

# **Determinants of Poverty in Sierra Leone, 2003**

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Sonja Fagnäs and Lindsay Wallace

## Acronyms

GoSL	Government of Sierra Leone
HIES	Household Income and Expenditure Survey
IMF	International Monetary Fund
UNDP	United Nations Development Programme
PRSP	Poverty Reduction Strategy Paper
RSLAF	Republic of Sierra Leone Armed Forces
SLP	Sierra Leone Police Forces
TRC	Truth and Reconciliation Committee
UNAMSIL	UN Peacekeeping Force in Sierra Leone

## Executive Summary

Sierra Leone is a resource rich, but highly indebted poor country in West Africa. The nature and depth of its poverty have not been well understood, as a devastating civil conflict from 1990 to 2002 prevented the collection of survey data and damaged Sierra Leone's people, resources and economy. This paper models the determinants of poverty in Sierra Leone based on the 2003 *Household Income and Expenditure Survey* (HIES). An OLS regression model of poverty determinants is developed, and it is amongst the first papers to include war-related variables in its analysis.

The survey reveals that almost 80% of individuals in rural households were poor, and urban poverty outside the capital city of Freetown was also significant at 71%. Poverty was also greater in the more remote districts. The analysis suggests that the poor were less likely to be educated and more likely to work in agriculture, particularly in rice production. Cocoa farmers were also very likely to be poor, which could be explained by the neglected state in which the war left the plantations of this once income-generating export crop. Over 98% of households in the poorest quintile of the population indicated that they were affected by the war compared with 87% in the richest households. Sierra Leoneans viewed the war as a key factor in their poverty, despite the fact that the country was underdeveloped prior to the outbreak of the hostilities.

Following a descriptive analysis of the correlates of poverty, a series of variables are regressed against household consumption to ascertain the factors that affect poverty, with separate models for Freetown, other urban areas and rural areas. Determinants of poverty are found to differ among the models. Households in urban areas were found to be generally better-off, even when controlling for other variables. Female education, in particular, both primary and secondary, was associated positively with household welfare, as was the number of women in the household. Agricultural work was associated with higher poverty in the rural areas, as was the cultivation of cocoa. The ownership of a farm without deeds was associated positively with household welfare, as was the area of land held.

One of the key findings of the survey is that the consequences of war are reflected in poverty levels, and the association differs depending on whether the household is rural, urban or resides in Freetown. Rural households with war refugees are poorer than others, whereas the loss or damage to property due to the war appeared to be negatively associated with poverty only in the urban areas outside of Freetown. The variables examined suggest that the effects of the war were not reflected in the poverty status of households residing in Freetown. The loss of property, having one's house burnt down as a result of war and having a relative killed during the war all had a statistically significant negative coefficient in the urban (excluding Freetown) regression. The Government of Sierra Leone has begun to address a number of the issues raised here with the Poverty Reduction Strategy Paper (PRSP), finalised in 2005. In particular, the strategy has focused on strengthening governance, improving pro-poor growth and developing human capital (GoSL, 2005). However, there are some findings resulting from our analysis that should be addressed in future iterations of the PRSP, including specific programmes focusing on supporting war refugees and cocoa producers.



## Chapter 1: Introduction

Sierra Leone is amongst the world's poorest countries, having long ranked near the bottom of the UNDP Human Development Index. From 1990 to 2002, a devastating civil war brought economic development to a halt and led to the death and displacement of large numbers of Sierra Leoneans. The depth and nature of poverty in post-conflict Sierra Leone are not known as the civil unrest prevented data collection and analysis. In 2003, as part of its Poverty Reduction Strategy Paper, Statistics Sierra Leone, with the support of the World Bank and the UK Department for International Development (DFID), carried out a Household Income and Expenditure Survey (HIES). This survey, the first conducted for over a decade, gathered information on household income, asset accumulation and expenditure patterns. It provided an opportunity to explore the determinants of poverty in Sierra Leone to guide future policy development.

The purpose of this paper is to examine the determinants of poverty in Sierra Leone based on the 2003 HIES, and to assess the impact of the war on poverty levels. It does so by means of both descriptive and regression analysis. The model developed builds upon similar work undertaken on the determinants of poverty in a variety of sub-Saharan African countries including Côte d'Ivoire (Glewwe, 1991), Mauritania (Coulombe and McKay, 1996), Malawi (Mukherjee and Benson, 2003), Ghana (Sackey, 2004), Burkina Faso (Fofack, 2002), and Mozambique (Simler et al., 2004 and Bruck, 2001a). It is amongst the first papers to use the HIES data and to include war-related variables in its analysis of the determinants of poverty.

The paper is structured as follows: Chapter 2 presents background information on Sierra Leone, highlighting key macroeconomic and structural factors, plus a brief background on the conflict. Chapter 3 describes the data collection and aggregation methodologies used by Statistics Sierra Leone. Poverty measures are examined in Chapter 4, while Chapter 5 describes the highlights of the poverty profile and the empirical model. The results of the analysis are presented in Chapter 6, and conclusions in Chapter 7. Annex 1 provides a summary of the poverty profile showing how individual and household characteristics are associated with poverty at a descriptive level.

## Chapter 2: Sierra Leone Background

### 2.1. General economic and social background

Despite being well endowed with natural resources, Sierra Leone remains one of the world's poorest countries. Rich in mineral resources including significant deposits of rutile, diamonds and bauxite, it also has large amounts of arable land and produces a number of cash crops including coffee, cocoa and groundnuts. Sierra Leone is a Highly Indebted Poor Country with a GDP per capita of US\$135 (2004), which is amongst the lowest in the world (IMF, 2005). It is also a prime example of a country suffering from the resource curse: the paradox of countries with significant natural resource endowments experiencing low growth rates. This paradox was first explored by Sachs and Warner (1995), who found that economies with a high ratio of natural resource exports in 1971 tended to have low growth rates during the period 1971–89 even controlling for important growth-related variables such as trade policy, government efficiency, investment rates and initial per capita income. Perälä (2003) furthered this analysis by focusing on the type of resource endowment, finding that, in the absence of social cohesion, countries with abundant oil or mineral resources are less likely to experience economic growth than those abundant in agricultural resources. Olsson (2003) found that diamond abundance has a U-shaped relationship with economic growth. These cross-country analyses suggest that Sierra Leone's wealth of mineral resources, diamonds in particular, may have played a role in its lack of development.

