



No.203/ February 2007

## Determinants of poverty vulnerability in Uganda

Charles Augustine Abuka

Bank of Uganda

Michael Atingi-Ego

Bank of Uganda

Jacob Opolot

Bank of Uganda

Patrick Okello

Uganda Bureau of Statistics





## **IIS Discussion Paper No. 203**

### **Determinants of poverty vulnerability in Uganda**

**Charles Augustine Abuka,**

**Michael Atingi-Ego**

**Jacob Opolot**

**Patrick Okello**

#### **Disclaimer**

Any opinions expressed here are those of the author(s) and not those of the IIS.

All works posted here are owned and copyrighted by the author(s).

Papers may only be downloaded for personal use only.

**IIS Discussion Paper No. 203**

## **Determinants of poverty vulnerability in Uganda**

Charles Augustine Abuka, Michael Atingi-Ego and Jacob Opolot  
Bank of Uganda

Patrick Okello  
Uganda Bureau of Statistics

January 2007

### Disclaimer

Any opinions expressed here are those of the author(s) and not those of the IIS.  
All works posted here are owned and copyrighted by the author(s).  
Papers may only be downloaded for personal use only

## **Determinants of poverty vulnerability in Uganda**

Charles Augustine Abuka, Michael Atingi-Ego and Jacob Opolot  
Bank of Uganda

Patrick Okello  
Uganda Bureau of Statistics

### **Abstract**

---

Ugandan data shows poverty to be entrenched in rural areas and in large households. Households with heads exposed to education, an improved health status, less reliance on agriculture as the most important source of earnings, access to electricity for lighting and, the presence of markets to sell produce in the community experience improved household well-being. The data also confirms two known stylized facts regarding poverty vulnerability. First, households in the Northern region have a higher probability of being poor than those in Central, Eastern, and Western regions. Second, the ‘annual cropping and cattle northern’ and ‘annual cropping and cattle Teso’ zones are the agro ecological zones that are positively correlated with poverty vulnerability. The fact that residence in rural areas is associated with higher incidence of poverty suggests that promotion of off-farm employment (for example, through rural electrification) would help reduce vulnerability.

---

**Key words:** Poverty vulnerability, logistic regression, Uganda

**Contact E-mail Address:** cabuka@bou.or.ug, caabuka@gmail.com

**JEL classification.** I32, Q18

### **Acknowledgements**

This paper is an output of the Policy Coherence project based in the Institute for International Integration Studies at Trinity College Dublin supported by a research grant from the Advisory Board for Irish Aid. The views expressed are not necessarily those of the Board of Trinity College nor those of the Advisory Board for Development Cooperation or the Bank of Uganda. We would like to acknowledge the assistance and advice of Hannah Chaplin and Alan Matthews, Institute for International Integration Studies, University of Dublin in the preparation of this paper.

# TABLE OF CONTENTS

<b>I INTRODUCTION.....</b>	<b>5</b>
<b>II DIMENSIONS OF POVERTY AND INEQUALITY .....</b>	<b>6</b>
2.1 RURAL DIMENSION OF POVERTY AND INEQUALITY .....	6
2.2 REGIONAL DIMENSION OF POVERTY AND INEQUALITY.....	8
2.3 GENDER DIMENSION OF POVERTY AND INEQUALITY .....	8
2.4 OCCUPATIONAL DIMENSION OF POVERTY AND INEQUALITY .....	8
2.5 UGANDAN LIVELIHOOD STUDIES .....	9
<b>III EMPIRICAL ANALYSIS OF THE FACTORS ASSOCIATED WITH POVERTY.....</b>	<b>10</b>
3.1 DATA AND ANALYTICAL APPROACH .....	10
3.2 DERIVED POVERTY LINES .....	12
3.3 COMPARISON OF SOCIOECONOMIC AND DEMOGRAPHIC CHARACTERISTICS .....	12
3.3.1 Mean household size.....	13
3.3.2 Mean age of household head .....	14
3.3.3 Annual household expenditure .....	14
3.3.4. Mean annual household expenditure on health.....	15
3.3.5 Rural-Urban residence .....	16
3.4 ECONOMETRIC ANALYSIS OF POVERTY CORRELATES.....	16
3.4.1 Logit model specification .....	16
3.4.2 Poverty correlates results .....	17
<b>IV CONCLUSIONS AND POLICY IMPLICATIONS .....</b>	<b>21</b>
<b>APPENDIX TABLES.....</b>	<b>26</b>

## LIST OF TABLES

Table 1: Proportion of people below the poverty line and inequality coefficient.....	7
Table 2: Percentage distribution of households by region.....	11
Table 3: Food poverty lines (z-values) by region and residence .....	12
Table 4: Mean household size by poverty status and region .....	13
Table 5: Mean household size by poverty status by region.....	13
Table 6: Mean age of household head by poverty status by region.....	14
Table 7: Mean age of household head by poverty status by region.....	14
Table 8: Mean Annual household expenditure by poverty status and region.....	14
Table 9: Mean Annual household expenditure by poverty status by region.....	15
Table 10: Mean Annual household health expenditure by poverty status and region .....	15
Table 11: Mean Annual household health expenditure by poverty status by region .....	15
Table 12: Percentage distribution of poor households by region and residence.....	16
Table 13: Percentage distribution of poor households by region and residence.....	16
Table 14: Distribution of districts within the regions .....	17
Table 15: Some features of the agro-ecological zones .....	18
Table 16: Definitions of variables .....	19
Table 17: Logit estimate of national poverty correlates with regions.....	20
Table 18: Logit estimate of national poverty correlates with agro ecological zones.....	21
Table 19: Calories used in estimating poverty lines .....	26
Table 20: Distribution of Household poverty status by agro-ecological zones .....	27
Table 21: Distribution of Household source of lighting by agro-ecological zones .....	27
Table 22: Distribution of Household sources of earnings by agro-ecological zones.....	27
Table 23: Household access to produce markets by agro-ecological zones .....	28
Table 24: Household access to input markets by agro-ecological zones.....	28
Table 25: Categorization of crop income by agro-ecological zones.....	28

## I INTRODUCTION

In Uganda, most households derive much of their incomes from subsistence agriculture. Analysis of the 2002/03 Uganda National Household Survey (UNHS) shows that small-scale agriculture employs 70.3 percent of Uganda's population. The main traditional cash crops are coffee, tea and cotton, while the food crops include bananas, cereals, cassava, sweet potatoes, beans, peas, simsim and groundnuts. Coffee and tea are mainly grown in Central and Western regions and cotton is mainly grown in the Northern and Eastern regions. The other sources of livelihood include employment income 13.3 percent, property income 8.0 percent and trading income 6.0 percent. On a regional basis, the Northern region is predominantly dependent on farming as a main source of economic livelihood 80 percent, followed by Western region 77.6 percent, Eastern region 76.3 percent and Central region 54.3 percent. Employment income, which ranks as the second most important source of economic livelihood, is more predominant in Central region 22.8 percent, followed by Eastern region 10.1 percent, Western region 9.0 percent and Northern region 7.2 percent. This pattern of relative importance of employment income may partly be explained by the fact that the administrative capital city and most industrial establishments that offer better employment opportunities are located in Central region. Property income as a source of household livelihood is also most significant in Central region 10.2 percent, followed by Northern region 7.5 percent, Eastern region 6.9 percent and Western region 6.7 percent. Trading and other income also rank as significant sources of income in Central region compared with other regions.

A review of consumption expenditure from the national household survey data spanning 1992 to 2003 shows that recovery efforts in the earlier years tended to be pro-poor (Okidi et al, 2004). Income poverty fell dramatically in the 1990's from 56 percent in 1992 to 44 percent in 1997 (Table 1). The decline in the poverty headcount was driven by increases in income, rather than by redistribution. During the 1992-97 period the Gini coefficient fell only slightly from 0.36 to 0.35. Essentially, growth much more than redistribution was responsible for the poverty reduction in Uganda during this period (Okidi et al, 2004 and Ssewanyana et al , 2004). A critical factor in consumption growth during this period was the increased prices that producers received for their crops. The liberalisation of agricultural marketing allowed producers to benefit from the increase in the world price of coffee from 0.82 US\$/kg in 1992/93 to 2.55 US\$/kg in 1994/95. The most dramatic poverty reductions were found among cash crop farmers (MFPED, 2004).<sup>1</sup>

Between 1997 and 2000, the poverty headcount continued to fall, from 44 to 34 per cent, even though during this period inequality as measured by the Gini coefficient increased from 0.35 to 0.39. Between 1997 and 2000 consumption expenditure per adult equivalent for the richest 10 percent of the population grew by 20 percent while that of the poorest 10 percent grew by only 8 percent. The poverty head count continued to fall despite an increase in inequality due to the slow down in agricultural growth and increase in insecurity in the Northern region of the country.

