

#### 4.2.3 Educational Attainment of Household Heads

From Table 4.4 below, we find that 54.3 percent of the household heads has no education at all and 18.1 of them can not even read and/or write. About 66 percent of those without education are men, indicative of the fact that in Lesotho, men's education was/is considered wasteful, especially in rural areas, since they have to herd their families' livestock or are normally considered as prospective mine workers in South African mines. A significantly high percent, 28.3, of household heads has only primary education and 9.7 percent has up to secondary education. Only 1.8 percent of household heads has

vocational education and 3.7 percent has teacher/technical education. Only 2.2 percent of household heads has university education and a majority of them, about 76 percent, are men. This indicates that a majority of household heads in Lesotho are uneducated hence this dictates that they either have to be self-employed or do petty jobs in the informal sector.

**Table 4.4 Educational Attainment of Household Heads by gender**

Educational attainment	Male		Female		Total	
	Freq	Percent	Freq	Percent	Freq	Percent
<i>None</i>	811	21.05	273	12.76	1,084	18.09
<i>None but can read/write</i>	1,324	34.36	846	39.55	2,170	36.21
<i>Primary</i>	1,014	26.32	680	31.79	1,694	28.27
<i>Secondary</i>	406	10.54	173	8.09	579	9.66
<i>Vocational</i>	68	1.76	42	1.96	110	1.84
<i>Teacher/technical</i>	130	3.37	94	4.39	224	3.74
<i>University/higher</i>	99	2.57	31	1.45	130	2.17
<i>Missing</i>	1	0.03	0	0	1	0.02
<b>Total</b>	<b>3,853</b>	<b>100</b>	<b>2,139</b>	<b>100</b>	<b>5,992</b>	<b>100</b>

Source: 2002/03 HBS Data

Table 4.5 below shows educational attainment of household heads by region of residence. Most of the educated household heads, i.e. those with university education and teacher/technical education, reside in urban areas and Maseru urban has the second highest number of most educated household heads (24 percent) after other urban regions (65 percent). On the other hand, of all the uneducated household heads, i.e. those who have not received any formal education, the highest proportion, 28 percent, of them live in the other urban regions and Maseru urban has the lowest percentage, 5 percent. However, the rural mountain regions have the highest percentage (38 percent) of those without any education and can not read and/or write.



**Table 4.5 Educational Attainment of Household Heads by Region**

Region	Educational attainment							Total
	None	None, read/write	primary	secondary	Vocational	Teacher	University	
<i>Maseru urban</i>	27	135	281	154	28	32	52	709
<i>Other urban</i>	172	725	800	349	77	161	70	2,354
<i>Rural lowland</i>	237	562	273	39	1	17	4	1,133
<i>Rural foothill</i>	160	277	120	15	1	4	1	579
<i>Rural mountain</i>	416	330	150	14	2	5	2	919
<i>Rural Senqu river valley</i>	72	141	70	8	1	5	1	298
<b>Total</b>	<b>1,084</b>	<b>2,170</b>	<b>1,694</b>	<b>579</b>	<b>110</b>	<b>224</b>	<b>130</b>	<b>5,992</b>

Source: 2002/03 HBS Data

#### 4.2.4 Household Heads' Main Economic Activity

From Table 4.5 below, only 0.37 percent of household heads has indicated that they are themselves employers, a majority 37.27 percent are employed with salary and 20.49 percent are subsistence farmers. About 8.78 percent of household heads are self-employed in various sectors of the economy. The remaining 33 percent of household heads are not in any paid job. Of all those who are not in any paid jobs, 0.72 percent are unpaid family workers, 0.78 percent are students, 2.9 percent are retired and 1.67 percent are disabled. About 8.18 percent of them have declared themselves as unemployed and a significant 16.64 percent are house-makers or housewives, which may be an indication of the proportion of those households that are dependent on the younger members of the households, i.e. children.

**Table 4.6 Economic Activity of Household Heads**

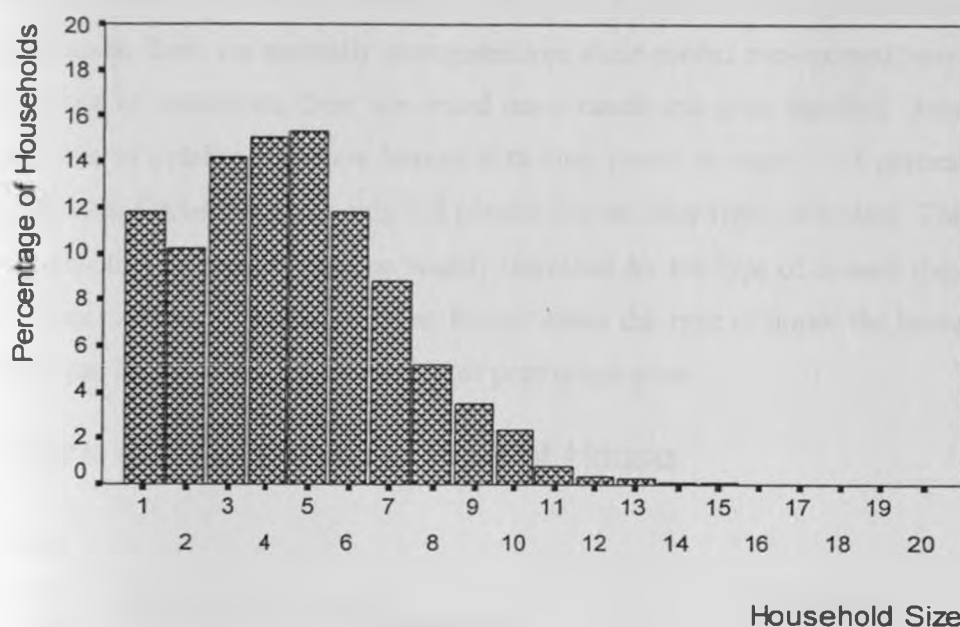
<b>Economic Activity</b>	<b>Frequency</b>	<b>Percent</b>
<i>Employer</i>	22	0.37
<i>Employed with salary</i>	2,233	37.27
<i>Subsistence farmer</i>	1,228	20.49
<i>Other self-employment</i>	526	8.78
<i>Unpaid family worker</i>	43	0.72
<i>Pupil/student</i>	47	0.78
<i>Retired</i>	174	2.9
<i>Disabled</i>	100	1.67
<i>Unemployed</i>	490	8.18
<i>Housemaker/housewife</i>	991	16.54
<i>Other</i>	137	2.29
<i>Missing</i>	1	0.02
<b>Total</b>	<b>5,992</b>	<b>100</b>

Source: 2002/03 HBS Data

#### **4.2.5 Household Size**

Figure 4.2 below shows that close to 16 percent of households have 5 household members, about 15 percent have 4 members and 14 percent have 3 members. A significant percentage of households (12 percent) are comprised of single members and these can either be those individuals who are widowed, divorced, orphaned children, or never married. The percentage of households with more members declines steadily as the household size increases beyond 5 members to up to 15 members. There are households with 16 to 18 members, although the percentage of those is significantly small. Since there is no variable showing the number of working household members, this household size distribution may also tell us something about the dependency ration in Lesotho. Assuming that the household head is the sole breadwinner, the average dependency ration is between 1:4 and 1:6.

Figure 4.2 Household Size Distribution



Source: 2002/03 HBS Data

#### 4.2.6 Household Housing and Services

Table 4.6 below shows the number of those households who are living in rented or their own houses. This Table indicates that only 16.2 percent of the households are living in rented house while the majority, 83.8 percent live in their own houses. This actually reflects the reality in Lesotho where almost every household, more especially in rural areas, has some piece of land given by the village chief without charge or at a very small fee, for those coming from outside the village, to build their homes. Hence it is rare to find people living in rented houses in rural areas, where the majority of the population lives.

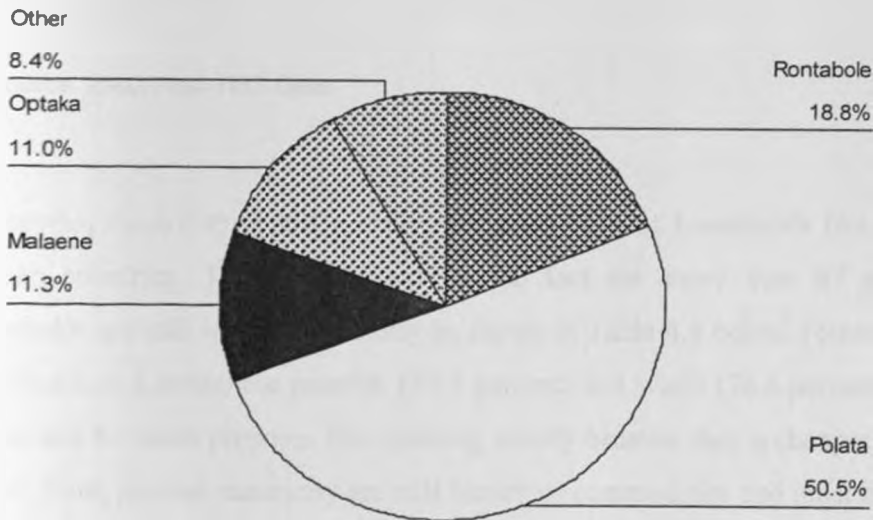
Table 4.7 Households living in rented dwellings

	Frequency	Percent	Cumulative Percent
Rented Dwelling	968	16.2	16.2
Unrented Dwelling	5024	83.8	100
<b>Total</b>	<b>5992</b>	<b>100</b>	

Source: 2002/03 HBS Data

Figure 4.3 below shows the type of the house the household is living in. Most of the households live in permanent structures. About 50.5 percent of the households live in polata houses, these are normally corrugated iron sheet-roofed two-roomed houses; 18.8 percent live in rontaboles, these are round one-roomed and grass thatched houses; 11.0 percent live in optakas, these are houses with three rooms or more; 11.3 percent live in rented houses (malaene) while only 8.4 percent live in other types of houses. This shows that in Lesotho the poor cannot be readily identified by the type of houses they live in like in most African countries such as Kenya where the type of house the household is living in can help classify the household as poor or not poor.

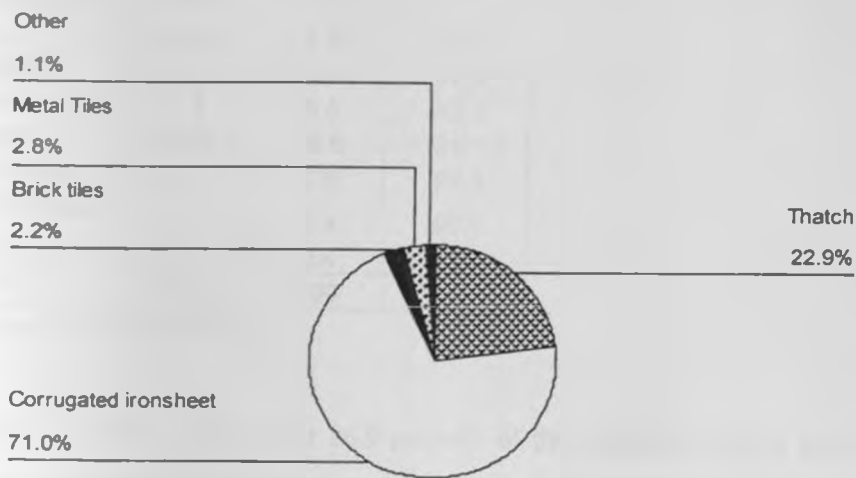
Figure 4.3 Household's Type of House



Source: 2002/2003 HBS Data

Figure 4.4 shows the main roofing material of the house of the household. Most of the households, 71.0 percent, live in corrugated iron sheet-roofed houses and 22.9 percent live in grass thatched houses. Roofing material, like the type of house a household lives in, offers little help in classifying households as poor and non poor in absolute terms but can give useful clues of relative poverty of the household.

Figure 4.4 Main Roofing Material of the House



Source: 2002/2003 HBS Data

In Lesotho, electricity is still a luxury for a majority of households like in many poor African countries. This is indicated by the fact the more than 87 percent of the households are still without electricity as shown in Table 4.8 below. Hence a majority of households in Lesotho use paraffin (38.7 percent) and wood (38.6 percent) to heat their homes and for other purposes like cooking, mostly because they are cheaper, see Table 4.8 below. Coal, gas and electricity are still luxurious commodities and most households can not afford to buy them and this explains their little use in heating houses.

Table 4.8 Households supplied with electricity

	Frequency	Percent	Cumulative Percent
Households with Electricity	760	12.7	12.7
Households without Electricity	5232	87.3	100
<b>Total</b>	<b>5992</b>	<b>100</b>	

Source: 2002/03 HBS Data

**Table 4.9 Source of Heating the House**

	Frequency	Percent	Cumulative Percent
Electricity	238	4	4
Gas	309	5.2	9.1
Paraffin	2318	38.7	47.8
Coal	316	5.3	53.1
Wood	2315	38.6	91.7
Cow dung	453	7.6	99.3
Crop waste	22	0.4	99.6
Other	21	0.4	100
<b>Total</b>	<b>5992</b>	<b>100</b>	

Source: 2002/03 HBS Data

Table 4.10 below shows that 26.9 percent of the households have piped water in their premises while 42.1 percent get water from the community water taps. 9.2 percent of the households get water from public wells, 1 percent from private wells, 4.3 percent from boreholes, 4.8 and 8.8 get it from covered and uncovered springs respectively. A negligible 0.3 percent of households get their drinking water from the rivers.