Compared with other African countries, Sierra Leone also has a relatively small population (4.8 million est. in 2002) of whom approximately 66% live in rural areas and most of whom are supported by subsistence agriculture. According to various indicators, the level of development in Sierra Leone remains very low. It ranked second worst in the 2005 *Human Development Report* (UNDP, 2005) and has consistently ranked at or near the bottom of the index for the past decade. (see GoSL, 2005 for more details). According to the same report, life expectancy at birth is only 40.8 years compared with a sub-Saharan African average of 46.1. The infant and under-five mortality rates are the worst in the world at 166 and 284 per 1000 births respectively, compared with sub-Saharan African averages of 105 and 179 per. Maternal mortality is also the worst in the world at 2,000 deaths per 100,000 live births. The level of education is also low, with the literacy rate for adults above the age of 15 being only 29.6%. Half of the population is undernourished (UNDP, 2005). More information on the standard of living in Sierra Leone can be found in the poverty profile in Annex 1.

Sierra Leone has historically been marred by poor governance, which worsened during the conflict. It is now considered broadly democratic, having held parliamentary and presidential elections in May 2002. Administratively it comprises thirteen administrative districts,<sup>1</sup> and a new policy of decentralisation began with district government elections in 2004 (see GoSL, 2005). However, government services are still primarily managed in Freetown, with only limited devolution of powers to the local level having taken place to date. Economic development and access to public services remain significantly more advanced in Freetown than in the rural areas.

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<sup>1</sup> A map of Sierra Leone along with descriptions of each of the districts can be found in Annex 3.



The government has begun to take steps to tackle the immense poverty and under-development. The Poverty Reduction Strategy Paper (PRSP) was finalised in 2005. In particular, the strategy focuses on strengthening governance and improving security, enhancing the potential for pro-poor economic growth and food security and developing human capital. Among other goals, it lists support for agriculture and fisheries in order to enhance economic potential as well as strengthening economic services and infrastructure, and enhancing the health and education systems (GoSL, 2005). As part of the Education for All National Action Plan tuition fees have been abolished for primary school, a programme of school reconstruction and rehabilitation has been introduced, the supply of free textbooks to primary schools has been enhanced, the provision of non-formal primary education expanded and incentives introduced for girls to attend secondary schools.

## **2.2 The conflict**

The 1991–2002 civil conflict has dominated life in Sierra Leone for the past sixteen years. During this period, political instability, military interventions and civil unrest disrupted everyday life. An estimated 20,000 people were killed, thousands more were injured or maimed and over 2 million people were displaced, 500,000 of whom fled to neighbouring countries (GoSL, 2005). The conflict was characterised by brutal attacks on civilian targets, the use of child soldiers by rebel groups, and periods of collusion between the army and the rebel groups (Keen, 2001).

The conflict also had a devastating impact on the economy, destroying economic and physical infrastructure, halting major mining activities and causing the abandonment of farms and plantations. It brought about the total collapse of public service delivery in rural areas, especially in health and education (World Bank, 2005). Many schools stopped operating or were destroyed by 2001, and only 13% of schools were usable (*ibid.*). Between 1991 and 2001, real GDP contracted by 5% a year, while interest rates remained high at 30% (IMF, 2005).

The cause of rebel wars like that in Sierra Leone has recently become the subject of academic debate. Much of the discussion has focused on whether greed (the opportunity for enrichment by rebel groups through the expropriation of resources) or grievances (rebellions breaking out because of legitimate complaints against governments) are the primary cause of conflict. In a cross-country regression, Collier and Hoeffler (2004) found that factors focusing on greed held more explanatory power than those related to grievances. They also found that countries like Sierra Leone, with high levels of commodity exports, low levels of secondary schooling, slow economic growth and low per capita income show a greater tendency to fall into conflict. The presence of diamonds has been argued by Olsson (2003) to be a key factor in stimulating rebel movements, as alluvial diamonds are easy to appropriate and highly tradeable. Deininger (2003), however, examines household level data in Uganda and found the lack of economic development to be the key factor that increased the incidence of civil strife. In particular, the provision of public goods, such as health care and education, was found to be a much more significant factor in determining civil strife than traditional greed factors.

Regression analysis can tell only part of the story and, as noted by Keen (2005), the war in Sierra Leone was too complex to be attributed to either greed or grievance alone. The most common explanations for the war include government corruption, the presence of easily mined alluvial diamonds to fund the rebellion and a historical over-

centralisation of resources and services in Freetown. Richards (2003), however, argues against the idea that diamonds were a primary cause of the conflict insisting instead that the social exclusion of young people and the poor was the primary cause. Similarly, Keen (2003) argues that, while diamonds helped to feed the hostilities, it was internal factors including the chieftaincy system, corruption, youth exclusion and the poor education system that caused the war.

Following the military intervention of the UN and the UK, the conflict was declared over in 2002. Since then, life in Sierra Leone has improved significantly as goods, services and people (including humanitarian assistance) are able to move freely throughout the country. The economy has begun to recover with GDP growth reaching a record 9.3% in 2003 and 7.4% in 2004 (World Bank, 2005b). Over 150,000 internally displaced persons (IDPs) and refugees have been resettled, while 72,000 ex-combatants have been disarmed and demobilized, and 56,000 ex-combatants have participated in reintegration activities. Internal security has also improved with the deployment of the United Nations Peacekeeping Force in Sierra Leone (UNAMSIL), followed by the continued improvement of the capabilities of the Sierra Leone Police Forces (SLP) and of the Republic and the Sierra Leone Armed Forces (RSLAF).

Concurrent with the improved security situation has been progress in dealing with the impact of the conflict. The Truth and Reconciliation Committee (TRC), which documented wartime atrocities, completed public hearings attended by all parties involved in the conflict, and submitted its report in 2004. A United Nations-sponsored Special Court has indicted 15 persons for crimes committed during the civil conflict, including former Liberian President Charles Taylor.