However, since 2000 income poverty has tended to rise. The proportion of people below the poverty line rose from 34 percent in 2000 to 38 percent in 2003. The increase in people below the poverty line has been accompanied by a further marked rise in inequality since 2000. The Gini coefficient measuring inequality rose from 0.39 in 2000 to 0.43 in 2003. The richest 20 percent of Ugandans experienced a 9 percent increase in expenditure in the 2000 to 2003 period while the

---

<sup>1</sup> There is also poverty that takes the form of temporary income shocks due to vulnerability to climatic factors (MFPED, 2004). Households can be impoverished if they are unable to insure themselves against shocks without selling vital assets or receiving outside assistance. Vulnerability mostly takes the form of disruption of household membership due to illness or death of a member. Illness affects the household's ability to raise income. Households headed by female widows were found to be more vulnerable to asset depletion and impoverishment.

rest of the population reported a decline in consumption expenditure. For the period 1997 to 2003 as a whole, only the top 20 percent enjoyed positive growth, even though real GDP growth averaged around 5.8 percent. These recent poverty patterns are explained by the slowdown in agricultural growth over the last three years. During the recent three years, the decline in farmer's incomes arising from world market conditions, insecurity, high population growth rate and morbidity related to HIV/AIDS have contributed in various ways to explaining the evolution of poverty indicators in the country. The slowdown in agriculture observed from 2000 to 2003 tended to increase inequality because the poor are concentrated in agriculture and the share of labour in the incomes of the other sectors is relatively small. In addition, insecurity tended to generate inequality because it restricted investment and growth, as well as reduced the current level of incomes. The Eastern region witnessed an increase in insecurity related poverty partly because there was distress migration into this region from the disturbed parts of the North and because of the reallocation of camps for some of the internally displaced persons (MFPED, 2004).

The overriding aim of the Ugandan government is to reverse this trend to increasing poverty and to reduce the poverty head count ratio to under 26 per cent by 2017 from 38.8 percent in 2002/2003. The most recent Poverty Eradication Action Plan 2004/5-2007/8 (PEAP) indicates that based on existing levels of inequality, a population growth of 3.6 percent per annum and real GDP growth of 6.0 percent per annum, 26 percent of the population will be living in poverty in 2017. If (PEAP) "meets its objectives of reducing inequality and raising GDP growth to 7 percent per annum, then a fall in the rate of population growth to 2.8 percent per annum would reduce poverty to 21 percent by 2017, even if annual real GDP growth remained at 6 percent". In order to maintain the trend of falling poverty head count ratios, government aims to increase the ability of the poorer households to participate in economic growth through the provision of public goods to support both agriculture and industry. In rural areas where the majority subsist, welfare improvement will depend on using the resource base and equipping farmers to understand the technical as well as the quality requirements of commercial production.

To operationalise these policies, it is important to know who are the poor as well as where they live, and to identify the factors that are associated with moving people out of poverty. The aim of this paper is to analyse the determinants and correlates of poverty, including by region and agro-ecological zone, using the 2002/03 Uganda National Household Budget Survey data. In order to appropriately understand poverty dynamics, national and regional food poverty lines are estimated to identify poor households. The socio-economic and demographic characteristics of the poor households between and within regions are then compared.

The structure of the paper is as follows. Section 2 briefly describes main patterns of poverty in Uganda. Section 3 discusses the results regarding poverty correlates. The final section provides the concluding remarks and discusses the implications that arise for policy.

## **II DIMENSIONS OF POVERTY AND INEQUALITY**

### **2.1 Rural dimension of poverty and inequality**

Poverty in Uganda remains predominantly a rural phenomenon that is pronounced among crop farmers. Indeed, the disproportionate contribution of rural areas to national poverty has remained unchanged at about 96 percent. Okidi et al (2004) report that the rural poverty head count declined from 60 percent in 1992 to 37 percent in 2000 before rising to 42 percent in 2003. The



corresponding figures for the urban areas are 28, 10 and 12 percent (Table 1). According to MFPED (2004), there is also a wide gap between urban and rural areas even after adjustment is made for the higher prices of consumer goods in urban areas. Human development indicators are also better among urban households. However, urban poverty also reflects migration from rural areas while the urban poor also face shortages of housing and sanitation.

Sectoral shares of household heads in poverty changed markedly, with a major shift out of crop agriculture.<sup>2</sup> The increase in poverty was particularly marked for households in crop agriculture, other sectors such as trade and hotels also showed large increases, while workers providing government services appear to have experienced reductions in poverty. However, poverty and inequality began to rise in the Northern part of the country. While a high proportion of increased public expenditures went to social services and should have improved access to health care and education over the 2000 to 2003 period, these expenditures did not directly increase the incomes of the poor, and the income benefits to public servants mostly went to people above the poverty line (MFPED, 2004). Some of the increases in public expenditure went to salaries, public administration and defence. Even the increase in education spending appears to have been beneficial to better off households (MFPED, 2004).

**Table 1: Proportion of people below the poverty line and inequality coefficient**

Region	1992	1997/98	1999/00	2002/03
National	55.7	44.4	33.8	37.7
Rural	59.7	48.7	37.4	41.1
Urban	27.8	16.7	9.6	12.2
Central	45.6	27.9	19.7	22.3
Western	53.1	43.8	26.2	31.4
Eastern	58.8	54.3	35.0	46.0
Northern	72.2	60.9	63.7	63.6
<b>Gini coefficients</b>				
National	0.36	0.35	0.39	0.43
Rural	0.33	0.31	0.33	0.36
Urban	0.40	0.35	0.43	0.48
<b>Population share</b>				
Rural	87.6	87.0	86.9	86.5
Urban	12.4	13.0	13.1	13.5
Central	30.6	29.3	29.0	31.6
Eastern	27.9	27.8	26.6	29.3
Northern	17.3	18.7	19.0	15.3
Western	24.2	24.3	25.4	23.7
Crop agriculture	66.6	63.3	67.6	52.2
Non-crop agriculture	5.0	3.3	3.2	5.4
Mining/construction	1.5	1.9	2.0	2.0
Manufacturing	4.0	5.1	3.0	7.1
Trade	7.4	8.9	7.2	14.2
Transport and comm.	1.7	1.9	2.2	2.6
Government services	8.1	6.2	5.6	6.0
Other services	2.6	3.1	4.5	4.7
Unemployed	3.3	6.3	4.9	5.7

<sup>2</sup> A number of specifically disadvantaged groups include orphans and other vulnerable children. About 14 percent of children below 18 years have lost at least one parent and 3 percent have lost both. It is estimated that for children between 6 to 17 years, as many as 20 percent have lost at least one parent as a result of HIV and conflict (MFPED, 2004). Orphans were more likely to work than other children. The elderly are also relatively more vulnerable. Female widows are relatively more likely to be poor. Disabled people suffer relative income poverty in addition to the reduction in their quality of life caused by their disability. In 2000, 46 percent of persons with disability were poor, compared to 34 percent of people in the general population (Mijumbi and Okidi, 2001 and Deininger and Mpuga, 2004). The chronically ill as well as those who are displaced are relatively poor. One of the most serious forms of poverty in Uganda is related to the living conditions of displaced people in camps.

Notes: Excludes comparable results from 1993/94, 1994,95 and 1996 surveys.  
Source: Okidi et al 2003, MFPED, 2004 Poverty Eradication Action Plan 2004/05-2007/08.

## **2.2 Regional dimension of poverty and inequality**

Table 1 shows how poverty increased in all regions in the most recent period, with a particularly marked increase in the East. Regional shares of people in poverty changed due largely to insecurity, and inequality measured by the Gini coefficient rose from 0.39 in 1999 to 0.43 in 2002/03. The Northern region registers the highest incidence of poverty in excess of 64 percent between 2000 and 2003. The North was also left behind as most parts of the country experienced benefits of growth between 1992 and 2000. The proportion of people in the Northern region below the poverty line fell from 72 percent in 1992 to 60 percent in 1997/98, but rose again to 66 percent in 2000.<sup>3</sup> Between 2000 and 2003 the North remained relatively poor while the East, which is the second poorest region, suffered a significant deterioration. The quality of livelihoods in the East deteriorated partly because of distress migration, implying that the main reason for the increasing regional gap was due to insecurity. Poverty is entrenched because investment is discouraged in households that are physically insecure. While the value of assets increased markedly between 1992 and 1999 in the West and Central regions, households in the North that started with smaller asset values were unable to increase their investments in land. Regional imbalance, especially between the North and the rest of the country, has persisted, with the Northern region being the only territory that experienced a decline in consumption expenditure between 1997 and 2000. Poor prices for cash crops and problems faced by pastoralist communities also contributed to the relative poverty in the North (Okidi, 2003).

## **2.3 Gender dimension of poverty and inequality**

Women in Uganda are poorer than men and there are also some dimensions of poverty in which women are generally at a disadvantage (Lawson, 2004). Female-headed households were found to be poorer than male-headed households in 1999 but not in 1992 or 2003. However, households headed by female widows are consistently poorer than others. Women also remain more affected by HIV/AIDS than men. The impact of the epidemic is heavier for women who often have to care for the sick and dependent. Female-headed households also have less land than male-headed households, even when corrected for household size. Widows tend to lose land assets over time as their children grow up. Women also participate less in the labour market than men and women's wages have been found to be significantly lower than men's. This may be a result of the difference in average educational status or a reflection of labour market institutions that discriminate against women. Women were also found to work longer hours than men when domestic tasks were considered (UBOS, UNHS 2002/03).