**Table 4.10 Household's Source of Water**

	Frequency	Percent	Cumulative Percent
Piped water on premises	1612	26.9	26.9
Piped community water	2522	42.1	69
Catchment tank	67	1.1	70.1
Public well	550	9.2	79.3
Private well	61	1	80.3
Covered spring	289	4.8	85.1
Uncovered spring	529	8.8	94
River	16	0.3	94.2
Borehole	256	4.3	98.5
Other	90	1.5	100
<b>Total</b>	<b>5992</b>	<b>100</b>	

Source: 2002/03 HBS Data

### 4.3 The Poverty Lines and Poverty Profiles

"A poverty profile is simply a special case of a poverty comparison, showing how poverty varies across sub-groups of society, such as region of residence or sector of employment" (Ravallion 1994, p.59-60 cited in Mwabu et al 2000). Under this section, we explain how we calculated the CBN poverty line and depict poverty profiles for Lesotho by region of residence (rural, urban, district), by gender, educational achievement, marital status and by main economic activity of the household head. As in Mwabu et al (2000), the presentation follows "type A" format, i.e. we report poverty measures (headcount index, poverty gap and severity) for each subgroup distinguished by some characteristic such as area of residence.

#### 4.3.1 The Cost-of-Basic-Needs (CBN) Poverty Lines<sup>16</sup>

As explained in chapter three, section 3.1.1.1, the CBN poverty line is the cost of a consumption bundle considered adequate for basic consumption needs. To identify our basic food basket, we ranked the households in an ascending order using food expenditure per month per adult equivalent and identified those households in the first quintile of the per adult equivalent expenditure distribution. These are 1199 households who spend M23.94<sup>17</sup> or less per month per adult equivalent. We then identified the 15 food items that are most commonly consumed by those households and these are listed in Appendix I, Table 1.1.

The food poverty line was therefore calculated as follows. We added up the calorie intake per month per adult equivalent of all poor households for each food item and then divided each food item calorie intake by 1199 to get the average calorie intake per month per adult equivalent. These are calories obtained by a representative poor household who is able to buy an average of each food item in the national food basket per month. The calories were then scaled to obtain the required Kcal 2250 per day per adult equivalent

<sup>16</sup> The Food Energy Intake poverty lines are reported in Appendix I Table 1.6 for comparison purposes.

<sup>17</sup> Lesotho currency is Maloti (M) and it is pegged at 1:1 with the South African Rand (R). M7.89=US\$1 as per 27/06/2008

and costed using the price of each food item to arrive at the M100.04 poverty line (see Appendix I, Table 1.2).

To get the absolute poverty line, we estimated equation (3.1a) and the estimated equation was found to be

$$s_i = 0.5581328 - 0.0897265 \log\left(\frac{y_i}{100.04}\right)^{18} \quad (4.1)$$

Then using equation (3.1b) the absolute poverty line was calculated as

$$z = 100.04(2 - 0.5581328) = M144.24$$

Therefore, each household had to spend M144.24 per month per adult equivalent in order to buy a consumption bundle considered adequate for basic consumption needs (food plus non-food basic consumption needs) in 2002/2003. A household that spend less than M144.24 per month per adult equivalent is considered to be absolutely poor. On the other hand, each household had to spend M100.04 per month per adult equivalent for it to buy the basic food basket in 2002/2003 and any household that spent less than this amount in 2002/2003 is considered to be food poor.

Our poverty lines are not that much different from the ones calculated by the BOS. Table 4.11 below compares our poverty lines and poverty measures.

**Table 4.11: Own and BOS Poverty Figures**

		Food Poverty Line	Absolute Poverty Line
<b>Own Figures</b>	Poverty Line (Maloti)	100.04	144.24
	Headcount Index (%)	41.56	54.27
	Poverty Gap (%)	21.38	29.57
	Poverty Severity (%)	13.94	20.11
<b>BOS Figures</b>	Poverty Line (Maloti)	84.41	149.91
	Headcount Index (%)	na	56.61
	Poverty Gap (%)	na	28.97
	Poverty Severity (%)	na	18.73

Source: Own poverty indices were computed from HBS Data; na= not available; BOS figures come from [www.bos.gov.ls](http://www.bos.gov.ls)

<sup>18</sup> See regression results in Appendix I Table 1.3



It can be seen from the Table 4.11 that our own computations and those of the BOS are not significantly different. According to BOS, 56.6 percent of the population was absolutely poor as of 2002/2003 while our figures show that about 54.3 percent of the population was absolutely poor at that time. BOS also found that the poor were, on average, 29.0 percent below the absolute poverty line while we found that they were 29.6 percent below the absolute poverty line. These differences may be due to the fact that our food basket is different to the one used by BOS and also the fact that we used the estimated April 2003 prices while BOS has probably used the actual prices which might be slightly different.

### 4.3.2 Regional Poverty

Tables 4.12 and 4.13 show regional variations in poverty measures by areas of residence. Table 4.12 displays both food and absolute poverty rates by district while Table 4.13 shows food and absolute poverty rates in rural and urban areas. In computing the district poverty rates, we assumed that the cost of basic needs is the same in all districts and that all districts have a common preference.

**Table 4.12: Household Food and Absolute Poverty Rates by Regions (Districts)**

District	Sample Size	Food Poverty Rates (Line = M100.04)			Absolute Poverty Rates (Line= M144.24)		
		Headcount (P0)	Poverty Gap (P1)	Severity (P2)	Headcount (P0)	Poverty Gap (P1)	Severity (P2)
Botha-Bothe	567	46.56	24.40	15.84	61.02	33.71	22.92
Leribe	848	45.52	24.29	16.06	58.73	32.84	22.76
Berea	620	46.61	22.58	13.62	60.65	32.13	20.96
Maseru	1069	32.46	17.60	11.94	43.87	24.06	16.69
Mafeteng	656	36.28	16.86	10.30	52.13	25.21	16.03
Mohale's Hoek	536	47.20	25.67	17.44	59.33	34.21	24.13
Quthing	514	41.63	21.29	13.86	51.75	29.02	19.93
Qacha's Nek	341	50.73	25.37	16.54	64.52	35.01	23.87
Mokhotlong	410	43.90	21.84	14.46	54.39	30.39	20.75
Thaba-Tseka	431	33.87	17.34	11.40	45.01	24.10	16.37
<b>National</b>	<b>5992</b>	<b>41.56</b>	<b>21.38</b>	<b>13.94</b>	<b>54.27</b>	<b>29.57</b>	<b>20.11</b>

Source: Computed from 2002/2003 HBS Data

From Table 4.12 above, using both food and absolute poverty rates, Qacha's Nek appears to be the most impoverished district with more than half of its residents (50.7 percent) being "hard-core"<sup>19</sup> poor and about 64.5 percent being absolutely poor. Maseru district on the other hand appears to be the least poor district using both food and absolute poverty rates. In Maseru, 32.3 percent of households cannot afford the basic food basket and 43.9 percent cannot afford the basic consumption bundle (food plus non-food commodities) per month.

Using the food poverty rates, Mohale's Hoek appears to be the second most food poor and most unequal district. 47.2 percent of households in Mohale's Hoek can not afford to buy the basic food bundle per month and are 25.7 percent below the food poverty line. This means that in order to help these households escape hard-core poverty, they need to be given about M25.70 each. Qacha's Nek is the second most unequal district as indicated by the food poverty gap of 25.4 percent and Mafeteng is the least unequal district with food poverty gap of 16.9 percent. Poverty severity is highest in Mohale's Hoek district (24.1 percent) seconded by Qacha's Nek with the severity index of 23.9 percent. On the other hand, Mafeteng, Thaba-Tseka and Maseru districts have the lowest poverty severity indices of 16.0, 16.4, and 16.7 percent respectively.

Using the absolute poverty rates to rank the district in a descending order, Qacha's Nek is the most poor with 64.5 percent of its households living in absolute poverty, second is Botha-Bothe with 61.0 percent, Berea comes third with 60.7 percent, fourth is Mohale's Hoek with 59.3 percent and Leribe is fifth with 58.73 percent of its households living in absolute poverty. The mountainous districts of Thaba-Tseka and Mokhotlong appear to be less poor than the largely lowland and foothill districts of Berea, Botha-Bothe and Leribe. Thaba-Tseka is the second least poor district with 45.0 percent of moderately poor households and Mokhotlong is sixth most poor district with 54.4 percent of households living in absolute poverty.

---

<sup>19</sup> This is the term used by Alemayehu et al (2005) to refer to those households who cannot afford to buy the basic food basket, i.e. those who are food poor.

Table 4.13 below shows rural-urban poverty rates using region specific absolute poverty lines and Table 4.14 uses the national absolute poverty line. We assumed that the basket of basic food items costs the same amount of Maloti in both rural and urban regions, M100.04. We then examined the consumption behaviour of those households who can just afford the reference food basket in both rural and urban areas to get the region specific absolute poverty lines. We found that the rural households spent more on non-food goods (M45.65) than do the urban households (M42.05). Hence a rural household needs M145.69 in order to escape absolute poverty while an urban household requires a slightly lower M142.09 to be out of absolute poverty.<sup>20</sup> This may be due to the fact that non-food commodities such as clothes tend to be more expensive in rural areas.

**Table 4.13: Household Food and Absolute Poverty Rates by Regions (Rural-Urban)**

Region	Sample Size	Food Poverty Rates (National Poverty Line=M100.04)			Absolute Poverty Rates (Region-Specific Poverty Lines)		
		Headcount (P0)	Poverty Gap (P1)	Severity (P2)	Headcount (P0)	Poverty Gap (P1)	Severity (P2)
Rural	2929	56.09	30.49	20.51	68.97	40.7	28.77
Urban	3063	27.65	12.66	7.66	39.57	18.89	11.85
<b>National</b>	<b>5992</b>	<b>41.56</b>	<b>21.38</b>	<b>13.94</b>	<b>53.94</b>	<b>29.55</b>	<b>20.12</b>

Source: Computed from 2002/2003 HBS Data

**Table 4.14: Household Food and Absolute Poverty Rates by Regions (Rural-Urban) using the National Poverty line (M144.24)**

Region	Sample Size	Absolute Poverty Rates (National Poverty Line= M144.24)		
		Headcount (P0)	Gap (P1)	Severity (P2)
Rural	2929	68.69	40.41	28.53
Urban	3063	40.48	19.2	12.06
<b>National</b>	<b>5992</b>	<b>54.27</b>	<b>29.57</b>	<b>20.11</b>

Source: Computed from 2002/2003 HBS Data

<sup>20</sup> The regression results of the estimated the behaviour of urban and rural households are in Appendix I Tables 1.4 and 1.5.

### 4.3.3 Household Poverty Rates by Gender of Head

Table 4.15 below shows the poverty rates by gender of household head. It is clear from this Table that poverty is more pronounced in female-headed households using any measure. About 44.6 percent of female-headed households are food-poor and are, on average, 23.0 percent below the food poverty line of M100.04, compared to 39.9 percent of food-poor male-headed households who are 20.5 percent below the food poverty line. The same pattern is still witnessed using the absolute poverty rates. 56.7 percent of female-headed households are absolutely poor compared to 53.0 percent of male-headed households and the poor female-headed households are far below the overall poverty line (31.6 percent) than poor male-headed households who are 28.5 percent. Poverty is also more severe among female-headed households.

**Table 4.15: Poverty by Gender of Household Head**

Gender	Sample Size	Food Poverty Rates (National Line=M100.04)			Absolute Poverty Rates (Line=M144.24)		
		Headcount (P0)	Poverty Gap (P1)	Severity (P2)	Headcount (P0)	Poverty Gap (P1)	Severity (P2)
Male	3853	39.89	20.5	13.36	52.95	28.47	19.31
Female	2139	44.55	22.97	14.98	56.66	31.55	21.56
<b>National</b>	<b>5992</b>	<b>41.55</b>	<b>21.38</b>	<b>13.94</b>	<b>54.27</b>	<b>29.57</b>	<b>20.11</b>

Source: Computed from 2002/2003 HBS Data

### 4.3.4 Poverty Rates by Household Head's Marital Status

From Table 4.16 below, we find that widowed household heads are the most poor of all the households using any measure. About 50.6 percent of widowed household heads are hard-core poor and 63.7 percent of them are absolutely poor. Households headed by never married heads are the least poor (food poor and absolutely poor) seconded by those households headed by those in "living together" marriage settings (i.e. cohabiting). Of all those headed by married heads, 52.8 percent of them are absolutely poor and these households are the third most impoverished. Both the poverty depth and severity are more pronounced among widow-headed households and less so in never-married-headed households.

**Table 4.16: Poverty Rates by Head's Marital Status**

Marital Status	Sample Size	Food Poverty Rates (National Line=M100.04)			Absolute Poverty Rates (Line=M144.24)		
		Headcount (P0)	Poverty Gap (P1)	Severity (P2)	Headcount (P0)	Poverty Gap (P1)	Severity (P2)
Never Married	428	28.27	14.13	9.08	36.45	19.53	13.22
Married	3290	39.30	20.11	13.17	52.77	28.10	19.02
Divorced	555	38.02	19.12	12.17	48.65	26.63	17.91
Widowed	1686	50.59	26.55	17.37	63.70	36.08	24.85
Living Together	33	36.36	14.84	8.45	48.48	23.36	14.20

Source: Computed from 2002/2003 HBS Data

### 4.3.5 Poverty Rates by Head's Educational Attainment

Table 4.17 below shows us the pattern that goes well with expectations. Poverty is very high in households headed by illiterate and less educated heads. 70.7 percent of households headed by households with no education, and cannot even read or write, are poor compared to only 14.6 percent of poor households headed heads with university education. This highlights the importance of education in fighting poverty, although there are still pockets of poverty even among the most educated household heads.