While the political and security situation has improved significantly over the past few years, one of the more worrying findings of recent conflict analysis is that states that have recently emerged from hostilities are much more likely to fall back into conflict. Collier et al. (2006) find that post-conflict countries have a 40% likelihood of resuming hostilities and that sustained economic growth (supported by an external military presence) is a key factor in reducing the risk of future conflicts. Richards (2003) argues that unless the issues of the social exclusion of the young and poor are addressed during post-war reconstruction, particularly in rural areas, Sierra Leone stands a high chance of falling back into war.

## Chapter 3: The Household Income and Expenditure Survey

Conducting the survey was a significant logistical undertaking by Statistics Sierra Leone, particularly in light of the difficulties in accessing remote areas of the country. A total of 3,720 households, (including 2,400 rural households) were surveyed. The survey covers a total of 23,022 individuals. It was carried out over twelve cycles between November 2002 and October 2003 with up to seven visits per household possible. A variety of issues were covered including consumption, income, savings, asset levels, migration, occupation, housing, health, education and agriculture. Statistics Sierra Leone also administered a price questionnaire, which collected information on the prices of various food and household commodities throughout the country and formed the basis of the cost of living index. A questionnaire containing questions about community characteristics was also administered. Oversight was provided by the World Bank.

One of the constraints in the data collection was the sampling frame. It was based on the 1985 population census, which was out of date, given the large amount of migration and displacement that occurred as a result of the war. Nevertheless, it was the best frame available at the time of the survey, and was also the basis for other surveys such as the Multi Indicator Cluster Survey undertaken by UNICEF in 2000. A new census was in the early stages of preparation during the HIES and new weights based on these census data are currently being calculated. However, the lack of a robust sampling frame must be identified as a weakness in the data analysed here. The level of bias that this frame may cause is currently not known.

A sample of 226 enumeration areas was drawn from the list of 1985 census enumerator areas, and this was ordered by region, district and urban/rural classification. Urban and rural areas were sampled separately via stratified sampling, so that the overall urban-rural division of the population was maintained. The proportion of urban enumeration areas in the sample was therefore the same as the proportion of total population living in urban areas. In each of the urban enumeration areas 20 households were randomly selected, whereas 15 households were randomly selected in the rural enumeration areas (Statistics Sierra Leone, 2004)

As with all household surveys, there are some issues of data quality that need to be addressed. First, it should be noted that some of the survey questions include a number of missing responses, where the question was applicable. This may be due to the general reluctance of people to answer questions being asked by a government organisation following the war, or it may be due to human error in the survey process. However, missing values are not a significant problem for the variables examined. Questions with higher numbers of missing values have been excluded from the poverty profile, since they could lead to misleading results.

Another area of concern is the possible exclusion of homeless individuals, as the survey was undertaken on a household basis. Richards (2004) has highlighted the importance of homeless youth in the civil war and has noted that these individuals often tend to be the poorest and most excluded members of society. It is possible, therefore, that the survey underestimates the level of poverty in the country. We have been unable to find any indication of the level of homelessness in 2003, although

Humphries and Weinstein (2004) found that over 60% of ex-combatants were displaced from their homes prior to joining a warring faction, indicating that homelessness has been a contributing factor in the conflict. It should also be noted that there may have been situations where the conflict enhanced the welfare of certain individuals or households, in particular homeless youth and others who were able to profit from looting or diamond mining, in which case the survey data may overstate poverty levels. However, despite these issues, the data quality has been assessed as sufficiently robust to support regression analysis.

## Chapter 4: Defining and Measuring Poverty in Sierra Leone

As noted by Dercon (2005a), poverty measurement involves three steps: choosing a quantitative welfare indicator, choosing a means of discriminating between the poor and non-poor (through the use of a poverty line), and aggregating this information into a poverty measure for a particular population. As is the current convention, the welfare indicator measured in the Sierra Leone HIES was a basket of goods *consumed* at the *household* level.<sup>2</sup> Consumption, rather than income, was used as the welfare indicator as it tends to be smoother and more reliable. This is particularly true in rural societies where much income is self-produced in the form of agricultural goods and it is difficult to assign income values to these enterprises (Mukherjee and Benson, 2003). Consumption is also less prone to under-reporting (Benson et al., 2004, Dercon, 2005a). As noted by Atkinson (1989), income can be interpreted as a measure of welfare opportunity, whereas consumption can be viewed as a measure of welfare achievement.

Household-level analysis was undertaken because, as noted by Coulombe and McKay (1996) and Dercon (2005a), poverty is fundamentally a household-level phenomenon and this is the level at which the expenditure data are available. In order to make comparisons between households of different sizes, per capita consumption or per 'adult' consumption values are required. In Sierra Leone, a series of adult equivalences were developed based on an equivalence scale developed for the 1998 Ghana household survey, (Annex 2). Adult equivalences use a weight assigned to each household member based on needs, which is typically contingent on age (for example, children need fewer calories than adults), and takes into account the economies of scale of large households. However, as noted by Deaton (1997), there are limitations to finding an effective adult equivalency scale.<sup>3</sup>

Statistics Sierra Leone used a cost of basic needs approach to develop a poverty line. A food poverty line was calculated from the consumption habits of the poorest 20% of the population. It was calculated based on the cost of an adult equivalent attaining the minimum nutritional requirement of 2700 calories. This was approximately 1033 Leones (Le) per day (May 2003 national prices). From this an extreme (or food) poverty line, of Le 377,045 per year per adult equivalent was calculated. After

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<sup>2</sup> Sen (1999) has argued the importance of focusing on qualitative measures of poverty to include absences of one or more of the basic capabilities that are needed to function in society, such as health and education. Indeed, one can argue that, given the high level of correlation between indicators of monetary and non-monetary poverty (poor health and education status, for example), non-monetary measures are reflected in monetary status. Deaton (2004) has argued that this can imply that the poor are indeed poorer and the rich richer, in real terms, than when measured by monetary means alone. While such an analysis of poverty is beyond the scope of this paper, it is important to keep in mind the limitations of the monetary measures being used.