## **2.4 Occupational dimension of poverty and inequality**

The largest group of poor households are those in agriculture and the poorest occupational group consists of households who specialise in crop production. Between 2000 and 2003 the proportion of households whose head is mostly employed in agriculture fell from 71 percent to 58 percent and there was an increase in the proportion of those who were self employed outside agriculture from 12 to 25 percent. Since farmer's incomes fell during this period, the proportion of farming households in poverty rose from 39 percent to 49 percent (Appleton and Ssewanyana, 2003). Participatory evidence also indicates poverty to be prevalent among pastoralists, fishermen and their families, and estate workers (MFPED, 2004).

---

<sup>3</sup> This pattern is observed even though the most insecure areas were omitted from the sample.

While inequalities between regions and between occupational groups and demographic groups are important, recent work (Ssewanyana et al, 2004) has tended to show that most inequality is explained by differentials within regions and within groups. The gender of the household head explains virtually none of the observed inequality; the rural–urban gap explains 20 percent of the inequality; differences between regions explain 13 percent; the economic activity of the head of the households explains 15 percent while education explains 25 percent. Inequalities in physical and financial assets seem to be important proximate determinants of inequality.

## **2.5 Ugandan livelihood studies**

A number of studies have investigated the probability of being in poverty using Ugandan household budget survey data.<sup>4</sup> Deininger and Okidi (2003) trace the main correlates of Uganda's poverty outcomes to the economic policy environment, physical household assets, human capital accumulation, health conditions, physical infrastructure, and external shocks. However, the pattern of change in these factors has been mixed. Households are reported to have accumulated total physical assets at about 2.7 percent per annum in the 1990's; the poor accumulated assets at 0.3 percent compared to 4 percent for the non-poor. Human capital improved over the period 1992 to 2003; the proportion of poor households with no formal education declined from 34 to 27 percent, while the proportion of non-poor households declined from 21 to 12 percent (Deininger and Okidi, 2003). Health conditions remain a problem with the number of days lost to illness by the average household rising from 8 to 12. The liberalisation of the coffee sector in 1991/92 increased the share of farm-gate prices in border prices from under 30 percent to more than 80 percent (Collier and Reinikka, 2001). However, the absence of a diversified economic base made the predominantly agricultural households vulnerable to volatility in the prices of commodities. Limited access to electricity remains the key critical constraint to growth and investment. At the national level the percentage of households living in communities with electricity increased only marginally from 23.5 percent in 1996 to 26 percent in 2002.

Lawson et al (2003) investigated poverty persistence and transitions in Uganda within the 1992 to 1999 panel households. Their study indicated that poverty incidence fell from 48.6 percent of households in 1992 to 29.3 percent by 1999, and 18.9 percent of the panel households were chronically poor. Nearly 40.0 percent experienced transitory poverty over this period, 29.6 percent of the households moved out of poverty and 10.3 percent slipped in. The study identified ownership of, or access to, assets at individual, household and community level as being major factors influencing poverty transitions and persistence.

Indeed, households with lower levels of human capital are poor. Lawson et al (2003) show that poor households in Uganda suffer from high illiteracy levels. Available data shows that 51 percent in rural areas are illiterate against a national average of 40 percent. In the same vein, Okidi and Mackey (2003) indicate that 32 percent of the chronically poor households in the 1992/93 were without any formal education. Lack of physical assets such as land and cattle was identified as an important factor in poverty determination. Lower asset levels guaranteed poverty. Households with a higher asset endowment were guaranteed a higher subsequent income and consumption expenditure growth. Indeed, chronically poor households lacked sufficient assets to benefit from the high growth paths that could have pulled them out of poverty.

Poor households are more likely to be reliant on subsistence agriculture and less liable to be engaged in non-farm wage work compared to the national average (Okidi and Mackey, 2003; Lawson, 2003). According to Okidi and Kempaka (2003), 80 percent of the chronically poor

---

<sup>4</sup> Most earlier studies have employed the 2000 and earlier UNHBS data. This study represents one of the initial attempts at employing the 2003 UNHBS dataset.

households had heads who earned a living from self employment in agriculture. The type of activities in which people are engaged were important drivers of poverty dynamics. An important escape route appeared to be working in non-agricultural activities in rural areas; this was, however, dependent on a sufficient level of human capital.

Analysis shows that both size of income and size of household play an important role in determining poverty status. A structural factor explaining the increase in inequality and poverty is the high rate of fertility. Poor households tend to have more children and their assets are subject to greater subdivision across generations. On average, a Ugandan woman who lives through childbearing years has 6.9 children and this is higher for the poorest families (MFPED, 2004). A high fertility rate tends to cause inequality among households over time. Chronically poor households are larger on average and have higher dependency rates than the national average (2002/03 Household Survey). Households moving into poverty increase their household size by 76 percent compared to 9 percent increase for households moving out of poverty (Lawson, 2003). Amongst the poorest households, the average number of children per household is twice as high as for the richest 20 percent (MFPED, 2002).

Panel and household survey data indicate a strong link between health and chronic poverty. Lawson (2003) and Neema (2002) show that income has a critical influence on health status. Sick-headed households were more strongly associated with moving into poverty than out of poverty. Similarly, effects may come from disease related mortality such that illness or death of a productive adult is likely to lead to loss of income as well as absorbing expenditures for health care and funerals.

Social and cultural factors are also important in determining the quality of rural livelihoods. Indeed, Bird and Shinyekwa (2003) indicate that households with a high share of alcoholic drinks in expenditure and in consumption were associated with poverty and domestic violence.

### **III EMPIRICAL ANALYSIS OF THE FACTORS ASSOCIATED WITH POVERTY**

#### **3.1 Data and analytical approach**

In this section, we set out to examine the factors associated with the probability of being poor in Uganda. The analysis employs primary data from the Uganda National Household Survey (UNHS) of 2002/2003 carried out by Uganda Bureau of Statistics. The UNHS collected information on the socio-economic characteristics of both the household and community levels. The main objective of the survey was to generate improved data on population and socio-economic characteristics of households for monitoring development performance. The UNHS comprised four modules including socio-economic, labour force, informal sector and community modules. The variables for this study were picked from the socio-economic and community modules. The food energy intake method was used to compute poverty lines using information on food cost and consumption from purchases, home production and gifts in one month preceding the survey. The computed poverty lines were then used to identify the poor households.

The total sample size used for analysis was 9,711 households. Three hundred households were dropped from the analysis because they turned out not to consume any of the items whose calorific values were available for the study. In other words, the list of foods and their calorific values was not exhaustive of all items in the consumption expenditure module. Items like Irish potatoes, fresh fish, onions, sugar, other vegetables apart from cabbages and Dodo were lacking,



to mention a few. The distribution of the households used in further analysis by region is provided in Table 2 below.

**Table 2: Percentage distribution of households by region**

Region	No. of households	Percentage
Central	2,694	28.63
Eastern	2,597	27.60
Northern	1,696	18.02
Western	2,424	25.76
Total	9,411	100.00

Source: Computed UBOS, UNHS 2002/2003 data

The study follows Okurut, Odwee and Adebua (2002) in applying the Greer and Thorbecke (1986) food energy intake (FEI) methodology to the computation of poverty lines. The FEI method of setting poverty lines is anchored on the cost of attaining a predetermined level of food energy intake. A number of ways exist of estimating the total expenditure needed to arrive at the stipulated food energy intake. The most common procedure is to generate the cost of a basket of commodities consumed by each household and the calorie equivalent or food energy implied by the basket of goods. This is followed by the calculation of the basket of commodities that would be sufficient to ensure an adequate food intake. The energy intake is taken as a predetermined value expressed in terms of calorie equivalents. Another procedure is to take a sub sample of households with total expenditure that is equivalent to a stipulated calorie level and compute a simple average.

The FEI method automatically provides the total expenditure implied by the level of food expenditure that gives the calorie intake, since the latter is a dependent variable in the regression equation. Following Greer and Thorbecke (1986), the total value of food consumed by each household is derived. This value of food is obtained as the sum of the value of purchased food and the household's own production that is consumed. The value of purchased food consumed by each household is established as a product of the quantities of the different food types purchased times the unit prices. The value of own output or donated food consumed by the household is the product of own production including donations and the prevailing local prices. The adult equivalent for each household is calculated depending on household size and composition, using an equivalence scale to convert children to adult equivalents.<sup>5</sup> The varied types and quantities of foods consumed by the different households are next converted to calories  $C_j$  using the calorie equivalents presented in Appendix A, Table A1. A regression model is then fitted to estimate parameters to be used in determining food poverty lines as in equation (1) below:

$$\ln X_j = \alpha + \beta C_j \quad (1)$$

where  $X_j$  defines total food expenditure per adult equivalent by household  $j$ ,  $C_j$  is the total calorie consumption per adult equivalent by household  $j$  while  $\alpha$  and  $\beta$  are parameters to be estimated. The food poverty line,  $Z$ , which is the estimated cost of acquiring the calorie recommended daily allowance (RDA) is generated as :

$$Z = e^{(\alpha + \beta R)} \quad (2)$$

<sup>5</sup> WHO (1985) Energy and protein requirements, WHO Technical Report Series 724, WHO: Geneva provided the conversion scale that is employed.

where  $Z$  is the food poverty line and  $R$  is the recommended daily allowance of calories per adult equivalent of 2200.