**Table 4.17: Household Poverty Rates by Head's Educational Attainment**

Educational Attainment	Sample Size	Food Poverty Rates (National Line=M100.04)			Absolute Poverty Rates (Line=M144.24)		
		Headcount (P0)	Poverty Gap (P1)	Severity (P2)	Headcount (P0)	Poverty Gap (P1)	Severity (P2)
None	1085	59.63	33.62	23.3	70.69	43.58	31.54
None but can Read/write	2170	49.86	25.68	16.5	63.82	35.24	23.97
Primary	1694	35.36	17.24	10.94	48.64	24.88	16.35
Secondary	579	18.13	7.71	4.48	29.36	12.54	7.48
Vocational	110	11.82	3.38	1.63	23.64	7.95	3.73
Teacher/Technical	224	14.29	5.92	3.34	27.23	10.35	5.86
University/Higher	130	9.23	4.07	2.78	14.62	6.36	4.08

Source: Computed from 2002/2003 HBS Data

### 4.3.6 Poverty Rates by Main Economic Activity of Household Head

From Table 4.18 below, we find that households headed by subsistence farmers are the most poor (72.1 percent), even more than those headed by those who reported to be unemployed (64.6 percent). This may be due to the harsh weather conditions which have disrupting the planting seasons in recent years therefore making the subsistence farmers to incur huge losses on their investments. Those unemployed include student heads, retired heads, housewives, unpaid family workers, disabled heads, and those who reported other economic activity.

**Table 4.18: Household Poverty Rates by Head's Main Economic Activity**

Economic Activity	Sample Size	Food Poverty Rates (National Line=M100.04)			Absolute Poverty Rates (Line=M144.24)		
		Headcount (P0)	Poverty Gap (P1)	Severity (P2)	Headcount (P0)	Poverty Gap (P1)	Severity (P2)
Employer	22	31.82	17.67	12.01	36.36	22.94	16.47
Employed with Salary	2233	24.85	10.85	6.47	37.17	17.02	10.46
Subsistence Farmer	1228	60.1	32.51	21.93	72.07	42.94	30.41
Other Self-Employment	526	31.18	14.26	8.36	47.34	22.17	13.6
Unemployed	1983	51.74	28.26	18.89	64.55	37.46	26.38

Source: Computed from 2002/2003 HBS Data

### 4.4 Determinants of Poverty

Since poverty is a multidimensional phenomenon, it has many causes and both absolute and food poverty have been attributed to lack of physical assets (e.g. land) and human assets (e.g. education) among other causes such as gender, poor sanitation and water supply (see World Bank 1997 cited in Mwabu et al 2000). As argued by Mwabu et al (2000), there is need to re-estimate poverty effects of these factors for specific countries because their magnitudes and signs might be affected by country specific institutions like social safety nets, even though these have been estimated in a number of developing countries (see Alemayehu et al 2005; Datt & Jolliffe 1999; Fissuh & Harris 2004).

In our analysis, we include a comprehensive list of explanatory variables which may be grouped into the following categories: *property-related*, such as amount of land in hectares and what we call productive livestock and other livestock holding; *household characteristics*, such as age, gender, educational attainment, household size, main economic activity; and *others*, such as time spent fetch drinking water from the nearest source, time spent to the nearest public transport, time spent to the nearest clinic/hospital, place of residence of the household (rural, urban or a particular district) etc (see Table 4.19).

**Table 4.19: Definition of Variables used in the Probit and Ordered Probit Models**

Variables	Definition
<b>Dependent Variable</b>	
Poverty	POOR=1 if poor, 0 otherwise. Poverty estimate based on Household consumption per adult equivalent
<b>Explanatory Variables</b>	
Age	Age of household head in years
Age Squared	Age Squared of Household head
Household size	Household size
Land	Amount of land owned in hectares
Area of residence	Area= 1 if in Rural and zero otherwise
Sex	Sex=1 if male, 0 otherwise
Main Economic Activity of Household Head	Activity=1 if Employer, 0 otherwise Activity=1 if Subsistence Farmer, 0 otherwise Activity=1 if Self-Employed, 0 otherwise Activity=1 if Unemployed, 0 otherwise
Educational Attainment of Household Head	Education=1 if no education but can read/write, 0 otherwise Education=1 if Primary, 0 otherwise Education=1 if Secondary, 0 otherwise Education=1 if Vocational, 0 otherwise Education=1 if Teacher, 0 otherwise Education=1 if University, 0 otherwise
Marital Status of Household Head	Status=1 if Never married, 0 otherwise Status=1 if Divorced, 0 otherwise Status=1 if Widowed, 0 otherwise Status=1 if Living together, 0 otherwise

Other ways of earning money by Household Head	Way=1 if as employed/contracted, 0 otherwise Way=1 if through Small Business, 0 otherwise Way=1 if through any other way, 0 otherwise
Household main source of Income	Source=1 if from private sector, 0 otherwise Source=1 if from farming, 0 otherwise Source=1 if from Household business, 0 otherwise Source=1 if pensions, 0 otherwise Source=1 if Remittances, 0 otherwise Source=1 if other source, 0 otherwise
Household member involved in business	Equal to 1 if Household member in business, 0 otherwise
Household pays rent for the dwelling	Equal to 1 if pays rent, 0 otherwise
Household Has Electricity	Equals 1 if connected, 0 otherwise
Household water source	Water=1 if from piped community tap, 0 otherwise Water=1 if from catchment tank, 0 otherwise Water=1 if from public well, 0 otherwise Water=1 if from private well, 0 otherwise Water=1 if from a covered spring, 0 otherwise Water=1 if from uncovered spring, 0 otherwise Water=1 if from river, 0 otherwise Water=1 if from borehole, 0 otherwise Water=1 if from other sources, 0 otherwise
Household Source of heat for the dwelling	Heat=1 if Gas, 0 otherwise Heat=1 if Paraffin, 0 otherwise Heat=1 if Coal, 0 otherwise Heat=1 if Wood, 0 otherwise Heat=1 if Cow dung, 0 otherwise Heat=1 if Crop waste, 0 otherwise Heat=1 if other heat source, 0 otherwise
Household's type of Toilet	Toilet=1 if Sewage system toilet, 0 otherwise Toilet=1 if Pit latrine, 0 otherwise Toilet=1 if VIP, 0 otherwise Toilet=1 if Bucket system, 0 otherwise Toilet=1 if Shared toilet, 0 otherwise Toilet=1 if Other toilet, 0 otherwise
Household garbage disposal	Disposal=1 if to street container Disposal=1 if dumped Disposal=1 if Burned, 0 otherwise Disposal=1 if Buried, 0 otherwise Disposal=1 if other forms, 0 otherwise
Household farm equipment	Number of farm assets
Household productive livestock	Number of farm -productive livestock (Cattle, donkeys, horses)
Household's other livestock	Number of other livestock (Chicken, pigs, sheep, goats)
Household ownership of bank account	Account=1 if the household has a bank account, 0 otherwise



Time taken to fetch drinking water	Equals 1 if less than 30 minutes, 0 otherwise
Time taken to the nearest public transport	Equals 1 if less than 30 minutes, 0 otherwise
Time taken to the nearest primary school	Equals 1 if less than 30 minutes, 0 otherwise
Time taken to the nearest Health center	Equals 1 if less than 30 minutes, 0 otherwise
District Dummies	Botha-Bothe Leribe Berea Mafeteng Mohale's Hoek Quthing Qacha's Nek Mokhotlong Thaba-Tseka

Note: The omitted category for Main Economic activity is "Employed"; for education is "None"; for Marital Status is "Married"; for Other ways of earning money is "No way"; for Main Source of Income is "Public Sector"; for Water Source is "Piped water on premises"; for Heat Source is "Electricity"; for Toilet is "No Toilet"; for Garbage Disposal is "Collected by Truck"; for District Dummies is "Maseru".

#### 4.4.1 Binomial Probit Model

Table 4.20 below presents the binomial probit model marginal effects from Stata 9 for determinants of household poverty. The binomial probit model results are presented in Appendix II Table 2.1. Since the 2002/2003 HBS data is a product of a complex survey design (multi-stage sampling procedure), we avoided the use of common estimation procedure that assumes that the data being analyzed constitute a simple random sample and used the estimation commands for survey data available in Stata 9 in order for us to get the robust standard errors to correct for the complex survey design factor.<sup>21</sup>

The 2002/2003 HBS data has two strata (rural and urban areas) and within each stratum, there are primary sampling units (these are villages or towns of residence) totalling 249. We therefore made use of the household weights instead of the population weights since our analysis is at household level.

<sup>21</sup> See Carolina Population Center (CPC) for the strengths and limitations of the survey commands.

**Table 4.20: Marginal Effects of the Binomial Probit for Consumption per Adult  
Equivalent Model: National Sample**

<b>Marginal effects after svy: probit</b>		
y = Pr(POOR) (predict)		
= 0.54513638		
<b>Variable</b>	<b>dy/dx</b>	<b>z</b>
Age	0.0016893	0.57
Age Squared	0.0000121	0.44
Household size	0.0417784*	11.16
Land	0.0022712	0.45
Area of Residence: RuralID*	-0.0425036	-1.63
Sex: MaleD*	-0.0102767	-0.41
<b>Main Economic Activity:</b> Employer*	-0.0372824	-0.32
: Subsistence Farmer*	0.0642426***	1.88
: Self Employed*	0.0289966	0.8
: Unemployed*	0.057281**	2.26
<b>Educational Attainment:</b> None but can read/write*	-0.0013017	-0.06
: Primary*	-0.0132133	-0.52
: Secondary*	-0.0400733	-1.15
: Vocational*	-0.0264032	-0.41
: Teacher/Technical*	-0.0190415	-0.39
: University*	-0.1402476***	-1.93
<b>Marital Status:</b> Never Married*	-0.0157058	-0.44
: Divorced*	-0.0030616	-0.1
: Widowed*	0.0050945	0.18
: Living Together*	0.0287766	0.28
<b>Other ways of earning:</b> As Employed/Contracted*	0.0581362**	2.04
: Running Small Business*	0.0162609	0.41
: Through Other Ways*	-0.0133328	-0.49
<b>Main Source of Income:</b> Private Sector employment*	0.0304441	1.14
: Farming*	0.1366058*	4.21
: Household Business*	0.087**	2.07
: Pension*	0.039185	0.79
: Remittances*	0.0979637*	3.03
: Other source*	0.1704513*	5.12
Household member involved in business*	-0.0362567	-1.37
Household pays rent for the dwelling*	-0.0220447	-0.85
Household Has Electricity*	-0.1053613*	-3.56
<b>Household water source:</b> Piped community tap*	0.1426455*	6.31
: Catchment Tank*	0.1065802***	1.73
: Public well*	0.0920257*	2.61
: Private Well*	0.0934006	1.37
: Covered Spring*	0.0761663***	1.78
: Uncovered Spring*	0.0550523	1.38
: River*	-0.1910355	-1.16
: Borehole*	0.093613*	2.65

: Other sources*	0.0452319	0.77
<b>Household Source of heat for the dwelling: Gas*</b>	-0.0124754	-0.19
: Paraffin*	0.00803	0.13
: Coal*	0.0175254	0.26
: Wood*	0.1401011**	2.22
: Cow Dung*	0.1681197*	2.67
: Crop Waste*	0.4091281*	7.91
: Other Source*	0.1341597	1.05
<b>Household's type of Toilet: Sewage system*</b>	-0.0248465	-0.41
: Pit Latrine*	-0.0223714	-0.9
: VIP*	-0.0160417	-0.62
: Bucket system*	0.0236574	0.14
: Shared Toilet*	-0.1068143*	-2.88
: Other Toilet*	0.0267061	0.3
<b>Household garbage disposal: Street container*</b>	-0.1870735**	-2.14
: Dumped*	-0.0844387	-1.27
: Burned*	-0.1000918	-1.53
: Buried*	-0.1179764	-1.6
: Other forms of disposal*	-0.2469981*	-2.58
Household's farm equipment	-0.0101824***	-1.66
Household's productive livestock	-0.0016292	-1.1
Household's other livestock	-0.0000797	-0.72
Household has a bank account*	-0.1296423*	-7.08
Household is less than 30 min from drinking water source*	-0.0106792	-0.39
Household takes less than 30 min to the nearest Public Transport*	-0.0148229	-0.6
Household takes less than 30 min to the nearest Primary School*	0.0158812	0.79
Household takes less than 30 min to the nearest Health Center*	-0.0227144	-1.13
<b>District of residence: Botha-Bothe*</b>	0.0493682	1.24
: Leribe*	0.0785689**	2.34
: Berea*	0.0405843	0.98
: Mafeteng*	0.0144521	0.38
: Mohale's Hoek*	0.0471076	1.25
: Quthing*	-0.055282	-1.21
: Qacha's Nek*	0.0646202	1.25
: Mokhotlong*	-0.013603	-0.27
: Thaba-Tseka*	-0.147009**	-2.53

(\*) dy/dx is for discrete change of dummy variable from 0 to 1

Note: \*, \*\*, \*\*\* indicates significance levels at 1, 5 and 10 percent level, respectively.

The results show that households with more members are more likely to be poor than those with few members. A one member increase in the household size increases the probability of a household being poor by 4.2 percent, ceteris paribus. This is because the more members are in the household, there is more money needed in order to buy each

household member the basic basket to be able to attain the required Kcal 2250 per day. Another variable that goes well with prior expectations is that of the main economic activity of household head. The results show that households headed by unemployed heads and subsistence farmers are more likely to be poor than those headed by employed household heads. When the household head gets unemployed, the household becomes 5.7 percent more likely to be poor, while those households headed by subsistence farmers are 6.4 percent more likely to be poor, relative to those headed by employed heads, all other things held constant. The most obvious reasons for this are that it is imperative for each household to have some kind of income in order for it to be able to buy a basket of basic commodities for its members. Moreover, subsistence farming has lately become a risky business because of poor weather conditions and the continued use of less productive traditional farming technologies.

The results also indicate that education is very important in combating poverty. If the household head has some level of education, his/her household is less likely to be poor compared to that headed by an uneducated head. However, the only significant level of education is university education, when using the national sample, and the probability of a household escaping poverty when its head gets university education is 14.0 percent, which is much higher than that of other lower levels of education.