<sup>3</sup> Mukherjee and Benson (2003), Bruck (2001a) and Deaton (1997) argue for the use of per capita consumption as the basis of the welfare indicator as opposed to the adult equivalent, for the sake of simplicity and because it more closely reflects reality. Per capita consumption assumes that the needs of everyone in the household are the same irrespective of age. Adult equivalences assume that each household member enjoys the same level of welfare for different levels of consumption (i.e. children and women need to consume less food than men to achieve the same level of welfare). It normalises consumption by taking into account age and gender. It should be noted, however, that consumption of non-food items is not very closely linked with age or gender.

controlling for household size, a household whose annual expenditure fell below the poverty line was deemed to be in extreme poverty as it was unable to cover its food costs.<sup>4</sup> Given that a household is unlikely to devote all of its income to purchasing food, the cost of other required non-food items (including shelter, health, education and sanitation) was calculated at Le 393,633 per year per adult equivalent based on the consumption habits of the poorest 20%. The poverty line was therefore set at 770,678 Le (food plus non-food) per adult equivalent per year, approximately 2,111 Le per day or approximately \$1 per day (March 2003 exchange rate). As monetary values differed across the country and seasonally, household expenditure was deflated regionally and seasonally, based on the local prices found in the regional price survey conducted throughout the year as part of the survey process.<sup>5</sup>

Three measures of the intensity of poverty of the Foster et al., (1984) class are used to describe the levels of poverty in Sierra Leone. These poverty measures  $P_\alpha$  are based on the following equation:

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

where  $n$  is the population size, individuals ( $i$ ) have been ranked from the poorest to the richest,  $y_i$  is the consumption expenditure (standard of living) for individual  $i$ ,  $z$  the minimum expenditure required to be above the poverty line,  $q$  the number of individuals defined as poor and  $\alpha$  a parameter reflecting the weight placed on the very poorest.

When  $\alpha = 0$ , equation (1) is equal to the headcount ratio of poor people. This is defined as the percentage of people falling below the poverty line and is the most commonly used measure of poverty, although a number of authors have highlighted some of its weaknesses (Ravallion, 1996, Deaton, 1997). In particular, it is not sensitive to variations within the poor. When  $\alpha = 1$ , the index takes into account the number of those in poverty and the average depth of poverty. This is commonly referred to as the poverty gap and provides the cost (as a percentage of the poverty line) of lifting all the poor out of poverty. When  $\alpha = 2$ , the index also reflects the distribution of poverty amongst the poor and places greater weight on those furthest from the poverty line. This is referred to as poverty severity or the squared poverty gap index. It is sensitive to inequality amongst the poor, since a higher weight is placed on those who are farthest away from the poverty line (Dercon, 2005a). For all of the measures, the higher the  $P$ , the higher the poverty level.

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<sup>4</sup> While using a minimum calorie requirement is a common method of determining the poverty line, Deaton (2004) highlights some of the weaknesses of this approach. First, the minimum calorie requirement varies amongst individuals depending upon body type and occupation, with sedentary workers requiring fewer calories than agricultural workers. Second, there is little differentiation between the type of calories consumed so that protein and micronutrient deficiencies will not be captured.

<sup>5</sup> Appleton (2003) argues the case for developing regional poverty lines in Uganda based on differing tastes in different regions. However, such an approach was beyond the scope of this data set and it does not appear that tastes differ significantly in different parts of the country. It is worth noting that expenditure data are available for all but seven households in the sample, and all have a positive value.

Table 4.1 summarises the above poverty measures by region and district for the standard poverty line.<sup>6</sup> The poverty measures are calculated both at the household and the individual level. Both are based on household expenditure per adult equivalent, but in the first case the values are summarised across all households and in the second across all individuals. Table 4.2 replicates the measures for the ultra/food poverty line, which was set at 377,045 per year. The figures in the tables correspond closely with those presented in the Poverty Reduction Strategy Paper (GoSL, 2005).

**Table 4.1 Measures of poverty (2003)**

	Individual Basis			Household Basis		
	<i>Poverty Headcount</i>	<i>Poverty Gap</i>	<i>Poverty Severity</i>	<i>Poverty Headcount</i>	<i>Poverty Gap</i>	<i>Poverty Severity</i>
	( $\alpha=0$ )	( $\alpha=1$ )	( $\alpha=2$ )	( $\alpha=0$ )	( $\alpha=1$ )	( $\alpha=2$ )
<b>Urban/Rural Divide</b>						
Freetown	0.16	0.04	0.17	0.15	0.38	0.14
Rural	0.81	0.37	0.20	0.77	0.34	0.18
Urban excl. Freetown	0.71	0.28	0.14	0.67	0.25	0.12
<b>District</b>						
Bo	0.65	0.29	0.16	0.62	0.27	0.15
Bonthe	0.85	0.40	0.22	0.83	0.36	0.19
Moyamba	0.67	0.26	0.12	0.66	0.24	0.11
Pujehun	0.62	0.22	0.10	0.57	0.18	0.08
Kailahun	0.92	0.45	0.25	0.90	0.43	0.24
Kenema	0.87	0.40	0.22	0.84	0.37	0.20
Kono	0.65	0.26	0.14	0.65	0.25	0.13
Bombali	0.90	0.53	0.34	0.88	0.50	0.31
Kambia	0.78	0.24	0.09	0.68	0.20	0.08
Koinadugu	0.79	0.36	0.20	0.75	0.33	0.18
Port Loko	0.84	0.35	0.17	0.79	0.31	0.16
Tonkolili	0.89	0.39	0.22	0.86	0.36	0.19
Western Area	0.44	0.18	0.09	0.41	0.16	0.08
Total	0.71	0.31	0.16	0.68	0.29	0.15

As Table 4.1 shows, poverty in Sierra Leone at the time of the survey was primarily a rural phenomenon. Over 77% of rural households and 81% of rural individuals were poor. However, urban poverty outside Freetown was also significant at 71%. Poverty was also much greater in the more remote districts of the country. In Kailahun, over 90% of the population and 90% of the households were living below the poverty line. This may have been due to the impact of the war on the cocoa and coffee plantations in the region, which had been a significant income earner in pre-war times. The poverty gap was greater in rural and remote districts, as was the severity of poverty. The poverty gap and severity index were greatest in Bombali, despite the headcount being higher in Kailahun, indicating that there were more severely poor people in Bombali.