The living standards of households reflect the income-generating opportunities available to the household and its members and the needs of the household, the latter including such issues as size and composition of the household (Colombe and Mackay, 1996). With this approach, the determinants of poverty are identified as those factors, mostly household characteristics, that lead to households having low-income levels (proxied by consumption in this context) relative to their needs. Demographic variables of relevance include household size, composition and dependency ratios. The characteristics of the economic head of the household, including educational level, gender and marital status, may also be important for the determination of living standards, though here the influence is not exclusively on household needs but perhaps also on the earning potential of households.

### 3.2 Derived poverty lines

The poverty analysis is implemented at two levels, national and regional. The national analysis employed the national food poverty line and a total sample size of 9,411 households. For the regional analysis, the region-specific food poverty lines and the corresponding sub-sample for each region shown in Table 3 were used. The national food poverty line was computed to be Shs. 81,728 per annum (which represents the minimum per capita food expenditure required to meet the recommended daily calorie allowance per adult equivalent). The Northern region had the lowest poverty line of Shs. 55,869 per annum. The poverty lines for Central region of Shs. 86,310 and that of the urban region exceeded the national poverty line in Table 9. The analysis of poverty lines confirms the finding by World Bank (1993) and Okurut, Odwee and Adebua (2002) that the Northern region poverty line is the lowest. As the physical calorie allowance per adult equivalent is the same across regions, this implies that the expenditure required to achieve the minimum level of food consumption in the region is less than elsewhere, either because the price level is lower in this region or, more likely, because households rely on cheaper sources of calories than elsewhere. The regional differences are very significant. This suggests that conclusions about poverty rates drawn from national data and a national poverty line need to be treated with some caution. For this reason, we provide information calculated both on the national and regional poverty lines in the tables, which follow.

**Table 3: Food poverty lines (z-values) by region and residence**

	Food poverty line per month Shs.	Food poverty line per year Shs.
<b>Region</b>		
Central	7,192.8	86,310
Eastern	6,478.9	77,738
Northern	4,656.3	55,869
Western	6,661.8	79,949
<b>Residence</b>		
Urban	7,001.3	84,010
Rural	6,679.1	80,146
Uganda	6,810.3	81,728

Source: Computed UBOS, UNHS 2002/2003 data, Note: Exchange rate used is the monthly official exchange rate for 2002: US\$ 1=1,797.

### 3.3 Comparison of socioeconomic and demographic characteristics

Grootaert (1997) categorized the household endowments that determine poverty into two major groups: human capital and physical capital. Human capital is embodied in the members of the household, and the ability to use this capital effectively in the labour market is a function of the age and sex of the household members. The human capital of the household head is particularly

important, with the head's education and work experience having a profound influence on the way the household relates to the labour market.

Socioeconomic and demographic characteristics of the households were investigated within and between regions with respect to poverty status. The computed national poverty line was used to identify the poor households for the between-region analysis and the regional food poverty lines were used to investigate the within-region characteristics. The relationship between the socio-economic and demographic characteristics of the households and their poverty status is investigated using cross tabulation and an analysis of variance technique was employed to test the difference between group means.

### 3.3.1 Mean household size

Evidence from earlier studies points to the link between poverty and household size. The larger the household, the higher the dependency ratio; hence the tendency to perpetuate poverty in the long run. In a subsistence economy, large household size tends to increase competition for resources such as land use between food crops and cash crops, which may be coupled with declining soil productivity. This may result in low output, low household income and the perpetuation of poverty.

The national mean household size for the sampled households is 5.2; Eastern region has the highest mean of 5.5, followed by Western region (5.2), Northern region (5.1) and Central region (5.0). Table 4 shows that poor households in Eastern Uganda have the highest mean household size of 6.1 and on the other hand non poor households in Northern Uganda have the lowest mean household size. The table shows that, nationally and in each region, poor households tend to be significantly larger than non-poor households, as suggested above.

**Table 4: Mean household size by poverty status and region**

Region	Poverty status		
	Poor	Non-Poor	Regional
Central	5.99	4.66	4.95
Eastern	6.09	5.13	5.54
Northern	5.65	4.37	5.11
Western	5.82	4.99	5.23
National	5.88	4.82	5.20

Notes: Based on national Poverty Line

$F_{4, 9412} = 70.13, P > F = 0.000$

Source: Computed UBOS, UNHS 2002/2003 data

On the basis of regional poverty lines, Eastern Uganda still exhibits the highest average household size among poor households of 6.1 and non-poor of 5.2 as shown in Table 5. In general, where the regional poverty lines are lower than the national line, the average household size of poor households is increased; where the regional poverty line is greater than the national line (as in Central region) the average size of poor households falls. This confirms the general finding from these two tables that larger households are more likely to be poor than smaller ones.

**Table 5: Mean household size by poverty status by region**

Region	Poor	Non-Poor	Significance
Central	5.90	4.64	$F_{1,2694} = 56.5, P > F = 0.000$
Eastern	6.12	5.15	$F_{1,2597} = 73.6, P > F = 0.000$
Northern	5.73	4.78	$F_{1,1696} = 71.33, P > F = 0.000$
Western	5.83	4.99	$F_{1,2425} = 63.87, P > F = 0.000$

Notes: Based on regional Poverty Line

Source: Computed UBOS, UNHS 2002/2003 data

### 3.3.2 Mean age of household head

Unlike household size, there is little variation in the average age of the household head across regions. The mean age of the household head based on the national poverty line is 39.2 for poor households and 40.1 for non-poor households. Although small in absolute terms, the difference is statistically significant, suggesting that households with older heads are less likely to be poor. Household heads of poor households are oldest in Northern region at 40.5 years, followed by Central region at 40.2 years, Eastern with 39.9 years and Western region with 39.6 years.

**Table 6: Mean age of household head by poverty status by region**

Region	Poor	Non-poor	Regional
Central	40.1	38.7	39.1
Eastern	39.9	39.9	39.9
Northern	40.5	39.0	39.9
Western	39.6	39.2	39.3

Notes: Based on national Poverty Line  $F_{4, 9412} = 4.17, P > F = 0.0022$

Source: Computed UBOS, UNHS 2002/2003 data

When regional poverty lines are used, Table 7 shows that the age of the household head varies significantly between poor and non-poor households in the Central and the Northern region but not in the Eastern and Western regions. The ordering of regions remains the same as for the national poverty line: the household heads of the poor in Northern Uganda are relatively older, with a mean age of 41.2 years, followed by Central region with 40.2 years, Eastern with 39.9 years and Western with 39.7 years as in Table 7 below.

**Table 7: Mean age of household head by poverty status by region**

Region	Poor	Non-poor	Significance
Central	40.2	38.8	$F_{1,2694} = 3.37, P > F = 0.06$
Eastern	39.9	39.9	$F_{1,2597} = 0.68, P > F = 0.4093$
Northern	41.2	39.1	$F_{1,1696} = 15.4, P > F = 0.0001$
Western	39.7	39.1	$F_{1,2425} = 1.49, P > F = 0.2224$

Notes: Based on regional Poverty Line

Source: Computed UBOS, UNHS 2002/2003 data

### 3.3.3 Annual household expenditure

The annual household expenditure by households in the survey area is presented in Tables 8 and 9 by poverty status of the households. As expected, poor households spend much less than non-poor households. As shown in Table 8, poor households in the North spend the least with Shs. 591,763, followed by Eastern region with Shs. 695,132, Western Shs. 730,269 and Central Shs. 913,106. The regional mean income differences are highly significant ( $p=0.000$ ). The income differentials between regions may be explained by the location of the major industries and the capital city effect, which offer better employment opportunities.

**Table 8: Mean Annual household expenditure by poverty status and region**

Region	Poor	Non-poor	Regional
Central	913,106	2,066,956	1,819,484
Eastern	695,132	1,578,229	1,199,518
Northern	591,763	1,140,554	821,542
Western	730,269	1,549,141	1,311,519
National	711,409	1,701,982	1,348,714

Notes: Based on national Poverty Line

$F_{4, 9412} = 215.21, P > F = 0.0000$

Source: Computed from UBOS, UNHS 2002/2003 data



When regional poverty lines are used, the poor in the Northern and Eastern regions have the lowest expenditure levels as shown in Table 9. Again, there is a significant difference in the mean incomes of poor and non-poor households between and within regions. In addition, the differences between regions reflect the different monetary values of the regional food poverty lines in each region.