At regional level<sup>22</sup> however, all levels of education are found to be essential for poverty alleviation in urban areas, except for teacher/technical education. Urban households headed by heads with these levels of education; no education but can read and/or write, primary education, secondary education, vocational and university education, are less likely to be poor relative to those households headed by heads with no education and who cannot even read and/or write and the coefficients are all significant. Teaching/technical education and university education are very important for poverty alleviation in rural areas but surprisingly, the results indicate that household heads headed by heads with secondary education are more likely to poor while the same level of education reduces poverty in urban areas.

---

<sup>22</sup> The probit model estimates for urban and rural areas are presented in Appendix II.

Household heads who engage in other jobs, especially those who get part-time employment/contracts, apart from the main economic activity are more likely to get their households into poverty than those who do not engage in other jobs. This may be an indication that for those household heads who do other jobs over and above their main economic activity may be doing so to cater for the increasing needs of their families but the increase in family income also induce expensive tastes which force households to spend more than they would otherwise do without this “other-job” income. This may also be an indication that most of the household heads who do more than one job are poor.

Farming is shown to be an impoverishing economic activity. Households whose main sources of income are farming, household business, remittances, and other sources are more likely to be poor than those whose main income source is the public sector employment. When the household head gets into farming instead of being employed in the public sector, the household becomes 13.7 percent more likely to be poor, which is much higher than when the household relies on remittances (9.8 percent) and household business (8.7 percent). Households whose main income source is from “other sources” are 17.0 percent more likely to be poor than those employed by the public sector. This may be because income from the public sector employment is more stable and more predictable than that from these other sources hence households can be able borrow to meet their current expenditures even during difficult times while it may prove difficult for those relying on other sources of income.

Rural households relying on pensions are more likely to be poor than their counterparts whose main source of income is private sector employment. Most of the pensioners in rural areas are retired mine workers<sup>23</sup> who mostly tend to hold on to their expensive tastes, developed during their working times, even when they are no longer working and this may explain their higher risk of being poor.

---

<sup>23</sup> Before the introduction of the Old-Age Pension scheme in 2004, most pensioners in Lesotho comprised retired civil servants and retired mine-workers, most of whom live in rural areas.

Electricity and easy access to water are some of the most important national poverty determinants. Households with electricity are less likely to be poor than those who do not have electricity and when the household gets connected to electricity, the probability of it being poor declines by about 10.5 percent. This is because electricity makes business easy and hence households may engage in small income-generating businesses to bridge their expenditure gaps. Electricity is however more important for urban poverty than it is for rural poverty. (See Appendix II for urban and rural poverty determinants).

Those households who get water from outside their houses, i.e. from community taps, public wells, springs, and boreholes, are more likely to be poor than those who have water piped to their premises. When the household get water from a community tap rather than from its own tap on the premises, its probability of falling under the poverty line increases by 14.3 percent, and this probability increases by 9.3 when the household gets water from a public well. This may be due to the time taken collecting water thereby disrupting household's members' engagement in other productive economic activities. Further, households are less likely to rely on these water sources to run their small income-generating businesses than those who have water on their premises.

The source of heating the household dwelling is also an indicator of poverty. Households using wood, cow dung and crop wastes are 14.0 percent, 16.8 percent and 40.9 percent, respectively, more likely to be poor than those who use electricity. The reason might be that firewood, cow dung and crop wastes are becoming very scarce resources nowadays partly because of continuing deforestation and bad weather conditions which discourage farming hence households take a lot of time looking for these sources instead of being engaged in other income-generating activities.

The availability of a toilet is also very important in the lives of many households as the results show that at least those households who use shared public toilets are 10.7 percent less likely to be poor than those who do not have any toilet. Households that burn, bury or use other means to dispose of their garbage are less likely to be poor than those whose garbage is collected. This might be because they do not have to pay any fees for garbage

collection hence money which would have otherwise be used to pay for garbage collection is used to buy basic consumption goods.

Household farm assets such as tractor, ploughing implements, scotch cards, etc seem to reduce poverty may be by helping a household to generate some income either by using them in household farming activities or by renting them. The results indicate that as the number of farm equipment increases by one unit, the probability of a household being poor declines by about 1 percent. Having a bank account is also very important for every household as this decreases the probability of being poor by a massive 13.0 percent. This may be because a bank account enables families to save during good times and withdraw at bad times to cushion the fall in their incomes and hence be able to meet the required cost of the basic basket of commodities.

Looking at the place of residence, Leribe district residents are 7.9 percent more likely to be poor than Maseru residents. On the other hand, residents of Thaba-Tseka district are 14.7 percent less likely to be poor than Maseru residents. This might be because Thaba-Tseka district is among the richest districts in livestock, relative to Maseru district, and this may be a contributing factor in the income generating function of residents of this district. Moreover, because Thaba-Tseka is one the mountainous districts with a lot of bushes, residents may be getting heat sources, firewood, easily and hence do not spend much of their incomes on things like paraffin but rather spend on other basic commodities such as food. This makes more sense when we consider the fact that rural households of Thaba-Tseka and Mokhotlong, which are both mountainous districts, are less likely to be poor than Maseru residents while the results are not significant for urban residents. Households living in urban Maseru's Hoek and Qacha's Nek are more likely to be poor than urban Maseru residents. This may be due to the fact that these districts are among those districts with lowest water and electricity connectivity which are found to be important for urban residents.

#### 4.4.2 Ordered Probit Model

To estimate the ordered probit model, we have ordered our sample into three mutually exclusive categories: hard-core poor (category 0), moderately poor (category 1) and non-poor (category 2), with households in category 0 being most affected by poverty. As in Alemayehu et al (2005), our poverty status classification is based on the absolute poverty and food poverty lines computed from the 2002/2003 Household Budget Survey (HBS).

The ordered probit results, the predicted probabilities of being in any of the three categories and the marginal effects are presented in Appendix II Tables 2.4, 2.5, 2.6 and 2.7. Table 4.21 below shows that the probability of a household in Lesotho being in hard-core poverty is 38.3 percent, that of being moderately poor is 15.9 percent and that of being non-poor is 45.8 percent. Almost all the variable coefficients that are significant in the probit model as determinants of poverty in Lesotho are also significant in the ordered probit model, especially in determining hard-core poverty. As in the probit model, using the national sample, aging and marital status of household-head appear not to be important determinants of poverty in Lesotho as the estimated coefficients are insignificant, even though they are indicative of the fact that aging and not being in marriage increase the probability of being poor (see Table 4.20 above and Appendices).

**Table 4.21: Predicted Probabilities of Being Extremely Poor, Moderately Poor or Non-Poor**

Probabilities of being		
Extremely Poor	Moderately Poor	Non-Poor
0.38327139	0.1588887	0.4578399

Source: Computed from 2002/2003 HBS Data

The ordered probit results also show that poverty determinants are different and have different impacts across the different poverty categories. For example, education variables are found to be insignificant in determining moderate poverty but secondary and university are very significant for determining whether a household becomes hard-



core poor or non-poor. The results also show that an increase of one member in the household increases the probability of being extremely poor by 3.8 percent while having secondary education reduces that likelihood by 5.2 percent and university education reduces it by 12.6 percent.

Further, while farming seems to increase the likelihood of being extremely poor by 12.2 percent, it seems to reduce the probability of being moderately poor, although this is not significant. This, however, highlights the fact that for the hard-core poor, all the anti-poverty initiatives that they might engage in all seem to be some contributing factors to their continuing impoverishment. Electricity has a higher impact on poverty for the extremely poor households than it is for the moderately poor. Having electricity connected to the household's dwelling reduces the likelihood of being in hard-core poverty by 9.0 percent and the likelihood of being in absolute poverty declines by 0.7 percent. The involvement of other household members in business reduces the probability of a household being hard-core poor by 4.2 percent.

Moreover, a unit increase on farm equipment reduces the probability of a household being food poor by 1.2 percent while the probability of being in absolute poverty declines by 0.05 percent. Having a bank account is also very important for the hard-core poor than it is for the moderately poor as it reduces the probability of being food poor by 11.3 percent, for the extremely poor, compared to 0.6 percent, for the moderately poor. Another striking point is that using firewood, cow dung and crop-wastes rather than electricity to heat the dwelling increases the probability of being poor for the hard-core poor but using the same materials, firewood and crop-wastes, reduces the likelihood of poverty for the moderately poor. This might suggest that, for the extremely poor households, time spent looking for either firewood, cow dung or crop waste is very important as could be used for other income generating activities that would enable the household to meet its basic food requirements if it had electricity in its dwelling.

## CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Conclusion

This paper has attempted to explore the nature and determinants of poverty in Lesotho. We have employed both the descriptive analysis, binomial and ordered probit models to analyse the 2002/2003 Household Budget Survey data. The paper has found that poverty in Lesotho poverty is more pronounced in rural areas than in urban areas, among households headed by married heads and among farming households. The mostly dry district of Moleleke's Hoek, the mountainous districts of Qutha's Nek and Botha-Bothe were found to be among the most poorest in Lesotho. Although aging in other countries (for example in Kenya) was found to be an important factor in poverty, we found it to be non-important at both national and regional level.

However, in the probit models, we found that gender, marital status, distance or time taken to the nearest health centre or public transport are not important determinants of poverty, though we have found that poverty is high among female headed households. The amount of land has also been found insignificant in determining poverty though its sign is positive. This is perhaps due to the fact that most households do not plough their land because of unpredictable weather conditions or even when they do plant some crops, they get low yields which do not sustain them for long.

Some of the household characteristics found to have a significant impact on poverty are educational attainment and household size. At national level, university education was found to be the most important while in rural areas having teaching training or technical education and secondary education were found to be most important. However, secondary education in rural areas was found to be increasing the probability of being poor. This might be indicative of the effects of the high costs of high school education in Lesotho and the fact that it is becoming increasingly difficult to get a job with secondary education, especially in rural areas. On the hand, secondary education and university education are very important in reducing the likelihood of being poor in urban areas.

These different effects of secondary education depending on area of residence highlights the easiness of getting a job maybe, in the informal sector, in urban areas relative to rural areas.

Productive livestock (cattle, donkeys and horses) do not have a significant impact on poverty, both at national and regional level (in rural areas). However, other livestock units (poultry, sheep, goats and pigs) were found to have a significant impact on poverty in urban areas not in rural areas. Households who rely mainly on remittances and those headed by pensioners were found to be the likely preys to poverty, especially in rural areas.

Eventhough the results of these paper turned out as expected, we did not address the possible endogeneity between some of the explanatory variables such as household size and marital status, main economic activity and main source of income, etc.

## **5.2 Policy Recommendations**

The results point out a number of policy options to the Government of Lesotho (GoL) which have a direct bearing on both the Vision 2020 and the Millennium Development Goals. In order for the government to effectively tackle both extreme and absolute poverty, there is an urgent need to strengthen farming in order to make it a productive business which households can rely on and hence anchor the economy as it used to be. Since subsistence farming has been a traditional practice, there is reluctance on the part of farmers to adapt to new ways of farming, especially in the face of harsh weather conditions; hence rain-fed farming is still the best way to farm in Lesotho. There is need for government to introduce new farming technologies such drip-irrigation system so as to reduce reliance on rain which is lately highly unpredictable and comes in such amounts that make it impossible to plant, when it does come. This should complement the currently piloted farming system which sort to commercialize Lesotho's agricultural sector. All these will prove futile if the current open-grazing (communal grazing) system

is not modified so as to make it be in harmony with commercial farming. These should be long term solutions to the current food insecurity in Lesotho.

Since poverty in Lesotho is more pronounced in certain regions and social groups, the Government should implement targeted anti-poverty initiatives as this may prove to be the most cost effective way of reducing poverty instead of blanket policies which treat every region and/or social group the same.

As the results have indicated that electricity is essential for poverty reduction, more so for rural communities and the hard-core poor, there is also a need to hasten the rural electrification process. This might help increase job opportunities, mainly self-employment, in rural areas as availability of electricity will make it easy for small entrepreneurs to set up businesses. This will also reduce the time families spent looking for firewood and therefore concentrate on more income-generating activities and more so help reduce deforestation.

Concerning household characteristics, the results show that improvements in education attainment would enhance the standard of living. Though the Government has been consistent and very committed on seeing to it that Basotho get quality education, there is still more that needs to be done. Given that the Government is currently implementing the Free Primary Education (FPE) that seeks to avail education to all school-going children, there must be stringent checks on the quality so as to minimize drop-out rates and enhance primary-to-secondary transition rates. However, the primary-to-secondary transition rates are also likely to be hampered by the high costs of secondary education in Lesotho. Hence there is need to reduce the secondary school fees, especially in Government-funded district high schools, in order to cater for the needy. Moreover, education quality and teaching of market oriented subjects (practical subjects such as wood-work and agriculture) at secondary level should be the Government's major focus so as to enhance income-generating skills of those students who may not proceed to higher education.

Furthermore, a smaller household size and more household's farm equipment also improve the household's welfare. But availability of farm equipment may be futile as long as farming continues to be an impoverishing business. Therefore, for the government of Lesotho to be able to reduce extreme poverty by 2015, which is the first Millennium Development Goal, there is an urgent call to address the problem of increasing household sizes, mainly due to the increasing number of orphans in the country, by setting up a social security fund for those households who look after orphaned children. This will go a long way to reinforce the main purpose of the old-age pension social security by reducing the burden on the pensioners, who do not only cater for themselves with their pensions, but also cater for the grand children who in most cases are orphans.