<sup>6</sup> A map of Sierra Leone and its various districts can be found in Annex 3.

**Table 4.2 Measures of ultra poverty**

	Individual Basis			Household Basis		
	<i>Poverty Headcount</i> ( $\alpha=0$ )	<i>Poverty Gap</i> ( $\alpha=1$ )	<i>Poverty Severity</i> ( $\alpha=2$ )	<i>Poverty Headcount</i> ( $\alpha=0$ )	<i>Poverty Gap</i> ( $\alpha=1$ )	<i>Poverty Severity</i> ( $\alpha=2$ )
<b>Urban/Rural Divide</b>						
Freetown	0.02	0.003	0.0006	0.01	0.001	0.00
Rural	0.34	0.10	0.42	0.31	0.09	0.04
Urban exc. Freetown	0.22	0.06	0.02	0.19	0.05	0.02
<b>District</b>						
Bo	0.27	0.08	0.04	0.25	0.07	0.03
Bonthe	0.35	0.10	0.04	0.29	0.08	0.03
Moyamba	0.17	0.04	0.01	0.17	0.04	0.02
Pujehun	0.16	0.03	0.01	0.10	0.02	0.01
Kailahun	0.50	0.12	0.04	0.46	0.11	0.04
Kenema	0.42	0.11	0.04	0.38	0.09	0.03
Kono	0.22	0.07	0.03	0.20	0.06	0.03
Bombali	0.64	0.22	0.09	0.58	0.20	0.08
Kambia	0.11	0.16	0.002	0.07	0.01	0.002
Koinadugu	0.31	0.10	0.05	0.29	0.09	0.04
Port Loko	0.21	0.06	0.02	0.19	0.05	0.02
Tonkolili	0.36	0.11	0.06	0.30	0.10	0.05
Western Area	0.18	0.03	0.001	0.14	0.03	0.006
Total	0.28	0.08	0.03	0.25	0.07	0.03

Again, ultra poverty was primarily a rural phenomenon, with urban ultra poverty outside of Freetown also being relatively high. Ultra poverty was relatively higher in rural than urban areas compared with overall poverty, which implies that the poorest of the poor in Sierra Leone were most likely to be found in the rural areas. Bombali had the greatest number of ultra-poor individuals and households, whereas Kailahun had the largest number of poor individuals and households. Bombali also had the largest overall and ultra poverty gaps and levels of ultra poverty severity on both a household and an individual basis.

The Gini co-efficient for Sierra Leone on a household basis was calculated at 0.41. It is the average of the absolute value of the differences between consumption levels for all individuals in the population relative to the mean consumption level of the population. Complete equality would yield a Gini of 0 (each proportion of the population consumes equivalent amounts) whereas complete inequality would yield a Gini of 1. This coefficient is comparable with that of other countries in the region.<sup>7</sup>

These figures do not differ significantly from previous surveys in Sierra Leone. The most recent household survey was undertaken in 1989/90 just before the outbreak of the war and showed that 82% of the population were living below the poverty line of US\$ 1 per day. It also found that 88% of the rural population was considered poor compared with 71% of the urban population (Central Statistics Office, 1990). A Gini coefficient of 0.629 was also calculated. While the results of the 2003 survey appear to

<sup>7</sup> The UNDP 2005 *Human Development Report* reported the following Gini coefficients for nearby countries: Gambia (0.475), Guinea (0.403) and Senegal (0.413).



indicate that poverty and inequality have decreased, because the two surveys used significantly different methodologies, it is not possible to compare them at a detailed level.

## Chapter 5: Determinants of Poverty: Description and Modelling Approach

This paper analyses the characteristics associated with poverty in two stages. The first step is to build a poverty profile by means of descriptive analysis of both household and individual characteristics and their association with poverty levels. In the choice of issues covered we have been guided by data availability and existing research on the determinants of poverty in other countries. The second step is to carry out a regression analysis that aims to distinguish the roles of different individual factors in household poverty. The regression analysis is undertaken at the household level, but individual-level data are used to build some further household characteristics. Previous research and the observations arising from the poverty profile are used to formulate testable hypotheses. This Chapter presents a profile of poverty based on the key findings of the descriptive analysis (Section 5.1), describes the regression model (Section 5.2) and the hypotheses to be tested (Section 5.3).

### 5.1 Descriptive analysis

This section highlights briefly the key areas of the poverty profile. A more detailed review, including statistical tables, can be found in Annex 1. The focus here is kept on areas for which variables are also included in the regression analysis.

There are a number of characteristics that correlate highly with poverty. These include location, aspects of household composition, education levels, employment status, asset ownership levels, war experience, social capital and the use of remittances.

Most variables of household composition are not highly correlated with poverty. Poor households are not more likely to be headed by a female, or by older or younger individuals. One area that did differ was household size. Poorer households tended to be slightly larger than non-poor households (6.5 people compared with 5.5).

Education variables, on the other hand, are generally found to be correlated with poverty. The poor, and poor women in particular, were less likely to be educated, or to attend school. Only 34% of men and 19% of women over the age of 14 were able to read in English, the primary language of the education system. The levels of literacy and numeracy were also low even amongst graduates. However, several of the statistics indicate that gender inequality in the education system is decreasing, and the primary school net enrolment rate for females was found to be higher than for males across all quintiles.

Employment and occupation variables also correlate highly with poverty. Agriculture and petty trading (wholesale and retail trade) were the most common forms of employment amongst both the poor and the non-poor, but a larger share of non-poor were involved in wholesale trade and services and a lower share in agriculture. Amongst farmers, rice was the most common crop grown by all expenditure quintiles, but the cultivation of cocoa and coffee, both export crops, was particularly concentrated in poor households. This finding is surprising, as one would normally expect those producing export crops to be less poor than subsistence farmers.