**Table 9: Mean Annual household expenditure by poverty status by region**

Region	Poor	Non-Poor	Significance
Central	948,298	2,088,855	F1,2694 =111.98, P>F = 0.000
Eastern	677,175	1,539,597	F1,2597 = 329.07, P>F = 0.000
Northern	490,427	1,002,943	F1,1696 =202.24, P>F = 0.000
Western	722,867	1,537,522	F1,2425 =188.36, P>F = 0.000

Notes: Based on regional Poverty Line

Source: Computed from UBOS, UNHS 2002/2003 data

### 3.3.4. Mean annual household expenditure on health

Health and well-being are an important dimension of poverty which is not captured directly by the survey. As a proxy, the average annual expenditure on health by households is presented in Tables 10 and 11 by poverty status of the households. As expected, Table 10 shows that poor households spend much less annually on health than non poor households, with poor households in the North spending the least with Shs. 4,672, followed by Eastern region that spends Shs. 6,800, Western Shs. 8,559 and Central Shs. 13,195. The regional mean expenditure differences are highly significant ( $p=0.000$ ) and are consistent with the findings of Okurut, Odwee and Adebua (2002). It is also significant that the differences in health expenditures across regions and between poor and non-poor households are less than the differences in total expenditure (Table 8). This suggests that, despite their lower overall incomes, poor households need to give relatively higher priority to health than to other items of expenditure.

**Table 10: Mean Annual household health expenditure by poverty status and region**

Region	Poverty status		
	Poor	Non-Poor	Regional
Central	13,195	14,205	13,984
Eastern	6,800	9,989	8,575
Northern	4,672	7,306	5,817
Western	8,599	13,386	12,354
National	7,880	12,308	10,737

Notes: Based on national Poverty Line  $F4, 5779 = 9.25, P>F = 0.0000$

Source: Computed from UBOS, UNHS 2002/2003 data

Using the regional poverty lines, the poor in the Northern and Eastern regions have the lowest expenditures on health as shown in Table 11. Again, there is a significant difference in the mean health expenditures of poor and non poor households between and within regions. The poor appear to spend relatively more on health even when regional poverty lines are employed.

**Table 11: Mean Annual household health expenditure by poverty status by region**

Region	Poor	Non-Poor	SIGNIFICANCE
Central	12732	14378	F1,1736 =0.18, P>F = 0.6721
Eastern	6846	9775	F1,1864 =15.54, P>F = 0.0001
Northern	4630	6386	F1,1109 =12.93, P>F = 0.0003
Western	8580	13770	F1,1270 =7.95, P>F = 0.0049

Notes: Based on regional Poverty Line

Source: Computed from UBOS, UNHS 2002/2003 data

### 3.3.5 Rural-Urban residence

As has been demonstrated by a number of other studies, poverty is more pronounced in rural areas, as more remunerative economic activities tend to be concentrated in urban areas. Table 12 shows that 78 percent of the rural residents of Eastern Region are poor while slightly more than half of non-poor persons are also rural resident. The implication is that residence tends to influence poverty; those living in a rural area are more likely to be poor. This pattern is also depicted in the Central and Western regions. However, it is noteworthy that almost one-third of poor persons in Central region are located in urban areas.

**Table 12: Percentage distribution of poor households by region and residence**

Region	Poor		Non-poor	
	Rural	Urban	Rural	Urban
Central	69.9	30.1	51.6	48.5
Eastern	78.1	21.9	50.8	49.2
Northern	73.5	26.5	49.5	50.5
Western	70.5	29.5	56.7	43.3
Pearson chi2(3)=17.0458 Pr=0.001			Pearson chi2(3)=18.0400 Pr=0.001	

Notes: Based on national Poverty Line

Source: Computed from UBOS, UNHS 2002/2003 data

The relationship between the rural and urban poor is highly significant. As observed in Okurut, Odwee and Adebua (2002), the rural urban divide is an important aspect of poverty analysis. The same pattern of poor households being more predominant in the rural areas is observed even if the analysis is based on the regional poverty lines as shown in Table 13. However, on its own, this evidence is not sufficient to conclude that living in a rural area has an independent influence on the probability of being poor. It may be that rural households differ in other important ways, such as their main livelihoods, average age, proportion of female-headed households, and so on, and that it is these factors which are responsible for the observed differences in the proportions of poor households between rural and urban areas. To decide this issue, it is necessary to move beyond cross-tabulations to regression analysis.

**Table 13: Percentage distribution of poor households by region and residence**

Region	Poor		Non-poor	
	Rural	Urban	Rural	Urban
Central	68.6	31.4	51.3	48.6
Eastern	77.8	22.2	52.0	48.0
Northern	77.7	22.3	55.0	45.0
Western	70.6	29.4	56.9	43.2
Pearson chi2(3) = 23.4927 Pr = 0.000			Pearson chi2(3) = 14.4530 Pr = 0.002	

Notes: Based on national Poverty Line

Source: Computed from UBOS, UNHS 2002/2003 data

## 3.4 Econometric analysis of poverty correlates

### 3.4 1 Logit model specification

This section employs a logistic regression model to identify some important correlates of poverty in Uganda. The regression calculates the probability of being in poverty after controlling for other associated risks in the form of an odds ratio and provides knowledge of the strengths of the

relationship between poverty status and its correlates. The probability,  $p$ , that a household is non-poor is given by:

$$P = \frac{e^z}{1 + e^z} \quad (3)$$

It is usual to use the logistic regression in the logit transformation of  $p$  given by  $Z$

$$Z = \ln\left(\frac{P}{1 - P}\right) \quad (4)$$

where

$$Z = \beta_0 + \beta_1 Y_1 + \beta_2 Y_2 + \beta_3 Y_3 + \dots + \beta_k Y_k \quad (5)$$

where  $\beta_{is}$  are the regression parameters and  $Y_{is}$  are the independent variables.

### 3.4.2 Poverty correlates results

Two models to investigate poverty correlates are estimated at the national level. The first model uses regions as a distinguishing feature while the second introduces the concept of agro-ecological zones. The main correlates investigated in both models are total size of the household ( $hsize$ ), the literacy level or the ability of the household to read and write ( $literacy$ ), the source of household earnings ( $sosearn$ ), the key crop grown by the household as a source of income during the year preceding the survey ( $ycrop$ ), the source of fuel used for lighting in the household ( $lighting$ ), availability of at least two outlets or markets for produce within a distance of five kilometres ( $mktprod5km$ ), availability of at least two markets for inputs within a distance of five kilometres ( $mktinp5km$ ), and being in an urban rather than rural area ( $urban$ ). In terms of region of residence, the households fall into four regions namely Central ( $reg\_1$ ), Eastern ( $reg\_2$ ), Northern ( $reg\_3$ ) and Western ( $reg\_4$ ) as shown in Table 14 below.

**Table 14: Distribution of districts within the regions**

No	Region	Districts
Reg_1	Central	Kalangala, Kampala, Kayunga, Kiboga, Luwero, Masaka, Mpigi, Mubende, Mukono, Nakasongola, Rakai, Sembabule, Wakiso
Reg_2	Eastern	Bugiri, Busia, Iganga, Jinja, Kaberemaido, Kamuli, Kapchorwa, Katakwi, Kumi, Mayuge, Mbale, Pallisa, Sironko, Soroti, Tororo
Reg_3	Northern	Adjumani, Apac, Arua, Gulu, Kitgum, Kotido, Lira, Moroto, Moyo, Nakapiripirit, Nebbi, Pader, Yumbe
Reg_4	Western	Bundibugyo, Bushenyi, Hoima, Kabale, Kabarole, Kamwenge, Kanungu, Kasese, Kibaale, Kisoro, Kyenjojo, Masindi, Mbarara, Ntungamo, Rukungiri

Source: Uganda National Household Survey 2002/2003: Report on the socio-economic survey.

There are nine agro-ecological zones into which the households can be placed. The nine agro-ecological zones include the intensive banana-coffee zone ( $agrozone\_1$ ), western banana-coffee-cattle ( $agrozone\_2$ ), households in the Montane areas ( $agrozone\_3$ ), annual cropping & cattle northern ( $agrozone\_4$ ), west Nile cereal-cassava-tobacco ( $agrozone\_5$ ), pastoral & some annual crops ( $agrozone\_6$ ), annual cropping and cattle-Teso ( $agrozone\_7$ ), banana-millet-cotton zone ( $agrozone\_8$ ), and medium altitude intensive banana-coffee ( $agrozone\_9$ ). Table 15 documents some of the key features of the agro-ecological zones and Appendix Tables, 20 to 26 show the key characteristics of the agro-ecological zones in respect of the poverty correlates.