Ease access to drinking water has proven to be a poverty reducing factor; hence the Government has to speed up the process of availing clean drinking water to every household. The availability of water makes businesses like poultry easier to run and this is supported by the results indicating that other livestock units (sheep, goats and poultry) are poverty reducing in urban areas but this variable is not significant for urban areas. So given high electricity and drinking water connectivity in urban areas relative to rural areas, starting a business is much easier for an urban household than it is for a rural household with similar characteristics. Given that poverty rates are higher in rural areas than in urban areas, a policy that prioritizes rural electrification and water availability will help address the current acute disparities in resource distribution.

The results have also indicated that those households that engage in other businesses (such as running small household businesses) other than their main economic activities are likely to be poor. This calls for policies aimed at strengthening small business owners' business management skills and to protect such businesses against the aggressive, mostly foreign-owned, big businesses. By doing this, the Government will be strengthening households to carry on with those livelihood activities that they can sustain and hence this will be a sustainable poverty alleviating policy.

## REFERENCES

- Alemayehu, G., de Jong, N., Kimenyi, M.S. & Mwabu, G., 2005. Determinants of poverty in Kenya: Household-level analysis. Working Paper 2005-44, Department of Economics, University of Connecticut
- Alkire, S., 2007. Choosing Dimensions: The capability approach and multidimensional poverty. CPRC Working Paper 88
- Bidani, B., Datt, G., Lanjouw, J.O. & Lanjouw, P., 2001. Specifying the Poverty Lines: How and Why? *The presentation delivered at the Asian Pacific Forum on Poverty: Reforming Policies and Institutions for Poverty Reduction*, Asian Development Bank: Manila, 5-9 February 2001
- Buthali, D., 1997. Poverty Measurement in Botswana. *Paper prepared for presentation at seminar on Poverty Statistics in Santiago*, 7-9 May 1997
- Branson, W., 1989. *Macroeconomic Theory and Policy*. New York: HARPER & ROW PUBLISHERS
- Cameron, C.A. & Trivedi, P.K., 2006. *Microeconometrics: Methods and Applications*. New York: Cambridge University Press.
- Carolina Population Center *Stata Tutorial: Commands to Analyse Survey Data*. [Online]. (Updated 01/08/2007) Available at: [www.cpc.unc.edu/services/computer/presentations/statatutorial](http://www.cpc.unc.edu/services/computer/presentations/statatutorial) [Accessed 13 June 2008].
- Central Bank of Lesotho, 2006. *Annual Report for 2005*. [Online]. Available at: [www.centralbank.org.ls](http://www.centralbank.org.ls) [Accessed 10 March 2007]
- Datt, G. & Jolliffe, D., 1999. Determinants of Poverty in Egypt: 1997. FCND Discussion paper no.74, Food Consumption and Nutrition Division, IFPRI, Washington, D.C.
- Duclos, J. & Araar, A., 2006. Poverty and Equity: Measurement, Policy, and Estimation with DAD. In J. Silber, ed. *Economic Studies in Inequality, Social Exclusion and Well-Being*. [e-book]. New York & Ottawa: Springer & International Development Research Centre. Available at: [http://www.idrc.ca/en/ev-97152-201-1-DO\\_TOPIC.html](http://www.idrc.ca/en/ev-97152-201-1-DO_TOPIC.html) [Accessed 23 April 2008]

- Duclos, J., Araar, A. & Fortin, C., n.d. *DAD 4.4: A Software for Distributive Analysis /Analyse Distributive*. MIMAP programme, International Development Research Centre, Government of Canada and CRÉFA, Université Laval.
- Dukuly, M., 2007. An Assessment of Urban Household Poverty in Liberia: A Case Study. MA Research Paper, School of Economics, University of Nairobi.
- Elbadawi, I. & Milante, G., 2006. Growth, Income Inequality and Poverty in Africa. *Poverty, Growth and Institution: AERC Senior Policy Seminar VII, Seminar Papers*. Nairobi: African Economic Research Consortium, pp. 27-45
- Fissuh, E. & Harris, M., 2004. Determinants of Poverty in Eritrea: A Household Level Analysis. Working Paper No. 364, Econometric Society 2004 Australasian Meetings, Econometric Society
- Foster, J., 1998. Absolute versus Relative Poverty. *The American Economic Review*, 88(2), pp. 335-341
- Foster, J., Greer, J. & Thorbecke, E., 1984. A Class of Decomposable Poverty Measures. *Econometrica*, 52(3), pp. 761-765
- Greene, W.H., 2003. *Econometric Analysis*. 5<sup>th</sup> ed. New Jersey: Prentice Hall
- Kimalu, P., Nafula, N., Manda, D.K., Mwabu, G. & Kimenyi, M.S., 2001. A Situational Analysis of Poverty in Kenya. KIPPRA Working Paper No.6
- Kingdom of Lesotho, 2004. *Poverty Reduction Strategy: 2004/2005 – 2006/2007* [Online]. Available at: <http://www.finance.gov.ls/documents/prs.php> [Accessed on 15 January 2008].
- Lesotho Bureau of Statistics, 2008. *Consumer Price Indices for February 2008*. [Online]. Available at: [www.bos.gov.ls/economics/prices.htm](http://www.bos.gov.ls/economics/prices.htm). [Accessed 15 May 2008].
- Levine, S., 2006. Measuring Progress towards Global Poverty Goals: Challenges and Lessons from Southern Africa. *The African Statistical Journal*, 3, pp. 89-110
- Meng, X., Gregory, R. & Wan, G., 2007. Urban Poverty in China and its Contributing Factors, 1986-2000. *Review of Income and Wealth*, 53(1), pp. 167-189
- Mwabu, G., Masai, W., Gesami, R., Kirimi, J., Ndeng'e, G., Kiriti, T., Munene, F., Chemengich, M. & Mariara, J., 2000. Poverty in Kenya: Profiles and Determinants. A collaborative Research Project between the University of Nairobi and the Ministry of Finance and Planning, Nairobi.

- Mwabu, G., 2006. Human Capital Investment, Growth and Poverty Reduction in Sub-Saharan Africa. *Poverty, Growth and Institutions: AERC Senior Policy Seminar VII, Seminar Papers*, Nairobi: African Economic Research Consortium, pp. 81-98
- Minujin, A., Delamonica, E., Gonzalez, E.D. & Davidziuk, A., 2005. Children Living in Poverty: A review of child poverty definitions, measurements, and policies. *Desk Review paper for UNICEF's Conference on "Children & Poverty: Global Context, Local Solutions"* [Online]. Available at: [http://www.unicef.org/policvanalysis/files/child\\_poverty\\_final\\_draft\\_4\\_05.pdf](http://www.unicef.org/policvanalysis/files/child_poverty_final_draft_4_05.pdf) [Accessed 25 April 2008]
- Omole, D.A., 2003. Poverty in Lesotho: A Case Study and Policy Options. *Revised paper submitted to the Lesotho Social Science Review*. [Online]. Available at: <http://www.gdnet.org/fulltext/omole.pdf> [Accessed 03 October 2007]
- Ravallion, M. & Bidani, B., 1994. How Robust is a Poverty Profile? *The World Bank Economic Review*, 8(1), pp. 75-102
- Ravallion, M., 1998. Poverty Lines in Theory and Practice. Living Standards Measurement Study, Working Paper No. 133
- Simler, K.R., & Arndt, C., 2007. Poverty Comparisons with Absolute Poverty Lines Estimated from Survey Data. *Review of Income and Wealth*, 53(2), pp. 275-294
- The National Economic Council of Malawi et al., 2001. The Determinants of Poverty in Malawi, 1998: An Analysis of the Malawi Integrated Household Survey, 1997-98. [Online]. Available at: [http://www.nso.malawi.net/data\\_on\\_line/economics/ihs/determinants\\_of\\_poverty.pdf](http://www.nso.malawi.net/data_on_line/economics/ihs/determinants_of_poverty.pdf) [Accessed 12 December 2007]
- United States Department of Agriculture, *Composition of Foods*. [Online]. Available at: <http://www.csudh.edu/oliver/chemdata/foodcomp.htm>. [Accessed 10 June 2008]
- Varian, H.R., 1992. *Microeconomic Analysis*. 3<sup>rd</sup> Ed. New York: W.W. Norton & Company
- Wagle, U., 2002. *Rethinking Poverty: Definition and Measurement*. [Online]. UNESCO, Oxford: Blackwell Publishers, Available at: <http://www.blackwell-svnerg.com/doi/pdf> [Accesses 22 February 2008].
- Wason, D. & Hall, D., n.d. Poverty in Lesotho 1993 to 2002: An overview of Household Economic Status and Government Policy. CPRC Working Paper No.



40 [Online] Available at: [www.chronicpovertv.org/cp40.htm](http://www.chronicpovertv.org/cp40.htm) [Accessed 09 September 2007].

West, C.E., Pepping, P. & Temalilwa, C.R. eds., 1988. *The Composition of Foods Commonly Eaten in East Africa*. Wageningen: Wageningen Agricultural University

Wooldridge, J.M., 2002. *Econometric Analysis of Cross Section and Panel Data*. Massachusetts: The MIT Press

Wooldridge, J.M., 2006. *Introductory Econometrics: A Modern Approach*. 2<sup>nd</sup> Ed. Massachusetts: The MIT Press

World Bank Institute, 2005. *Introduction to Poverty Analysis*. [Online]. Available at: <http://siteresources.worldbank.org/PGLP/Resources/povertvmanual.pdf> [Accessed on 15 February 2008].

## APPENDICES

### APPENDIX I

Appendix Table 1.1

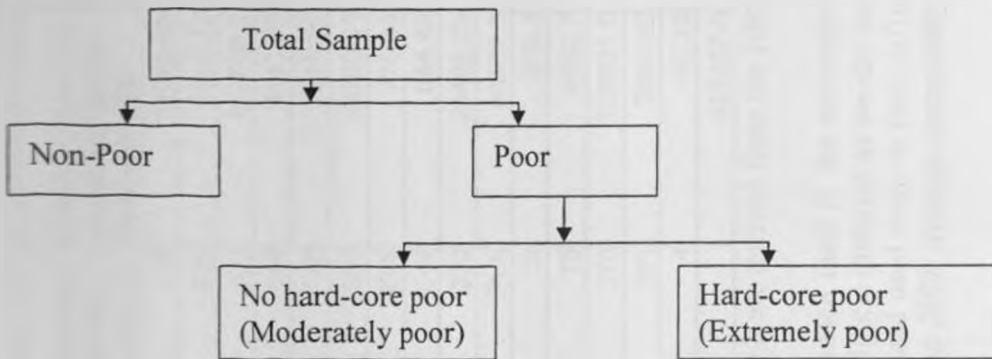
Food Items Commonly Consumed by Households in the First Quintile of the Expenditure Distribution (Expenditure is in Maloti per Month per Adult Equivalent)

Food Item	Households Purchasing the Food Item (%)
Bread	16%
Wheat Flour	10%
Maize meal	100%
Poultry	11.50%
Eggs (Chicken)	17%
Cooking oil	35.11%
Apple	10%
Orange	9%
Dry Beans	13%
Cabbage	100%
Tomato	14%
Potatoes	12%
Sugar	50%
Biscuits	9%
Tea	13%

Source: Computed from the Household Budget Survey Data, 2002/2003

Note: This is the national food basket and was applied to all regions (only food items consumed by at least 9% of households were included in the basket).

Figure1: A Nested Structure of Poverty Status



Source: Nesting Structure adopted from Alemayehu et al (2005)

**Appendix Table 1.2: Monthly Food Expenditure Line per Adult Equivalent (Cost-of-Basic-Needs Approach)**

Food Item (1)	Calories per 100 grams (2)	Calorie Intake per month per Adult Equivalent (3)	Average Calorie Intake/Adult Equivalent (4)	Calorie Intake as a ratio of Total Intake (5)	Calories Recommended/Adult Equivalent (6)	Quantity needed to meet monthly calories (7)	Maloti per Qty at 2003 prices (8)	Food Expenditure needed to meet calories (Maloti) (9)
Bread	235	18045.65	15.05	0.0411	92.39	0.39	3.05	1.2
Wheat Flour	335	4432.72	3.7	0.0101	22.69	0.07	38.53	2.61
Maize meal	335	117856.2	98.3	0.2682	603.4	1.8	25.41	45.77
Poultry	140	4141.25	3.45	0.0094	21.2	0.15	16.69	2.53
Eggs (Chicken)	140	2216.56	1.85	0.005	11.35	0.08	14.98	1.21
Cooking oil	900	86360.91	72.03	0.1965	442.15	0.49	9.71	4.77
Apple	63.9	725.94	0.61	0.0017	3.72	0.06	4.67	0.27
Orange	44	844.49	0.7	0.0019	4.32	0.1	3.82	0.38
Dry Beans	320	24460.25	20.4	0.0557	125.23	0.39	4.07	1.59
Cabbage	31.9	65332.3	54.49	0.1487	334.49	10.49	3.04	31.88
Tomato	22	870.4	0.73	0.002	4.46	0.2	4.38	0.89
Potatoes	75	4352.7	3.63	0.0099	22.29	0.3	3.2	0.95
Sugar	375	106931.6	89.18	0.2433	547.47	1.46	3.5	5.11
Biscuits	381	2850.69	2.38	0.0065	14.6	0.04	5.93	0.23
Tea	4	45.78	0.04	0.0001	0.23	0.06	11.22	0.66
<b>Total</b>		<b>439467.5</b>	<b>366.53</b>		<b>2250</b>			<b>100.04</b>

Note: Columns 1-3 are derived from the HBS data; col4=col3/1199; col5=col4/366.53; col6=2250\*col5; col7=col6/col2; col8=given; col9=col8\*col7

Source: The approach used in the estimation of the CBN food poverty was adopted from Mwabu et al (2000). However, the two approaches are slightly different as we did not convert the food quantities into the same measure, e.g. kilograms, as done by Mwabu et al (2000) but instead used them in their different measures, e.g. grams, kilograms and millilitres, as we got them from the 2002/2003 HBS data and the 2008 average commodity prices data from BOS. Despite this difference, the two methods produce the similar results.