Wage employment was not common. The survey revealed that only 10% of respondents between the ages of 15 and 65 worked for a wage. Richer households tended to be less involved with agriculture and operated their own enterprises.

Over 70% of businesses had no employees regardless of poverty status, but those in the top expenditure quintiles operated the largest enterprises in terms of number of workers.

Perhaps surprisingly, in terms of asset ownership, a higher percentage of those in the poorest quintile (66%) owned their homes, compared with 44% in the richest quintile. The poor were more likely than the non-poor to own their own homes and to have had land allocated to them within the previous 12 months. Land ownership was higher among the poor than the non-poor. Farm ownership, on the other hand, rises slightly with the expenditure quintile. Another potentially important household asset was livestock. The raising of livestock was not particularly widespread amongst the survey respondents and the differences between the poor and non-poor were not significant in this regard.

It is difficult to understate the impact of the civil war on the people of Sierra Leone. Over 98% of households in the poorest quintile indicated that they had been affected by the war, compared with 87% in the richest quartile. Sierra Leoneans viewed the war as a key factor in their poverty, despite the fact that the country was underdeveloped prior to the outbreak of the war. One-quarter of respondent households thought that the loss of property due to the war was the main cause of their poverty. The poor were also more mobile than the non-poor, and most of them indicated that the war was the primary cause of their mobility. Resettlement programmes have been in place for war refugees or ex-combatants, but the survey does not include sufficient detail to allow us to conclude what the effects of such initiatives have been.

The role of social capital in development has received attention recently. Loosely defined, it refers to the social networks and other associations that bind a community together. The survey found that poor and rural households were more likely to participate in community and labour-intensive public works programmes than non-poor and urban households, but in both cases participation was high. Maintenance of roads and bridges was the main form of participation among the poor, whereas community development activities were carried out mainly by the non-poor.

Remittances can be important sources of income in poor countries, and over 50% of individuals indicated that they had sent remittances to others in the past. In Sierra Leone, 40% of the poor received remittances, compared with 50% of the non-poor. Over 70% of the poor used the money for current consumption. There was also some variation in the use of the funds. Urban recipients in Bo, Freetown and abroad were more likely to use the funds for schooling than those residing in the same village as the sender or in other rural areas.

## **5.2 Modelling approach**

Based on the above observations, this paper takes as a starting point that district- and sector-specific, community, household, and individual characteristics cause poverty and influence the capacity to escape poverty. The descriptive analysis above (and in Annex 1) can only identify bivariate correlations between poverty and certain factors without controlling for the other factors, whereas multivariate analysis identifies the

impact on poverty of individual variables, independently of others. We observe that cocoa and coffee growers were concentrated in Kailahun, where poverty rates were extremely high. However, it is difficult to tell whether a household is poor because of the tendency to grow coffee, since coffee plantations were mainly found in this area, or because of some other feature of this area. Including a district dummy and the crop grown separately in the regression model will give us some indication of this. Similarly, households in urban areas are better off, but this correlation does not reveal what the underlying factors for their relative wealth might be. If, however, households in urban areas tend to have a higher level of education and are thus able to earn more, the regression analysis will disentangle the relative impact of these two variables on poverty.

Poverty can be modelled in a number of ways. The first method is to regress per capita consumption against a series of independent variables. A second approach is to run a probit, or logit regression, where the dependent variable is a binary variable with 1 representing the individual being poor, and 0 the non-poor. Coudouel et al. (2002) and Simler et al. (2004) note that there are a number of weaknesses in the second type of model. Specifically, as the probit/logit approach uses an artificial construct as the dependent variable, information about the actual relationship between the level of consumption and the dependent variables is lost. In particular, Simler et al. (2004) argue that the loss of information by only mapping those who are poor and the arbitrariness of the poverty line limit the effectiveness of modelling poverty rather than consumption. An intermediate approach might be to run a multinomial logit or ordered probit type model, where the poverty indicator is divided into several categories, such as one based on quintiles (see, for example, Coulombe and McKay (1996) and Fissuh and Harris (2004) for similar examples).

For simplicity, and based on the arguments of Simler et al. (2004) and Ravallion (1996), consumption is modelled directly. Appleton (2001) raises the point that, by doing so, one does not control for the fact that the determinants of consumption, or the degree of the impact of different factors, may be different for the poor below the poverty line from the non-poor, since the estimation relies on a simple linear model. However, he finds that the results of a Tobit model, that takes the potential non-linearity into account, and those of a standard ordinary least squared (OLS) model, are not significantly different. The model used in this study is a simple linear model, similar to that used in other countries, most notably Malawi (Benson and Mukherjee (2003)) and Mozambique (Simler et al. (2004) and Bruck (2001)). The model used is as follows:

$$(2) \quad \ln(C_i) = \mathbf{X}_i' \boldsymbol{\beta} + u_i$$

where  $C_i$  is the total household adult equivalent consumption of food and non-food items of household  $i$  in regionally deflated real Le,  $X_i$  is a vector of variables on household characteristics (see Table 3 below), and  $u_i$  a random error term. (Note - change subscripts from  $j$  to  $i$ ).

Due to the differing level and nature of poverty for urban and rural dwellers and the significant differences between Freetown and the Western Area and other urban centres, three separate models were estimated: one for Freetown and the Western Area, one for other urban areas, and one for rural areas, also excluding Freetown and the Western area. This is similar to Glewwe (1991) who found poverty determinants to

be significantly different in rural and urban areas. A model including all households is also estimated. Each model specification will use district dummies to control for unobserved district-specific characteristics.

Some limitations to the model should be noted. First, in the selection of potential determinants, we were guided by the results of the poverty profile as well as the findings of similar studies. However, in the selection and construction of variables, we also made an effort to minimise the possibility of simultaneous causality between the variables, but in some cases this was difficult with a cross-sectional dataset. Care is taken to ensure that correlation between independent variables was within acceptable limits.

Second, it is important to keep in mind that the analysis only represents the determinants of poverty at a single point of time, specifically November 2002 to October 2003. As Coulombe and McKay (1996) note, individuals experience fluctuating living standards over their life cycle. This may be somewhat mitigated in developing countries, because of the practice of multiple generations living together.