**Table 15: Some features of the agro-ecological zones**

No.	Agro-ecological zone	Districts	Main crops	Other crops
Agrozone_1	Intensive banana-coffee zone	Kalangala, Kampala, Masaka, Mpigi, Mubende, Mukono, Rakai, Sembabule, Iganga, Jinja	Matooke food type, robusta coffee, maize, beans, sweet potatoes, cassava	Matooke beer type
Agrozone_2	Western banana-coffee-cattle zone	Bushenyi, Kabarole, Mbarara, Ntungamo, Rukungiri	Matooke food type, robusta coffee, maize, beans, sweet potatoes, cassava	Matooke beer type, groundnuts
Agrozone_3	Montane	Kapchorwa, Kabale, Kisoro, Kasese	Sweet potatoes, irish potatoes, maize, vegetables	Matooke beer type
Agrozone_4	Western Nile cereal-cassava tobacco	Adjumani, Moyo, Arua	Maize, groundnuts, cassava	Beans, simsim, sorghum, sweet potatoes, tobacco
Agrozone_5	Annual cropping & cattle northern	Apac, Lira, Gulu, Kitgum	Millet, beans, cassava, simsim	Maize, cotton
Agrozone_6	Pastoral & some annual crops	Kotido, Moroto	Maize, sweet potatoes	Millet, beans
Agrozone_7	Annual cropping & cattle Teso	Katakwi, Kumi, Pallisa, Soroti	Millet, sorghum, groundnuts, cassava	Matooke beer type, maize, cotton, sweet potatoes
Agrozone_8	Banana-millet-cotton	Kiboga, Luwero, Bugiri, Busia, Kamuli, Tororo, Hoima, Kibaale, Masindi	Beans, sweet potatoes, cassava, matooke food type, maize	Matooke beer type, coffee, cotton
Agrozone_9	Medium altitude intensive banana-coffee	Mbale, Nebbi, Bundibugyo	Matooke food type, maize, beans, cassava	Sweet potatoes, coffee

Notes: crops grown are based on the 1999/2000-crop survey. The main crops are those grown by more than 50 percent of the households and the other crops by 25-50 percent of the households

Source: The agro-ecological zones with the respective districts are derived from UNICEF (1994) and Obwona et al (2004).

It is expected that total size of the household and dependence on agriculture as a key source of household earnings would correlate positively with being poor. The use of electricity as a source of fuel, availability of markets for produce, being in an urban rather than rural area, and the literacy level are expected to correlate negatively with being poor.

Table 16 provides the definitions of the key variables that are applied in the regression results reported in Tables 17 and 18.



**Table 16: Definitions of variables**

<b>Variables</b>	<b>Description</b>
Poornat	Poor or non poor (dummies)
Hsize	Household size (continuous) measured in numbers of persons per household.
Literacy	Whether head of household is able to write meaningfully and read with understanding in any language. Literate versus not literate
Sosearn	Most important source of earning. Agriculture Versus non-Agriculture (dummies)
Ycrop	Households' income from crop during the last year i.e. 2001, in Uganda shillings (continuous)
Lighting	Fuel used by household for lighting (Electricity versus other sources) (dummies)
mktinp5km	Availability of at least 2 outlets/ markets to buy agric inputs within 5 Km in 2002 (dummies)
Urban	Residence (urban versus rural) (dummies)
mktprod5km	Presence of at least 2 outlets/ markets to sell agric produce within 5 Km in 2002 (dummies)
Reg_1	Central region
Reg_2	Eastern region
Reg_3	Northern region
Reg_4	Western region
Agrozone_1	Intensive banana -coffee
Agrozone_2	Western banana-coffee-cattle
Agrozone_3	Montane
Agrozone_4	West Nile cereal-cassava-tobacco
Agrozone_5	Annual cropping and cattle northern
Agrozone_6	Pastoral and some annual crops
Agrozone_7	Annual cropping and cattle -Teso
Agrozone_8	Banana-millet-cotton
Agrozone_9	Medium altitude intensive banana-coffee

Source: Definitions derived from the UNHS and Ministry of Agriculture.

The main results for the correlates of poverty status are reported in Tables 17 and 18. Table 17 focuses on regions in the poverty correlates, while Table 18 introduces the aspect of agro ecological zones.<sup>6</sup> Both models have a good fit evidenced by the non-significant Hosmer–lemeshow goodness of fit statistic. A non-significant statistic signifies that the data fits the model well (null hypothesis being there is a good fit). All variables are in line with theoretical expectations.

Overall, the results show that an increase in the household size by 1 person raises the likelihood of that household being poor by up to 17 percent, while the ability of a household head to read and write reduces the chances of a household being poor by 33 percent. In addition, relying on agriculture other than non-agricultural activity as the most important source of earning increases the chances of a household being in poverty by up to 41 percent. On the other hand, an increase in a household's income from a crop obtained during the year preceding the survey, though statistically significant, had a minimal influence on the chance of a household being in poverty. Indeed, a one percent increase in mean crop income reduced the probability of being in poverty by about 0.008. However, using electricity rather than other sources of fuel taken together for lighting reduced the chances of a household being in poverty by up to 70 percent. Furthermore,

<sup>6</sup> Because of the underlying nature of product and input markets and the resultant high collinearity between these variables, it was not possible to include both of them in the same equation. However, very similar results were obtained when either variable was employed on its own. The final results that were generated in Tables 17 and 18 employ proximity to product markets.

the presence of at least 2 outlets or markets to sell agric produce within 5 Km in a village or community reduced the chances of household being poor by about 31 percent. Finally, being in an urban rather than in a rural area, controlling for other factors, reduced the chances of a household being reported as poor by over 46 percent. These results are shown in Tables 17 and 18 below.

**Table 17: Logit estimate of national poverty correlates with regions**

Variable	Model 1		
Poornat	Coefficient	p-value	Odds ratio
hsize	0.16168	0.000	1.1755
literacy	-0.3939	0.001	0.6744
sosearn	0.3455	0.003	1.4127
lighting	-1.2017	0.001	0.3007
urban	-0.6084	0.000	0.5442
ycrop	-1.10e-06	0.000	0.9999
mktprod5km	-0.3686	0.000	0.6917
Reg_1	-1.2747	0.000	0.2795
Reg_2	-0.8173	0.000	0.4416
Reg_4	-0.9846	0.000	0.3736
Constant	0.0094	0.928	2.529445
<i>Post estimation results</i>			
Sensitivity			44.18
Specificity			83.23
Correctly specified			67.09
Hosmer – lemeshow		chi(2) =17.18	Pr > chi(2) =0.0283

Source: Regression results using UBOS, UNHS 2002/2003 data

The regressions in the model 1 Table 17 use the Northern region as a base category. The results show that households in the Central region in comparison with those from the Northern region were 70 percent less likely to be reported poor. Households in the Eastern and Western regions were 56 percent and 63 percent respectively less likely to be poor in comparison with those from the Northern region. Note that these results are based on the national poverty line. We saw earlier that, especially in the Northern region, the national poverty line exaggerates the numbers of food-poor compared to a regional poverty line, which takes the different sources of calories in the Northern region into account. Hence, these regional differences reported here will over-estimate the actual differences in food poverty between regions.

**Table 18: Logit estimate of national poverty correlates with agro ecological zones**

Variable	Model 2		
Poornat	Coefficient	p-value	Odds ratio
hsize	0.15881	0.000	1.17212
literacy	-0.38146	0.000	0.68286
sosearn	0.36158	0.000	1.43560
lighting	-1.22113	0.000	0.29489
urban	-0.61207	0.000	0.54223
ycrop	-1.10e-06	0.000	0.99999
mktprod5km	-0.32963	0.000	0.71919
agrozone_1	-0.98892	0.000	0.37198
agrozone_2	-0.98233	0.000	0.37444
agrozone_3	-0.66762	0.000	0.51293
agrozone_4	-0.22731	0.142	1.25521
agrozone_6	0.46130	0.008	1.58614
agrozone_7	-0.47801	0.001	0.62001
agrozone_8	-0.73431	0.000	0.47984
agrozone_9	-0.48378	0.001	0.61645
Constant	0.206276	0.121	0.81361
<i>Post estimation results</i>			
Sensitivity		43.19	
Specificity		83.49	
Correctly specified		67.45	
Hosmer – lemeshow		Pearson chi(3345) =9.96 Pr > chi(2) =0.2677	

Source: Regression results using UBOS, UNHS 2002/2003 data

The regressions in model 2 on Table 18 use the annual cropping and cattle northern zone (Zone 4) as the base category. The results indicate that households in the intensive banana-coffee zone in comparison with those from the annual cropping and cattle northern zone were 63 percent less likely to be in poverty and those in the Western banana-coffee-cattle zone were equally 63 percent less likely to be in poverty. Households in the montane zone were 48 percent less likely to be in poverty. The agro ecological zones that were positively correlated with poverty vulnerability relative to the base zone were the West Nile cereal-cassava-tobacco and the Pastoral and some annual crops zones. The other zones had a negative but significant correlation.

The results emphasise the relationship between dependence on particular crops and poverty. Indeed, the patterns of poverty have a clear association with agro ecological zones with living in the Pastoral and some annual crops zone having the highest probability of being poor.