**Appendix Table 1.3: Estimating the National Absolute Poverty line**

reg FS InNormExp

Source	SS	df	MS	
Model	66.1088211	1	66.1088211	Number of obs = 5992
Residual	245.42778	5990	.040972918	F( 1, 5990) = 1613.48
Total	311.536601	5991	.052000768	Prob > F = 0.0000
				R-squared = 0.2122
				Adj R-squared = 0.2121
				Root MSE = .20242

FS	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
InNormExp	-.0897265	.0022338	-40.17	0.000	-.0941056 -.0853475
_cons	.5581328	.0026458	210.95	0.000	.5529462 .5633195

National Absolute Poverty Line ( $z_{\text{national}}$ ) =  $100.04(2 - 0.5581328) = 144.24$

**Appendix Table 1.4: Estimating the Urban Absolute Poverty line**

reg FS InNormExp

Source	SS	df	MS	
Model	37.8774089	1	37.8774089	Number of obs = 3063
Residual	105.737286	3061	.03454338	F( 1, 3061) = 1096.52
Total	143.614694	3062	.046902252	Prob > F = 0.0000
				R-squared = 0.2637
				Adj R-squared = 0.2635
				Root MSE = .18586

FS	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
InNormExp	-.1024561	.0030941	-33.11	0.000	-.1085228 -.0963895
_cons	.5796408	.0037731	153.62	0.000	.5722427 .587039

Urban Absolute Poverty Line ( $z_{\text{urban}}$ ) =  $100.04(2 - 0.5796408) = 142.09$

**Appendix Table 1.5: Estimating the Rural Absolute Poverty line**

reg FS InNormExp

Source	SS	df	MS	
Model	27.8300524	1	27.8300524	Number of obs = 2929
Residual	137.76238	2927	.047066068	F( 1, 2927) = 591.30
Total	165.592432	2928	.056554792	Prob > F = 0.0000
				R-squared = 0.1681
				Adj R-squared = 0.1678
				Root MSE = .21695

FS	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
InNormExp	-.0865111	.0035577	-24.32	0.000	-.0934869 -.0795352
_cons	.5437254	.0040794	133.29	0.000	.5357266 .5517242

Rural Absolute Poverty Line ( $z_{\text{rural}}$ ) =  $100.04(2 - 0.5437254) = 145.69$

**Appendix Table 1.6: Estimating the Food Energy Intake (Food and Absolute) Poverty lines<sup>24</sup>**

Source	SS	df	MS			
Model	2781.81309	1	2781.81309	Number of obs =	5992	
Residual	3811.32804	5990	.636281809	F( 1, 5990)	= 4371.98	
				Prob > F	= 0.0000	
				R-squared	= 0.4219	
				Adj R-squared	= 0.4218	
				Root MSE	= .79767	
Total	6593.14113	5991	1.10050762			

lnFoodExPe~d	Coef	Std. Err.	t	P> t	[95% Conf. Interval]	
KcalPerAd	.000215	3.25e-06	66.12	0.000	.0002086	.0002214
_cons	3.509311	.0132091	265.67	0.000	3.483416	3.535205

Food poverty line ( $z_f$ ) =  $e^{(3.509311 + 0.000215 * 2250)} = 55.80$

The average non-food expenditure is M52.79

The Absolute poverty line is therefore M55.80 + M52.79 = M108.59

It is evident that, in our case, the two methods produce significantly different poverty lines. They are even far below those estimated by the BOS.

<sup>24</sup> We calculate the food poverty line using the equations (3.2a) and (3.2b) and the absolute poverty by adding average non-food expenditure of households who are 10% above and 20% below the food poverty line as in Mwabu et al (2000). Equation (3.2c) was estimated but it proved difficult to use quadratic equation to get desired results.

## APPENDIX II

**Appendix Table 2.1: Survey: Probit regression**

Number of strata = 2	Number of obs =	5992	
Number of PSUs = 249	Population size =	370971.99	
	Design df =	247	
	F( 76, 172) =	11.68	
	Prob > F =	0	
Explanatory Variables	Coefficient	Linearized Std. Err.	t
Age	0.0042618	0.0074163	0.57
Age Squared	0.0000304	0.0000688	0.44
Household size	0.1053981*	0.0093878	11.2
Land	0.0057296	0.0128115	0.45
Area of Residence: RuralD	-0.1072514	0.065958	-1.63
Sex: MaleD	-0.0259378	0.0636897	-0.41
<b>Main Economic Activity:</b> Employer	-0.0936962	0.2952239	-0.32
: Subsistence Farmer	0.1633627***	0.0876705	1.86
: Self Employed	0.073454	0.0920876	0.8
: Unemployed	0.1450652**	0.0644595	2.25
<b>Educational Attainment:</b> None but can read/wroteD	-0.0032838	0.0567788	-0.06
: Primary	-0.0333101	0.0641448	-0.52
: Secondary	-0.100761	0.0873118	-1.15
: Vocational	-0.0664148	0.1606306	-0.41
: Teacher/Technical	-0.0479334	0.1227422	-0.39
: University	-0.353925***	0.1865095	-1.9
<b>Marital Status:</b> Never Married	-0.0395547	0.0904013	-0.44
: Divorced	-0.007721	0.0750714	-0.1
: Widowed	0.0128566	0.0702905	0.18
: Living Together	0.0729582	0.2575372	0.28
<b>Other ways of earning:</b> As Employed/Contracted	0.1481335**	0.0734948	2.02
: Running Small Business	0.0411205	0.0995537	0.41
: Through Other Ways	-0.0335882	0.0685715	-0.49
<b>Main Source of Income:</b> Private Sector employment	0.0769866	0.0674431	1.14
: Farming	0.3510341*	0.0858609	4.09
: Household Business	0.2231348**	0.1104425	2.02
: Pension	0.0995413	0.1273577	0.78
: Remittances	0.2517889**	0.0851435	2.96
: Other source	0.448128*	0.0935243	4.79
Household member involved in business	-0.0912333	0.0663212	-1.38
Household pays rent for the dwelling	-0.0555145	0.0654338	-0.85
Household Has Electricity	-0.2649164*	0.0747295	-3.55
<b>Household water source:</b> Piped community tap	0.3631994*	0.0583294	6.23
: Catchment Tank	0.2763477***	0.1660106	1.66
: Public well	0.2363611**	0.0928926	2.54
: Private Well	0.2410275	0.181608	1.33

: Covered Spring	0.1951635***	0.1122995	1.74
: Uncovered Spring	0.1401505	0.102431	1.37
: River	-0.4875812	0.4435569	-1.1
: Borehole	0.2410988***	0.0933974	2.58
: Other sources	0.1150734	0.1503604	0.77
<b>Household Source of heat for the dwelling:</b> Gas	-0.0314271	0.1676621	-0.19
: Paraffin	0.0202632	0.1593812	0.13
: Coal	0.0443249	0.1732268	0.26
: Wood	0.3573582**	0.1638437	2.18
: Cow Dung	0.4449728**	0.1789817	2.49
: Crop Waste	1.554712*	0.5023785	3.09
: Other Source	0.3522251	0.3564777	0.99
<b>Household's type of Toilet:</b> Sewage system	-0.0625158	0.152268	-0.41
: Pit Latrine	-0.056368	0.0622845	-0.91
: VIP	-0.0404302	0.0648156	-0.62
: Bucket system	0.0599204	0.4292023	0.14
: Shared Toilet	-0.2685486*	0.0937238	-2.87
: Other Toilet	0.0676812	0.2243331	0.3
<b>Household garbage disposal:</b> Street container	-0.476779**	0.2332776	-2.04
: Dumped	-0.213977	0.1692414	-1.26
: Burned	-0.252113	0.1650108	-1.53
: Buried	-0.2968857	0.1870704	-1.59
: Other forms of disposal	-0.6426196**	0.2748875	-2.34
Household's farm equipment	-0.025688***	0.0154507	-1.66
Household's productive livestock	-0.0041101	0.0037224	-1.1
Household's other livestock	-0.000201	0.0002799	-0.72
Household has a bank account	-0.3272782*	0.0465018	-7.04
Household is less than 30 min from drinking water source	-0.0269772	0.0687472	-0.39
Household takes less than 30 min to the nearest Public Transport	-0.0374316	0.0624435	-0.6
Household takes less than 30 min to the nearest Primary School	0.0400508	0.0503936	0.79
Household takes less than 30 min to the nearest Health Center	-0.057262	0.0505742	-1.13
<b>District of residence:</b> Botha-Bothe	0.1256092	0.1021055	1.23
: Leribe	0.2005131**	0.0869738	2.31
: Berea	0.1029432	0.1054502	0.98
: Mafeteng	0.0365239	0.0969947	0.38
: Mohale's Hoek	0.1196966	0.09635	1.24
: Quthing	-0.1388744	0.1150061	-1.21
: Qacha's Nek	0.1651155	0.1345447	1.23
: Mokhotlong	-0.0342629	0.1265913	-0.27
: Thaba-Tseka	-0.3710263*	0.1496509	-2.48
Constant	-0.7678052	0.3450047	-2.23

Note: \*, \*\*, \*\*\* indicates the significance levels at 1, 5 and 10 percent levels, respectively.

**Appendix Table 2.2: Rural Subpopulation Survey Probit Regression Results**

Number of strata = 2	Number of obs = 5985		
Number of PSUs = 249	Population size = 370972		
	Subpop. no. of obs = 2922		
	Subpop. size = 177277		
	Design df = 247		
	F( 73, 175) = 12.99		
	Prob > F = 0		
<b>Explanatory Variables</b>	<b>Coefficient</b>	<b>Linearized Std. Err.</b>	<b>t</b>
Age	0.0039454	0.0112	0.35
Age Squared	0.0000354	0.0001	0.34
Household size	0.1012962*	0.01296	7.81
Land	0.0097971	0.01729	0.57
Sex: MaleD	-0.0120257	0.10417	-0.12
<b>Main Economic Activity:</b> Employer	0.5097366	0.48113	1.06
: Subsistence Farmer	0.2669795**	0.1167	2.29
: Self Employed	0.2404654	0.17595	1.37
: Unemployed	0.2093038***	0.11222	1.87
<b>Educational Attainment:</b> None but can read/write	0.083802	0.06601	1.27
: Primary	-0.022797	0.08629	-0.26
: Secondary	0.4096456**	0.17564	2.33
: Vocational	-0.6258245	0.62878	-1
: Teacher/Technical	-0.5721184**	0.26567	-2.15
: University	-1.106694***	0.63673	-1.74
<b>Marital Status:</b> Never Married	-0.024908	0.15877	-0.16
: Divorced	0.0525253	0.12088	0.43
: Widowed	0.0524913	0.10489	0.5
<b>Other ways of earning:</b> As Employed/Contracted	0.4196513*	0.11055	3.8
: Running Small Business	-0.1505908	0.14539	-1.04
: Through Other Ways	-0.1100772	0.09222	-1.19
<b>Main Source of Income:</b> Private Sector employment	0.2245075***	0.12991	1.73
: Farming	0.5471006*	0.13039	4.2
: Household Business	0.734448*	0.21496	3.42
: Pension	0.4378574*	0.20768	2.11
: Remittances	0.3418113**	0.14247	2.4
: Other source	0.7238641*	0.17134	4.22
Household member involved in business	-0.1980208**	0.09814	-2.02
Household pays rent for the dwelling	-0.1518341	0.24181	-0.63
Household Has Electricity	0.1746402	0.16703	1.05
<b>Household water source:</b> Piped community tap	0.813802*	0.15818	5.14
: Catchment Tank	0.8284238*	0.24395	3.4
: Public well	0.629495*	0.16795	3.75
: Private Well	0.7940579**	0.36534	2.17
: Covered Spring	0.5928725*	0.18123	3.27
: Uncovered Spring	0.5817116*	0.17207	3.38



: River	-0.140845	0.50924	-0.28
: Borehole	0.7027899*	0.17234	4.08
<b>Household Source of heat for the dwelling:</b> Gas	-0.2270502	0.70258	-0.32
: Paraffin	0.1637504	0.67103	0.24
: Coal	0.2092329	0.70149	0.3
: Wood	0.3390163	0.67792	0.5
: Cow Dung	0.48997	0.67778	0.72
: Crop Waste	1.284322	0.83725	1.53
: Other Source	0.3634871	0.77726	0.47
<b>Household's type of Toilet:</b> Sewage system	0.6362735***	0.32613	1.95
: Pit Latrine	-0.1009735	0.09109	-1.11
: VIP	-0.1341273	0.0902	-1.49
: Bucket system	-0.1802467	0.43698	-0.41
: Shared Toilet	-0.2058663	0.39565	-0.52
: Other Toilet	-0.2871528	0.23545	-1.22
<b>Household garbage disposal:</b> Street container	-0.8982179	0.55698	-1.61
: Dumped	-0.3394259	0.45857	-0.74
: Burned	-0.2782793	0.45495	-0.61
: Buried	-0.4871751	0.41703	-1.17
: Other forms of disposal	-1.101086**	0.54754	-2.01
Household's farm equipment	-0.058142**	0.02287	-2.54
Household's productive livestock	-0.0028498	0.00333	-0.86
Household's other livestock	0.0001621	0.00021	0.79
Household has a bank account	-0.4561535*	0.07913	-5.76
Household is less than 30 min from drinking water source	0.0347014	0.08176	0.42
Household takes less than 30 min to the nearest Public Transport	-0.0358501	0.08419	-0.43
Household takes less than 30 min to the nearest Primary School	0.0144624	0.06482	0.22
Household takes less than 30 min to the nearest Health Center	-0.0262264	0.07981	-0.33
<b>District of residence:</b> Botha-Bothe	0.1032043	0.15149	0.68
: Leribe	0.2233279	0.15723	1.42
: Berea	-0.0726982	0.16887	-0.43
: Mafeteng	-0.0082637	0.13356	-0.06
: Mohale's Hoek	-0.1684564	0.14531	-1.16
: Quthing	-0.520726*	0.17965	-2.9
: Qacha's Nek	-0.1835823	0.17949	-1.02
: Mokhotlong	-0.3760701**	0.19051	-1.97
: Thaba-Tseka	-0.6501943*	0.18432	-3.53
<b>Constant</b>	-1.350544	0.82195	-1.64

Note: \*, \*\*, \*\*\* indicates the significance levels at 1, 5 and 10 percent levels, respectively.