Third, bias on coefficients of interest resulting from omitted variables could be another potential problem, not easily controlled for in a cross-sectional dataset. District-level dummy variables are included to control for district-level differences. Due to quite severe inconsistencies in the implementation of the community survey, although desirable, it was impossible to link the majority of the households to community-level information. Community-specific characteristics could not therefore be included in the regression analysis.

### 5.3 Hypotheses and data

Table 5.1 below shows the variables included in the regression analysis and descriptive statistics for them. As there are a total of 3720 households, the number of observations in each case reveals the number of missing values for each. This Section explains the hypotheses attached to each of the variables.

#### *Household composition*

- **Gender of household head (head female):** The gender of the head of household will be included as a determinant of poverty. In Sierra Leone, 67% of female-headed households fell below the poverty line, against 68% of male-headed households. This suggests that gender may not matter. However, a study of Ghana found that female-headed households were 5% more likely to be poorer than male-headed households (Sackey, 2004). In Malawi, Mukherjee and Benson (2003) found that, in one region, the marginal effect of a male-headed household was negative, perhaps due to the high level of male wage-labour migration in the area. Simler et al. (2004) found that male-headed households were richer than female-headed households in Mozambique.
- **Age of household head (age hh):** The poverty profile found little correlation between the age of the household head and poverty. In theory, households with a younger head are less likely to be prosperous than those with a working older one. Households with either older or younger household heads may be more likely to consume less than those with heads of household who are of working age.

- **Single parent (spouse):** This is a dummy variable used to indicate whether or not the spouse of the head of the household lives in the household. Single-parent families are more likely to be poor than two-parent families.<sup>8</sup>
- **Adult student (as):** The existence of an adult student attending school reduces their ability to provide income to the household. A dummy variable is included for this variable. If the student is involved in higher education, however, this is likely to correlate with wealth levels.
- **Household size (hh size):** The majority of studies have found that increased household size is correlated with increased poverty. In Sierra Leone, poorer households tend to be slightly larger than non-poor households. Lanjouw and Ravallion (1995) highlight the need to examine this issue more thoroughly. Mukherjee and Benson (2003), Simler et al. (2003), and Glewwe (1991) use the square of household size as an explanatory variable to allow for non-linearities in the relationship between household size and living standards. Other things being equal, we expect smaller households to be less poor and, following other research, the square of household size is included as an independent variable (hh2). In addition, households with a higher share of children are likely to have fewer income-generating opportunities than those with more adults of working age. The regressions include variables for the proportion of children below the age of 10 (child) in the household and that of adults between the ages of 18 and 65 (adult).
- **Proportion of women in household (prop women):** It is expected that households with a higher proportion of women will be less well-off than those with a lower proportion of women, as women generally have a lower earning potential than men. This also relates to the survey finding that people in polygamous marriages tended to be poorer.

### *Education*

The poverty profile showed many correlations between education levels and poverty. In examining Côte d'Ivoire, Glewwe (1991) found household education levels to be a key determinant of poverty in urban areas, but not in rural. One would expect the returns to education to be higher in urban areas or in Freetown than in rural areas in Sierra Leone. Simler et al. (2004) found that education, specifically women's education, was a key determinant of household poverty status. Similarly, Mukherjee and Benson (2003) found that higher levels of education in Malawi resulted in welfare improvements. Bruck (2001a), on the other hand, using a different data set for Mozambique, found that education was not a significant factor in poverty levels, especially for rural households. The education variables used in the regression analysis for Sierra Leone are:

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<sup>8</sup> Due to the relatively high number of missing observations, a dummy variable is included as an indicator of missing values for this variable (see below). The number of observations is thus raised to 3720 (the total number of households). The exclusion of the variable 'spouse' does not have a significant effect on the results.

- **Primary:** A dummy variable for whether the household has an adult female or male member who has completed at least primary school (at least 6 years). The variable is included separately for women and men.
- **Secondary:** A dummy variable for whether the household has a female or male member who has completed any form of secondary school. Secondary school here refers to any schooling above primary.
- **Mean primary:** The average years of female/male primary education in the household for adult members who no longer attend school (separate for men and women). This is an alternative to the primary dummy variable.

These three sets of variables take the value of zero if there are no adult females or males in the household, or the adult males and females are still enrolled in school, regardless of class completed. To mediate the possibility of simultaneous causality, the education of only those adults who no longer attend school is considered. Adults who currently attend school are assigned a value of zero for education, since it can be argued that their education was not yet in productive use.

- **Literacy of household head (head read):** A dummy variable for literacy of the household head (capacity to read in English).
- **Education of parent (edu father) (edu mother):** A dummy variable for whether the parent of the household head had no education. It was expected that households where the parents of the head of the household had no education would be worse-off than households where the parents were educated. This is a test for whether the lack of education and resulting poverty persists from generation to generation.<sup>9</sup>

All of the education variables cannot be included in the same regression as the average years of education correlate highly with the presence of an educated member. Due to the way the variables are constructed, the primary and secondary school dummies also correlate highly (0.9), so both are not included in the model at the same time.

#### *Employment of household head*

As noted in the poverty profile, only 10% of the Sierra Leoneans surveyed were engaged in wage employment, with rice farming and petty trading being the most common forms of employment, particularly amongst the poor. Coulombe and McKay (1996) in their study of Mauritania found that the incidence of poverty was lowest amongst public-sector employees and highest amongst those in agriculture. Mukherjee and Benson (2003) had similar findings in Malawi, as did Sackey in Ghana (2004). It is expected that Sierra Leone will produce similar results. The following employment categories (mutually exclusive) for the household head's current main employment status are used:

- Wage employment (**paid employee**)
- Non-agricultural self-employment with employees (**self-employed\_e**)

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<sup>9</sup> Due to the relatively high number of missing observations, a dummy variable is included as an indicator of missing values for this variable (see below). The number of observations is thus raised to 3720 (the total number of households). The exclusion of the variables 'edu father' and 'edu mother' does not have a significant effect on the results.