## IV CONCLUSIONS AND POLICY IMPLICATIONS

UNHS survey data over the period 2000 to 2003 has tended to show an increase in poverty levels in the country. Using the 2002/2003 data for analysis, the results suggest that increases in household size tended to increase household poverty, while the ability of a household head to read and write reduced the chances of a household being poor. Good health indicators proxied by an increase in health expenditure in households reduced the chances of being poor. In addition, families that relied on agriculture rather than non-agricultural activity as the most important source of earnings increased their chances of being poor. Using electricity as a source of fuel for lighting reduced the chances of a household being categorized as poor. Furthermore, the presence of markets for agricultural produce in the community reduced the chances of households being poor. Finally, being in urban rather than in a rural area also reduced the chances of households being reported as poor.

The empirical results confirm the known stylized facts regarding poverty vulnerability in Uganda namely; households in the Central, Eastern, and Western regions in comparison with those from the northern region were less likely to be reported poor. The data also show that the agro ecological zone that was most highly correlated with poverty vulnerability was the Pastoral and some annual crops zone.

These results underline the importance of education in poverty reduction. Education is an important driver of household income growth and associated poverty reduction. It is crucial that education programs address issues of equity and access by the majority. The outstanding issues that inhibit access to education need to be comprehensively addressed. The results show that an increase in the schooling of household heads has an impact on the productivity and hence earnings of the individual and could also influence the productivity of other members of his household.

Residence in rural areas continues to be associated with a higher incidence of poverty. The proximate explanations of rural poverty relate to access to productive resources and opportunities for gainful employment. Improving agricultural productivity and providing additional employment opportunities in rural areas may reduce the vulnerability to poverty.

The issue of household size needs to be tackled as it has consistently been shown to keep per capita income growth rates below population growth rates and create difficulties for government poverty reduction efforts. Public and private interventions are therefore required in promoting population control strategies.

Rising inequality especially at the regional level undermines national poverty reduction efforts. It is important to address regional and socio-economic inequality between groups in the country in as far as this relates to access to public infrastructure and access to productive resources. Rural electrification has the potential of improving the capacity of the poor to improve their living standards and therefore the rural electrification project should be allocated more resources for faster implementation.

Finally, the results point to high incidence of poverty in regions that have experienced significant amounts of insecurity in the country. Guaranteeing security to all regions of the country would provide incentives for productive investment. Ensuring security of life and property would help to encourage foreign investment in regions that are currently insecure, providing the driver for increased rural productivity and growth.



## REFERENCES

- Appleton, S and Mackinnon 1996. Poverty in Uganda: Characteristics, causes and constraints. EPRC Research Bulletin
- Appleton, S and Sewanyana, S. 2003. Preliminary explanations for the worsening poverty 1999-2003, Information Paper for UBOS/MFPED.
- Appleton, S and Sewanyana., 2003. Poverty analysis in Uganda 2002/03, Economic Policy Research Centre, Mimeo.
- Appleton, S. 2001. Changes in poverty and inequality in Collier, P and Reinnika (eds) *Uganda's recovery: the role of farms, firms and government*, World Bank: Washington D.C.
- Appleton, S., 2001. Poverty reduction during growth: the case of Uganda, 1992-2000.
- Appleton, S., Emwanu, T., Kagugube, J. and Muwonge, J. 1999. Changes in poverty in Uganda, 1992-1997, Mimeo.
- Bahiigwa, G, Ellis, F and Fjelstad, O-H. 2004. Uganda rural taxation study, EPRC/ODG/CMI Institute.
- Bahiigwa, G. 2002. Uganda's poverty eradication agenda: Measuring up to the millennium development goals, MFPED Background paper for the Consultative Group Meeting, May.
- Bird, K. and Shinyekwa, I. 2003. Multiple shocks and downward mobility: earning from the life histories of rural Ugandans, CPRC Working Paper.
- Chronic Poverty Research Centre 2005. The chronic poverty report, 2004-05, Manchester.
- Chronic Poverty Research Centre in Uganda, 2005. The chronic poverty in Uganda: The policy challenges, Kampala.
- Collier, P and Reinikka, R. 2001. Reconstruction and liberalisation: An overview in Collier, P and Reinnika, R (eds) *Uganda's recovery: the role of farms, firms and government*, World Bank: Washington D.C.
- Dat, G., and Ravallion, M. 1996. How important to India's poor is the sectoral composition of economic growth? *World Bank Economic Review* 10: 1-26.
- Dat, G., and Ravallion, M. 1998. Why have some Indian states done better than others at reducing rural poverty, *Economica* 257: 17-38.
- Deininger, K and Okidi, J. 2003. Growth and poverty reduction in Uganda, 1992-2000: Panel data evidence, *Development Policy Review* 21: 481-509.
- Deininger, K., and Mpuga, P. 2003. Has the abolition of health user fees improved the welfare of the vulnerable groups? Evidence from Uganda, The World Bank mimeo.

- Ellis, F., and Bahiigwa, G. 2003. Rural livelihoods and poverty reduction in Uganda, World Development Report.
- Jalan, J. and Ravallion (1998). Determinants of transient and chronic poverty: Evidence from china. Washington D.C., World Bank
- Lawson, D. 2004 Gender analysis of the Ugandan National Household Surveys (1992-2003), Paper for PEAP revision.
- Lawson, D., McKay, A., and Okidi, J. 2003. Poverty persistence and transitions in Uganda: A combined qualitative and quantitative analysis, Chronic Poverty Research Centre (CPRC) Working Paper No: 38, University of Manchester, U.K.
- Lwanga-Ntale, C. 2003. Chronic poverty and disability in Uganda, Paper to be presented at the International Conference: Staying poor: Chronic poverty and development policy. University of Manchester, 7<sup>th</sup>-9<sup>th</sup> April 2003.
- Lwanga-Ntale, C. 2004. The face of chronic poverty in Uganda from the poors perspective: Constraints and opportunities, Conference paper, Staying poor: Chronic poverty and development policy, University of Manchester.
- Mackinnon, J., and Reinikka, R. 1999. Lessons from Uganda on strategies to fight poverty, World Bank Policy Research Working Paper, 2440.
- McGee, Rosemary. 2000. Analysis of participatory assessment (PPA) and Household survey findings on poverty trends in Uganda, Institute of development studies, Sussex (UK) and Department for International Development, DFID (UK).
- Menard, S.1995. **Applied Logistic regression analysis**. Sage Publications. Series: Quantitative Applications in the Social Sciences, No. 106.
- Mijumbi, P., Okidi, J., Angemi, D., and Birungi, 2004. Understanding the determinants of income inequality in Uganda, EPRC Background paper for PEAP.
- Ministry of Finance Planning and Economic Development, 2002. Deepening the understanding of poverty, second participatory poverty assessment report, Uganda participatory poverty assessment process.
- Ministry of Finance Planning and Economic Development, 2004. Poverty eradication Action Plan 2004/5-2007/8, Kampala, Uganda.
- Ministry of Finance, Planning and Economic Development, 2002. Deepening our understanding of poverty, Ugandan Participatory Poverty Assessment Process, Kampala.
- Morrissey, O., Rudaheeranwa, N., and Moller L. 2003. Trade policies, performance and poverty in Uganda, ODI, EPRC and University of Nottingham.
- Nabbumba, R., and Bahiigwa, G. 2003. Agricultural productivity constraints in Uganda: implications for investment, International Food Policy Research Institute.

Okidi, J. 2004. Trends in Uganda household assets during the 1990's, Economic Policy Research Centre.

Okidi, J., Ssewanyana, S., Bategeka, L., and Muhumuza, F. 2004. Operationalising pro-poor growth: A country case study on Uganda, A joint initiative of AFD, BMZ, GTZ, (KfW Development Bank), DFID and the World Bank, Poverty Status Report 2003

Okurut, F.N., Odwe, J.J.A., and Adeboa, A. 2002. Determinants of regional poverty in Uganda, AERC Research Paper 122, African Economic Research Consortium Nairobi.

Ravallion, M., and Dat, G. 1996. How important to India's poor is the sectoral composition of economic growth?, *World Bank Economic Review* 10: 1-26.

Ssewanyana, S., Nabyonga O.J., Kasirye, I., and Lawson, D. 2004. Demand for health care services in Uganda: Implications for poverty reduction, EPRC mimeo.,

Ssewanyana, S., Okidi, J., Angemi, D., and Barungi, V. 2004. Understanding the determinants of income inequality in Uganda, Background paper for PEAP, EPRC.

Shenggen Fan Xiaobo Zhang and Neetha, Rao 2003 Public expenditure, growth and poverty reduction in rural Uganda, International Food Policy Research Institute.

UBOS., 2003. Uganda National Household Survey 2002/03, Report on the socio-economic survey.

UBOS., 2003. Uganda National Household Survey 2002/03, Report on the labour force survey.

Udry, C. 1996. Gender, agricultural production and the theory of the household. *Journal of Political Economy*, 104:1010-1046.

Williamson, T and Canagaraja, S. 2003. Is there a place for virtual poverty funds in pro-poor public spending reform? Lessons from Uganda's PAF, *Development Policy Review* 21:4.