**Appendix Table 2.3**

Number of strata = 2	Number of obs = 5985
Number of PSUs = 249	Population size = 370972
	Subpop. no. of obs = 3056
	Subpop. size = 192754
	Design df = 247
	F( 74, 174) = 7.86
	Prob > F = 0

<b>POOR</b>	Coef.	Linearized Std. Err.	t
Age	0.0068249	0.01128	0.61
Age Squared	6.71E-07	0.00011	0.01
Household size	0.1295904*	0.01535	8.44
Land	-0.0110461	0.01794	-0.62
Sex: MaleD	-0.0525007	0.08536	-0.62
<b>Main Economic Activity:</b> Employer	-0.5344951	0.4149	-1.29
: Subsistence Farmer	0.1395784	0.1776	0.79
: Self Employed	-0.0098207	0.11157	-0.09
: Unemployed	0.1160607	0.08245	1.41
<b>Educational Attainment:</b> None but can read/write	-0.2693642**	0.12372	-2.18
: Primary	-0.2292279**	0.11476	-2
: Secondary	-0.3891141*	0.13748	-2.83
: Vocational	-0.3465569***	0.19368	-1.79
: Teacher/Technical	-0.2289813	0.16852	-1.36
: University	-0.5458232**	0.2168	-2.52
<b>Marital Status:</b> Never Married	-0.0370254	0.11899	-0.31
: Divorced	-0.0315954	0.10052	-0.31
: Widowed	-0.0448328	0.09797	-0.46
: Living Together	-0.0452795	0.29896	-0.15
<b>Other ways of earning:</b> As Employed/Contracted	-0.0501341	0.11139	-0.45
: Running Small Business	0.1209949	0.13167	0.92
: Through Other Ways	0.0165257	0.09743	0.17
<b>Main Source of Income:</b> Private Sector employment	0.1208956	0.07869	1.54
: Farming	0.2658274	0.18376	1.45
: Household Business	0.1050801	0.13236	0.79
: Pension	-0.036726	0.16772	-0.22
: Remittances	0.3398203*	0.11175	3.04
: Other source	0.3938004*	0.1146	3.44
Household member involved in business	0.0226055	0.09095	0.25
Household pays rent for the dwelling	-0.0238389	0.07103	-0.34
Household Has Electricity*	-0.2862315*	0.08082	-3.54
<b>Household water source:</b> Piped community tap	0.3201429*	0.06348	5.04
: Catchment Tank	0.1916106	0.24137	0.79
: Public well	0.3467204*	0.13355	2.6
: Private Well	0.2251844	0.20721	1.09
: Covered Spring	0.3352803	0.23531	1.42
: Uncovered Spring	0.0369561	0.16174	0.23

: River	0.1161698	0.85395	0.14
: Borehole	-0.0376001	0.14781	-0.25
: Other sources	0.1030408	0.15475	0.67
<b>Household Source of heat for the dwelling:</b> Gas	-0.0092536	0.17521	-0.05
: Paraffin	-0.0327487	0.16441	-0.2
: Coal	-0.0376083	0.18265	-0.21
: Wood	0.4696616*	0.17457	2.69
: Cow Dung	0.3813305	0.25716	1.48
: Other Source	0.3052974	0.54565	0.56
<b>Household's type of Toilet:</b> Sewage system	-0.0917789	0.17383	-0.53
: Pit Latrine	-0.0437506	0.08927	-0.49
: VIP	-0.0384843	0.09463	-0.41
: Bucket system	0.1227777	0.60031	0.2
: Shared Toilet	-0.2474316**	0.11721	-2.11
: Other Toilet	0.0627661	0.38985	0.16
<b>Household garbage disposal:</b> Street container	-0.3466838	0.2541	-1.36
: Dumped	-0.1379986	0.179	-0.77
: Burned	-0.265638	0.17577	-1.51
: Buried	-0.2051745	0.20592	-1
: Other forms of disposal	-0.3406548	0.31801	-1.07
Household's farm equipment	0.0197582	0.02187	0.9
Household's productive livestock	-0.0063809	0.00677	-0.94
Household's other livestock	-0.0069072*	0.00247	-2.8
Household has a bank account	-0.2471773*	0.06082	-4.06
Household is less than 30 min from drinking water source	-0.0338679	0.11519	-0.29
Household takes less than 30 min to the nearest Public Transport	-0.0737743	0.08171	-0.9
Household takes less than 30 min to the nearest Primary School	0.0896252	0.0772	1.16
Household takes less than 30 min to the nearest Health Center	-0.0509131	0.06652	-0.77
<b>District of residence:</b> Botha-Bothe	0.0613984	0.14637	0.42
: Leribe	0.1287656	0.09984	1.29
: Berea	0.1707228	0.13471	1.27
: Mafeteng	0.0058326	0.1425	0.04
: Mohale's Hoek	0.3458604*	0.12165	2.84
: Quthing	0.1640223	0.11744	1.4
: Qacha's Nek	0.5260577*	0.15139	3.47
: Mokhotlong	0.235749	0.17268	1.37
: Thaba-Tseka	-0.0961721	0.2575	-0.37
<b>Constant</b>	-0.7639242	0.44624	-1.71

Note: \*, \*\*, \*\*\* indicates the significance levels at 1, 5 and 10 percent levels, respectively.

**Appendix Table 2.4: Ordered Probit Model Results**

Poverty		Coefficient	Linearized Std. Err.	t
Number of strata =	2		Number of obs =	5992
Number of PSUs =	249		Population size =	370972
			Design df =	247
			F( 72, 176) =	15.62
			Prob > F =	0
Age		-0.0042006	0.0068839	-0.61
Age Squared		-0.0000228	0.0000633	-0.36
Household size		-0.0996617*	0.008446	-11.8
Land		-0.0085509	0.0110122	-0.78
Area of Residence: RuralID		0.0666526	0.0626129	1.06
Sex: MaleD		0.0382593	0.0404954	0.94
<b>Main Economic Activity:</b> Employer		0.0218346	0.2982935	0.07
: Subsistence Farmer		-0.2065931*	0.080108	-2.58
: Self Employed		-0.0641353	0.0834249	-0.77
: Unemployed		-0.1859748*	0.0587857	-3.16
<b>Educational Attainment:</b> None but can read/writeD		0.0264727	0.0507696	0.52
: Primary		0.0640565	0.0579345	1.11
: Secondary		0.1385971***	0.0839448	1.65
: Vocational		0.1467534	0.1483908	0.99
: Teacher/Technical		0.0944456	0.113686	0.83
: University		0.3533246**	0.1849795	1.91
<b>Other ways of earning:</b> As Employed/Contracted		-0.1197142***	0.069213	-1.73
: Running Small Business		-0.0902612	0.0892682	-1.01
: Through Other Ways		0.0145423	0.0675894	0.22
<b>Main Source of Income:</b> Private Sector employment		-0.0749225	0.0674558	-1.11
: Farming		-0.3157622*	0.0811624	-3.89
: Household Business		-0.2359858**	0.1012105	-2.33
: Pension		-0.0520125	0.1228612	-0.42
: Remittances		-0.2208959*	0.0828563	-2.67
: Other source		-0.398211*	0.0841132	-4.73
Household member involved in business		0.1158554***	0.0615706	1.88
Household pays rent for the dwelling		0.0462103	0.0631048	0.73
Household Has Electricity		0.2456558*	0.0712448	3.45
<b>Household water source:</b> Piped community tap		-0.3415877*	0.0542268	-6.3
: Catchment Tank		-0.1970025	0.1539876	-1.28
: Public well		-0.2398692*	0.0874376	-2.74
: Private Well		-0.2308985	0.1654254	-1.4
: Covered Spring		-0.2112195**	0.1061641	-1.99
: Uncovered Spring		-0.1937703***	0.1070112	-1.81
: River		0.4441933	0.4372627	1.02
: Borehole		-0.2243323**	0.090712	-2.47
: Other sources		-0.1054657	0.1440714	-0.73
<b>Household Source of heat for the dwelling:</b> Gas		0.0283858	0.157341	0.18
: Paraffin		-0.0709617	0.1464208	-0.48

	: Coal	-0.04304	0.1588018	-0.27
	: Wood	-0.4255652*	0.1492167	-2.85
	: Cow Dung	-0.4760973*	0.1620388	-2.94
	: Crop Waste	-1.296715*	0.361605	-3.59
	: Other Source	-0.6327853***	0.3692088	-1.71
<b>Household's type of Toilet:</b> Sewage system				
	: Pit Latrine	0.0392358	0.1428165	0.27
	: VIP	0.0506162	0.0575238	0.88
	: VIP	0.0543493	0.0608613	0.89
	: Bucket system	-0.0041888	0.2983607	-0.01
	: Shared Toilet	0.2738582*	0.08723	3.14
	: Other Toilet	0.0606193	0.194615	0.31
<b>Household garbage disposal:</b> Street container				
	: Dumped	0.4462176***	0.2274309	1.96
	: Dumped	0.2571571	0.1600711	1.61
	: Burned	0.2842409***	0.1560946	1.82
	: Buried	0.3635529**	0.176588	2.06
	: Other forms of disposal	0.6307204*	0.2442358	2.58
Household's farm equipment				
		0.0319609**	0.0140833	2.27
Household's productive livestock				
		0.0053507	0.0038432	1.39
Household's other livestock				
		0.0001747	0.0002981	0.59
Household has a bank account				
		0.3008437*	0.0434161	6.93
Household is less than 30 min from drinking water source				
		0.0376368	0.0684093	0.55
Household takes less than 30 min to the nearest Public Transport				
		0.0060785	0.0580818	0.1
Household takes less than 30 min to the nearest Primary School				
		-0.005637	0.0470759	-0.12
Household takes less than 30 min to the nearest Health center				
		0.0430059	0.0473531	0.91
<b>District of residence:</b> Botha-Bothe				
		-0.1068669	0.0959058	-1.11
	: Leribe	-0.1967985**	0.0864833	-2.28
	: Berea	-0.0886462	0.0972695	-0.91
	: Mafeteng	-0.0028576	0.0894213	-0.03
	: Mohale's Hoek	-0.1265086	0.0930422	-1.36
	: Quthing	0.1231047	0.1108914	1.11
	: Qacha's Nek	-0.1472897	0.126923	-1.16
	: Mokhotlong	-0.0097761	0.1214842	-0.08
	: Thaba-Tseka	0.3506755**	0.1486371	2.36
/cut1		-1.121703	0.3410069	-3.29
/cut2		-0.7189679	0.3402546	-2.11

Note: \*, \*\*, \*\*\* indicates the significance levels at 1, 5 and 10 percent levels, respectively.

/cut1 and /cut2 are the underlying cut-off points of our latent variable (poverty status). They are also referred to as the auxiliary parameters.

**Appendix Table 2.5: Determinants of Being Hard-core Poor**

Marginal effects after svy:oprobit			
y = Pr(Poverty==0) (predict, p outcome(0))			
= 0.38327139			
variable	dy/dx	z	P>z
Age	0.0014783	0.55	0.582
Age Squared	9.53E-06	0.39	0.698
Household size	0.038467*	11.99	0.000
Land	0.0032248	0.76	0.445
Area of Residence: RuralD*	-0.0245796	-1.02	0.306
Sex: MaleD*	-0.0061907	-0.28	0.782
<b>Main Economic Activity:</b> Employer*	-0.0093725	-0.08	0.934
:Subsistence Farmer*	0.0798342**	2.55	0.011
:Self Employed*	0.0239694	0.75	0.454
:Unemployed*	0.0712049*	3.14	0.002
<b>Educational Attainment:</b> None but can read/wroteD*	-0.0105486	-0.54	0.587
: Primary*	-0.0242793	-1.10	0.271
: Secondary*	-0.05241***	-1.70	0.089
: Vocational*	-0.054619	-1.01	0.310
: Teacher/Technical*	-0.0355959	-0.84	0.400
: University*	-0.1261222**	-2.10	0.036
<b>Marital Status:</b> Never Married*	0.0062185	0.18	0.857
: Divorced*	0.0121439	0.44	0.662
: Widowed*	0.0127064	0.52	0.600
: Living Together*	0.0549726	0.57	0.570
<b>Other ways of earning:</b> As Employed/Contracted*	0.0465123***	1.71	0.087
: Running Small Business*	0.0338803	0.97	0.331
: Through Other Ways*	-0.0054447	-0.21	0.833
<b>Main Source of Income:</b> Private Sector employment*	0.0283798	1.09	0.274
: Farming*	0.1217469*	3.83	0.000
: Household Business*	0.0913994**	2.28	0.023
: Pension*	0.019158	0.40	0.687
: Remittances*	0.085968*	2.63	0.009
: Other source*	0.1553573*	4.64	0.000
Household member involved in business*	-0.0427306***	-1.87	0.062
Household pays rent for the dwelling*	-0.0168372	-0.71	0.478
Household Has Electricity*	-0.0901011*	-3.54	0.000
<b>Household water source:</b> Piped community tap*	0.1305676*	6.31	0.000
: Catchment Tank*	0.0760239	1.24	0.214
: Public well*	0.0930237*	2.69	0.007
: Private Well*	0.0899304	1.37	0.172
: Covered Spring*	0.0821211**	1.96	0.050
: Uncovered Spring*	0.0754541***	1.78	0.075
: River*	-0.1537135	-1.16	0.247
: Borehole*	0.0876147**	2.43	0.015
: Other sources*	0.04078	0.72	0.472

<b>Household Source of heat for the dwelling:</b> Gas*	-0.010272	-0.17	0.863
: Paraffin*	0.0276287	0.50	0.620
: Coal*	0.0168697	0.28	0.783
: Wood*	0.1639824*	2.89	0.004
: Cow Dung*	0.1877727*	2.96	0.003
: Crop Waste*	0.4591235*	5.19	0.000
: Other Source*	0.2508348***	1.81	0.070
<b>Household's type of Toilet:</b> Sewage system*	-0.0137903	-0.26	0.798
: Pit Latrine*	-0.0190104	-0.87	0.383
: VIP*	-0.0203133	-0.88	0.378
: Bucket system*	0.0036557	0.03	0.974
: Shared Toilet*	-0.0993819*	-3.26	0.001
: Other Toilet*	-0.0221357	-0.30	0.762
<b>Household garbage disposal:</b> Street container*	-0.154531*	-2.21	0.027
: Dumped*	-0.0984642	-1.59	0.111
: Burned*	-0.1058089***	-1.85	0.065
: Buried*	-0.1296**	-2.24	0.025
: Other forms of disposal*	-0.2078341*	-3.26	0.001
Household's farm equipment	-0.0120611**	-2.24	0.025
Household's productive livestock	-0.0020441	-1.40	0.162
Household's other livestock	-0.0000662	-0.58	0.561
Household has a bank account*	-0.1130038*	-7.04	0.000
Household is less than 30 min from drinking water source*	-0.0142529	-0.54	0.588
Household takes less than 30 min to the nearest Public Transport*	-0.0022491	-0.10	0.919
Household takes less than 30 min to the nearest Primary School*	0.001931	0.11	0.914
Household takes less than 30 min to the nearest Health center*	-0.0165213	-0.92	0.360
<b>District of residence:</b> Botha-Bothe*	0.0407862	1.09	0.277
: Leribe*	0.0754507**	2.21	0.027
: Berea*	0.0336339	0.89	0.372
: Mafeteng*	0.000289	0.01	0.993
: Mohale's Hoek*	0.0488836	1.35	0.178
: Quthing*	-0.046344	-1.13	0.257
: Qacha's Nek*	0.0567795	1.14	0.255
: Mokhotlong*	0.0037575	0.08	0.936
: Thaba-Tseka*	-0.125618**	-2.53	0.011

(\*) dy/dx is for discrete change of dummy variable from 0 to 1

Note: \*, \*\*, \*\*\* indicates the significance levels at 1, 5 and 10 percent levels, respectively.

**Appendix Table 2.6: Determinants of Being Moderately Poor**

Marginal effects after svy:oprobit			
y = Pr(Poverty==1) (predict, p outcome(1))			
= 0.158887			
variable	dy/dx	z	P>z
Age	0.000058	0.55	0.582
Age Squared	3.74E-07	0.38	0.702
Household size	0.0015087*	3.38	0.001
Land	0.0001265	0.76	0.449
Area of Residence: RuralD*	-0.0009775	-0.97	0.333
Sex: MaleD*	-0.0002368	-0.28	0.777
<b>Main Economic Activity:</b> Employer*	-0.0004157	-0.07	0.940
: Subsistence Farmer*	0.0010619	1.20	0.230
: Self Employed*	0.0006832	1.04	0.298
: Unemployed*	0.0018854**	2.30	0.021
<b>Educational Attainment:</b> None but can read/writeD*	-0.0004312	-0.51	0.607
: Primary*	-0.0010893	-0.95	0.343
: Secondary*	-0.0032869	-1.20	0.229
: Vocational*	-0.0037728	-0.69	0.491
: Teacher/Technical*	-0.0020531	-0.64	0.525
: University*	-0.0140188	-1.19	0.234
<b>Marital Status:</b> Never Married*	0.0002258	0.20	0.845
: Divorced*	0.0004111	0.51	0.611
: Widowed*	0.0004591	0.56	0.573
: Living Together*	0.0005673	0.32	0.749
<b>Other ways of earning:</b> As Employed/Contracted*	0.0008425***	1.76	0.079
: Running Small Business*	0.0007633***	1.83	0.067
: Through Other Ways*	-0.0002268	-0.20	0.842
<b>Main Source of Income:</b> Private Sector employment*	0.000914	1.25	0.210
: Farming*	0.0008983	0.62	0.535
: Household Business*	-0.0000123	-0.01	0.994
: Pension*	0.0005615	0.60	0.550
: Remittances*	0.0003038	0.24	0.813
: Other source*	-0.0033209	-1.07	0.283
Household member involved in business*	-0.0023345	-1.39	0.165
Household pays rent for the dwelling*	-0.0007644	-0.62	0.535
Household Has Electricity*	-0.0068702**	-2.25	0.024
<b>Household water source:</b> Piped community tap*	0.0035558**	2.53	0.011
: Catchment Tank*	0.0000115	0.00	0.996
: Public well*	-0.0000865	-0.05	0.959
: Private Well*	-0.0006127	-0.18	0.857
: Covered Spring*	-0.0000111	-0.01	0.995
: Uncovered Spring*	0.0004603	0.33	0.745
: River*	-0.0205071	-0.64	0.520
: Borehole*	-0.0002173	-0.12	0.901
: Other sources*	0.0007368	1.61	0.107



<b>Household Source of heat for the dwelling: Gas*</b>	-0.0004549	-0.16	0.876
: Paraffin*	0.0009984	0.52	0.603
: Coal*	0.0005232	0.36	0.717
: Wood*	0.0028848***	1.76	0.078
: Cow Dung*	-0.0080894	-1.08	0.278
: Crop Waste*	-0.080108**	-2.39	0.017
: Other Source*	-0.0207832	-0.77	0.444
<b>Household's type of Toilet: Sewage system*</b>	-0.0006367	-0.22	0.825
: Pit Latrine*	-0.0008367	-0.79	0.430
: VIP*	-0.0009049	-0.78	0.437
: Bucket system*	0.0001361	0.03	0.973
: Shared Toilet*	-0.008721**	-2.04	0.042
: Other Toilet*	-0.001138	-0.24	0.807
<b>Household garbage disposal: Street container*</b>	-0.0204901	-1.24	0.216
: Dumped*	-0.0028118**	-2.04	0.042
: Burned*	-0.0064541	-1.37	0.170
: Buried*	-0.0142616	-1.33	0.184
: Other forms of disposal*	-0.035888***	-1.68	0.092
Household's farm equipment	-0.000473**	-2.04	0.041
Household's productive livestock	-0.0000802	-1.30	0.195
Household's other livestock	-2.60E-06	-0.57	0.568
Household has a bank account*	-0.0061529*	-3.73	0.000
Household is less than 30 min from drinking water source*	-0.0004697	-0.64	0.522
Household takes less than 30 min to the nearest Public Transport*	-0.0000871	-0.10	0.918
Household takes less than 30 min to the nearest Primary School*	0.0000761	0.11	0.915
Household takes less than 30 min to the nearest Health center*	-0.0006891	-0.86	0.391
<b>District of residence: Botha-Bothe*</b>	0.0008077***	1.88	0.060
: Leribe*	0.0009171	1.04	0.296
: Berea*	0.0008702	1.42	0.157
: Mafeteng*	0.0000113	0.01	0.993
: Mohale's Hoek*	0.0008917***	1.82	0.069
: Quthing*	-0.0028753	-0.84	0.403
: Qacha's Nek*	0.0006312	0.68	0.496
: Mokhotlong*	0.0001403	0.08	0.933
: Thaba-Tseka*	-0.0130095	-1.49	0.136

(\*)  $dy/dx$  is for discrete change of dummy variable from 0 to 1

Note: \*, \*\*, \*\*\* indicates the significance levels at 1, 5 and 10 percent levels, respectively.

**Appendix Table 2.7: Determinants of Being Non-Poor and Marginal Effects**

Marginal effects after svy:oprobit				
y = Pr(Poverty==2) (predict, p outcome(2))				
= 0.4578399				
variable	dy/dx	Std. Err.	z	P>z
Age	-.0015363	.00279	-0.55	0.581
Age Squared	-9.91e-06	.00003	-0.39	0.698
Household size	-.0399757*	.00341	-11.73	0.000
Land	-.0033513	.00438	-0.76	0.444
Area of Residence: RuralD*	.0255572	.025	1.02	0.307
Sex: MaleD*	.0064275	.02324	0.28	0.782
<b>Main Economic Activity:</b> Employer*	.0097882	.11789	0.08	0.934
:Subsistence Farmer*	-.0808961*	.03094	-2.61	0.009
:Self Employed*	-.0246526	.03265	-0.75	0.450
:Unemployed*	-.0730903*	.02303	-3.17	0.002
<b>Educational Attainment:</b> None but can read/writeD*	.0109797	.02026	0.54	0.588
: Primary*	.0253687	.02316	1.10	0.273
: Secondary*	.0556968***	.03347	1.66	0.096
: Vocational*	.0583918	.05926	0.99	0.324
: Teacher/Technical*	.037649	.04549	0.83	0.408
: University*	.140141**	.07175	1.95	0.051
<b>Marital Status:</b> Never Married*	-.0064443	.03563	-0.18	0.856
: Divorced*	-.012555	.02858	-0.44	0.660
: Widowed*	-.0131655	.02503	-0.53	0.599
: Living Together*	-.0555399	.09499	-0.58	0.559
<b>Other ways of earning:</b> As Employed/Contracted*	-.0473548***	.02714	-1.74	0.081
: Running Small Business*	-.0346436	.03508	-0.99	0.323
: Through Other Ways*	.0056715	.0269	0.21	0.833
<b>Main Source of Income:</b> Private Sector employment*	-.0292938	.02664	-1.10	0.272
: Farming*	-.1226452*	.03099	-3.96	0.000
: Household Business*	-.0913871**	.03856	-2.37	0.018
: Pension*	-.0197195	.04846	-0.41	0.684
: Remittances*	-.0862718*	.03176	-2.72	0.007
: Other source*	-.1520364*	.03072	-4.95	0.000
Household member involved in business*	.045065***	.02452	1.84	0.066
Household pays rent for the dwelling*	.0176016	.02497	0.70	0.481
Household Has Electricity*	.0969713*	.02832	3.42	0.001
<b>Household water source:</b> Piped community tap*	-.1341233*	.02108	-6.36	0.000
: Catchment Tank*	-.0760354	.05896	-1.29	0.197
: Public well*	-.0929372*	.0332	-2.80	0.005
: Private Well*	-.0893177	.06257	-1.43	0.153
: Covered Spring*	-.08211**	.04024	-2.04	0.041
: Uncovered Spring*	-.0759144***	.04114	-1.85	0.065
: River*	.1742206	.16478	1.06	0.290
: Borehole*	-.0873974**	.03446	-2.54	0.011
: Other sources*	-.0415168	.05644	-0.74	0.462

<b>Household Source of heat for the dwelling:</b> Gas*	.0107269	.06222	0.17	0.863
: Paraffin*	-.0286272	.05769	-0.50	0.620
: Coal*	-.0173929	.06263	-0.28	0.781
: Wood*	-.1668672*	.05695	-2.93	0.003
: Cow Dung*	-.1796833*	.05623	-3.20	0.001
: Crop Waste*	-.3790155*	.05543	-6.84	0.000
: Other Source*	-.2300516**	.1116	-2.06	0.039
<b>Household's type of Toilet:</b> Sewage system*	.014427	.05686	0.25	0.800
: Pit Latrine*	.0198471	.02281	0.87	0.384
: VIP*	.0212183	.02418	0.88	0.380
: Bucket system*	-.0037918	.11753	-0.03	0.974
: Shared Toilet*	.1081029*	.03457	3.13	0.002
: Other Toilet*	.0232737	.07777	0.30	0.765
<b>Household garbage disposal:</b> Street container*	.1750212**	.08641	2.03	0.043
: Dumped*	.101276	.06271	1.62	0.106
: Burned*	.11226***	.06181	1.82	0.069
: Buried*	.1438616**	.06863	2.10	0.036
: Other forms of disposal*	.2437216*	.08495	2.87	0.004
Household's farm equipment	.012534**	.00558	2.25	0.025
Household's productive livestock	.0021243	.00152	1.40	0.162
Household's other livestock	.0000688	.00012	0.58	0.561
Household has a bank account*	.1191568*	.01715	6.95	0.000
Household is less than 30 min from drinking water source*	.0147226	.02702	0.54	0.586
Household takes less than 30 min to the nearest Public Transport*	.0023362	.02301	0.10	0.919
Household takes less than 30 min to the nearest Primary School*	-.0020071	.01862	-0.11	0.914
Household takes less than 30 min to the nearest Health Center*	.0172105	.01883	0.91	0.361
<b>District of residence:</b> Botha-Bothe*	-.0415939	.03774	-1.10	0.270
: Leribe*	-.076368**	.03389	-2.25	0.024
: Berea*	-.0345041	.0383	-0.90	0.368
: Mafeteng*	-.0003003	.03561	-0.01	0.993
: Mohale's Hoek*	-.0497753	.03649	-1.36	0.173
: Quthing*	.0492192	.04422	1.11	0.266
: Qacha's Nek*	-.0574107	.04924	-1.17	0.244
: Mokhotlong*	-.0038978	.04826	-0.08	0.936
: Thaba-Tseka*	.1386275**	.05804	2.39	0.017

(\*) dy/dx is for discrete change of dummy variable from 0 to 1

Note: \*, \*\*, \*\*\* indicates the significance levels at 1, 5 and 10 percent levels, respectively.