## APPENDIX TABLES

**Table 19: Calories used in estimating poverty lines**

Foods	Kilocalories per 100 grams of edible part
Fresh yellow maize	165
Dry white maize grain	345
Maize flour	335
Finger millet grain	315
Finger millet flour	320
Rice	335
Sorghum grain	345
Sorghum flour	335
Bread, white	240
Bread, brown	235
Fresh cassava	140
Cassava flour	320
Sweet potato	460
Fresh yam	110
Fresh beans	105
Fresh peas	105
Dried beans	320
Dried cow peas	320
Dried soya beans	405
Groundnuts	570
Simsim	592
Eggplant	30
Matoke	82
Sweet banana	82
Beef	235
Goat meat	170
Pork	625
Mutton	255
Poultry	140
Chicken egg	140
Dried fish	255
Cow milk	79
Powder milk	355
Orange	44
Passion fruit	48
Pineapple	48
Mango	60
Cabbage	25
Dodo	58

Source: West et al

**Table 20: Distribution of Household poverty status by agro-ecological zones**

Agro-ecological zone	Non-Poor (%)	Poor (%)
Intensive banana -coffee	77.02	22.98
Western banana-coffee-cattle	75.85	24.98
Montane	69.13	30.87
West Nile cereal-cassava-tobacco	51.92	48.08
Annual cropping and cattle northern	47.56	52.44
Pastoral and some annual crops	44.48	55.52
Annual cropping and cattle -Teso	50.60	49.40
Banana-millet-cotton	70.06	29.94
Medium altitude intensive banana-coffee	67.76	32.20
<b>Total</b>	67.76	32.24
	Pearson chi2(8) =525.1810	Pr=0.000

Source: Computed from UBOS UNHS 2002/2003 survey data

**Table 21: Distribution of Household source of lighting by agro-ecological zones**

Agro-ecological zone	Other sources (%)	Electricity (%)
Intensive banana -coffee	79	21
Western banana-coffee-cattle	89	11
Montane	88	12
West Nile cereal-cassava-tobacco	98	2
Annual cropping and cattle northern	94	6
Pastoral and some annual crops	99	1
Annual cropping and cattle -Teso	94	6
Banana-millet-cotton	91	9
Medium altitude intensive banana-coffee	89	11
<b>Total</b>	90.4	9.6
	Pearson chi2(8)=344.5116	Pr=0.000

Source: Computed from UBOS UNHS 2002/2003 survey data

**Table 22: Distribution of Household sources of earnings by agro-ecological zones**

Agro-ecological zone	Agricultural (%)	Non-agricultural (%)
Intensive banana -coffee	73	27
Western banana-coffee-cattle	68	32
Montane	61	39
West Nile cereal-cassava-tobacco	47	53
Annual cropping and cattle northern	63	37
Pastoral and some annual crops	87	13
Annual cropping and cattle -Teso	72	28
Banana-millet-cotton	68	32
Medium altitude intensive banana-coffee	73	27
<b>Total</b>	69	31
	Pearson chi2(8)=226.1421	Pr=0.000

Source: Computed from UBOS UNHS 2002/2003 survey data

**Table 23: Household access to produce markets by agro-ecological zones**

Agro-ecological zone	Outside 5 Km	Within 5 Km
Intensive banana -coffee	28	72
Western banana-coffee-cattle	29	71
Montane	28	72
West Nile cereal-cassava-tobacco	6	94
Annual cropping and cattle northern	22	78
Pastoral and some annual crops	56	44
Annual cropping and cattle -Teso	70	30
Banana-millet-cotton	37	63
Medium altitude intensive banana-coffee	18	82
<b>Total</b>	31	69
	Pearson chi2(8)=827.1042	Pr=0.000

Notes: Access is measured by proximity of produce market within a 5 Km radius of household.

Source: Computed from UBOS UNHS 2002/2003 survey data

**Table 24: Household access to input markets by agro-ecological zones**

Agro-ecological zone	Outside 5 Km	Within 5 Km
Intensive banana -coffee	32	68
Western banana-coffee-cattle	31	69
Montane	30	70
West Nile cereal-cassava-tobacco	11	89
Annual cropping and cattle northern	36	64
Pastoral and some annual crops	56	44
Annual cropping and cattle -Teso	75	25
Banana-millet-cotton	37	63
Medium altitude intensive banana-coffee	22	78
<b>Total</b>	35	65
	Pearson chi2(8)=722.7045	Pr=0.000

Notes: Access is measured by proximity of input market within a 5 Km radius of household.

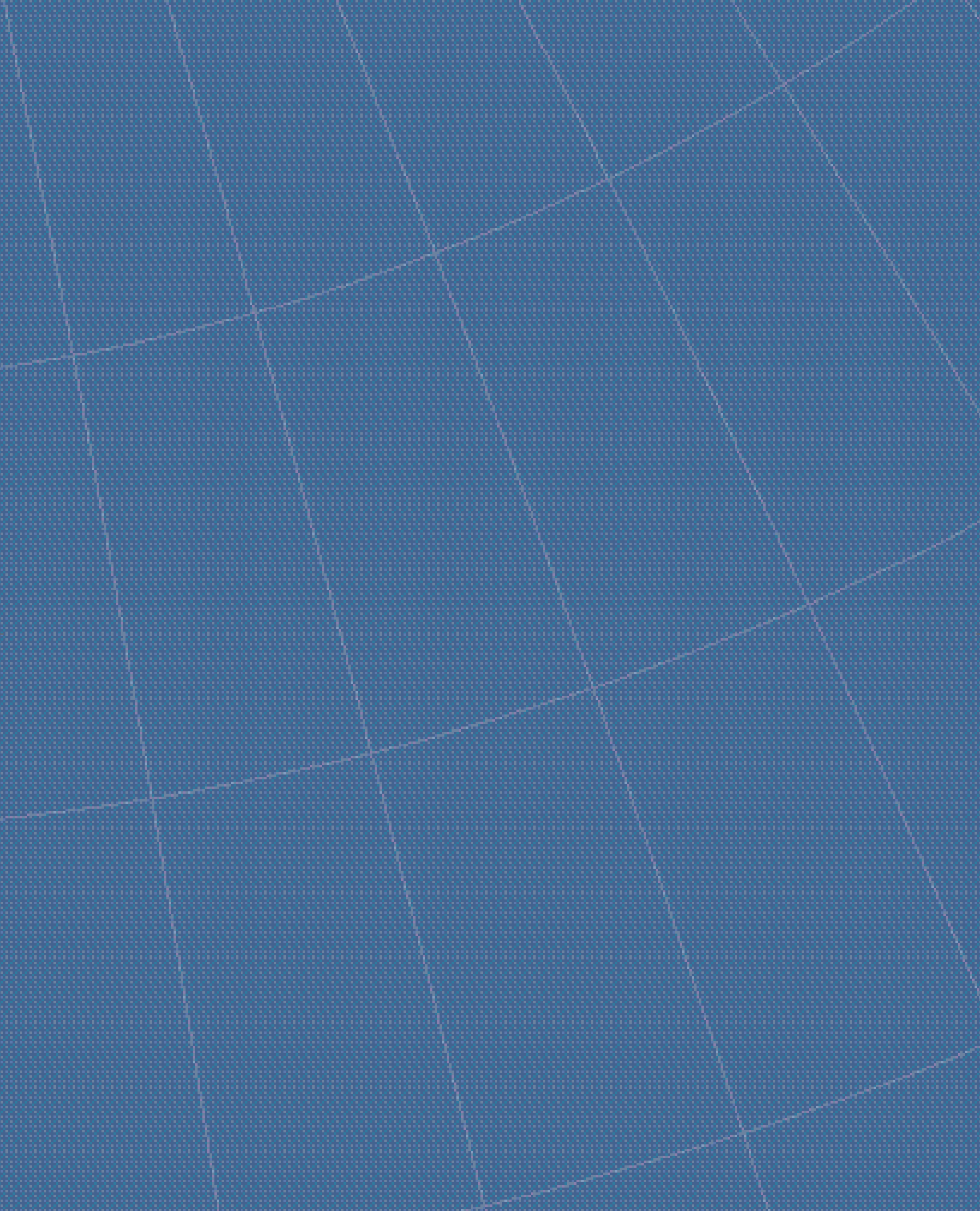
Source: Computed from UBOS UNHS 2002/2003 survey data

**Table 25: Categorization of crop income by agro-ecological zones**

Agro-ecological zone	0-50,000	50,001-100,000	100,001-500,000	500,000+
Intensive banana -coffee	66	10	19	
Western banana-coffee-cattle	55	16	25	
Montane	53	16	27	
West Nile cereal-cassava-tobacco	44	15	32	
Annual cropping and cattle northern	62	15	21	
Pastoral and some annual crops	99	0	1	
Annual cropping and cattle -Teso	78	10	9	
Banana-millet-cotton	67	14	16	
Medium altitude intensive banana-coffee	63	12	21	
<b>Total</b>	64	13	20	
			Pearson chi2(8)=827.1042	Pr=0.000

Notes: Household crop income refers to year preceding survey.

Source: Computed from UBOS UNHS 2002/2003 survey data.



**Institute for International Integration Studies**

The Sutherland Centre, Trinity College Dublin, Dublin 2, Ireland