- Non-agricultural self-employment without employees. Since this category includes the majority of petty traders, it is broken down into traders and others:
  - **trader**
  - **self-employed other**
- Self-employed agricultural worker (**self employed\_a**)
- Unpaid non-agricultural (**unpaid\_na**)
- Unpaid agricultural (**unpaid\_a**)

An additional variable for crops harvested by the household is included in the regressions for rural households, as the type of farming undertaken could be a significant determinant of poverty. This is particularly important, given the high correlation between poverty and the harvesting of coffee and cocoa. A dummy variable is included for whether or not the household has harvested rice or not in the past year, and similarly for cocoa, cassava, coffee, palm oil, cotton and groundnut.

#### *Asset ownership*

It could be argued that household assets are dependent on consumption and, due to problems of endogeneity, should not be included in the regression. Potential simultaneity can lead to over-estimation of the coefficient, and care is required in interpretation. However, assets can be important determinants of consumption behaviour if they function as a form of insurance and in some cases can also be used for income generation. The following asset variables are included:

#### *Household land ownership*

Security of tenure, particularly through outright ownership of land, is expected to have a significant impact on one's poverty status, although, in Sierra Leone, land ownership does not appear to be correlated with poverty. Mukherjee and Benson (2003) found that the amount of land available for cultivation is associated with improvements in welfare. Simler et al. (2004) used the square root of area owned as an independent variable, since the relationship between landholding and welfare appears to be non-linear. In Mozambique, Bruck (2001a) found that the size of the area farmed by smallholders was the most significant factor in determining poverty status.

The variables used to capture land ownership are

- A dummy variable for whether the household owns land (**own land**)
- The area of land owned (either in acres or cropping rate - (**land acre**), (**land crop**)) and the squared area to capture non-linearities
- A dummy variable for whether the household owns a farm it operates with deeds (**farm own\_d**) and another for whether the household owns a farm it operates without deeds (**farm own**)
- The number of farms owned by a household (**farm no**), which could be an insurance factor, but may also signal less significant farming.

#### *Livestock (goats, sheep)*

This can be a source of both income and nutrition for the household. Whereas chickens are very common, the ownership of other livestock is relatively rare. The next



most commonly owned are goats and sheep, for which dummy variables are included in the regression.

### *House*

There appears to be no clear link between whether the household owned a house and poverty; in fact the correlation between house ownership and poverty appears to be negative. This may not be all that surprising, if richer households are found in urban areas with rented accommodation, whereas poorer households tend to construct their own poorer-quality homes.

### *War*

The most popular answer as to why Sierra Leoneans consider themselves to be poor was loss of property due to the war. Bruck (2001a) found that the war continued to have an important influence on rural livelihoods in Mozambique. As most households (over 95%) said that they were affected by the war, dummy variables for how members of the household were affected are included, rather than a dummy variable for whether or not someone in the household was affected by the war. These are:

- someone lost limbs (**disabled**)
- the household lost property (**lostprop**)
- house was burnt (**houseburn**)
- a relative was killed (**relkilled**)
- the household was displaced (**displaced**)

In addition, a dummy variable for whether the household included one or several members who could be considered as war refugees (**refugee**) is included. These households are identified as those that include someone who responded that s/he or moved away due to fighting/drought during the war, and then resettled in the same area. It is well known that many Sierra Leoneans fled to neighbouring countries, such as Liberia and Guinea, and drought is rare in Sierra Leone. Thus, an alternative dummy variable is constructed for whether someone who moved to Liberia or Guinea and then returned to the same area, lives in the household (**refugee\_gl**).

### *Social capital*

Grootaert et al. (2002) found that higher levels of social capital, as measured by involvement in associations to reflect social norms and relationships in a community, result in higher levels of welfare. Bruck (2001a) also found this to be the case in Mozambique. To capture possible effects of community involvement, a dummy variable for whether or not someone in the household participates in community programmes (**community**) is included. This may, however, be a misleading measure, since community action may be more prevalent in smaller areas, where poverty is also higher, and less common in urban areas, inhabited by richer households.

### *Remittances*

This is the only variable for income source used, but if it can be considered an extra source of income, it is likely to improve household welfare. The variable is a simple dummy variable for whether or not the household receives remittances.

*Location (District\_x)*

Given that poverty was significantly higher in rural areas, location is an important variable to include in the regression. It is expected that residing in Freetown will be associated significantly with whether or not someone is poor. Separate regressions were run for the three main areas: urban excluding Freetown and the Western Area, Freetown and the Western Area and rural.

Access to infrastructure has also been found to be a significant variable in a number of other studies. Glewwe (1991) found that, in rural areas, infrastructure has substantial predictive power: households located in villages that are nearer to paved roads and public markets are better-off. A series of dummy variables have been created for each district to pick up localised effects.

**Table 5.1 Descriptive Statistics**

<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>St. Dev</b>	<b>Min</b>	<b>Max</b>
<b>Expenditure ('000 Le)</b>	3713	790.7	2450.2	63.1	144000
<b>HH composition</b>					
HH size	3720	6.19	2.74	1.0	20.0
Head female	3720	0.19	0.39	0.0	1.0
Age hh	3720	46.48	14.14	16.0	99.0
Spouse	3054	0.95	0.22	0.0	1.0
Prop women	3720	0.52	0.19	0.0	1.0
Child (share)	3720	0.32	0.20	0.0	0.86
Adult (share)	3720	0.49	0.20	0.0	1.0
Adult student	3720	0.16	0.37	0.0	1.0
<b>Education</b>					
Head read	3714	0.25	0.43	0.0	1.0
Primary female	3714	0.16	0.36	0.0	1.0
Primary male	3718	0.27	0.44	0.0	1.0
Secondary female	3714	0.13	0.33	0.0	1.0
Secondary male	3718	0.23	0.42	0.0	1.0
Mean primary female (yrs)	3714	0.50	1.18	0.0	6.0
Mean primary male (yrs)	3719	0.89	1.58	0.0	6.0
Edu father	2713	0.63	0.48	0.0	1.0
Edu mother	3082	0.82	0.39	0.0	1.0
<b>Work</b>					
Paid employee	3437	0.13	0.33	0.0	1.0
Self employed_e	3437	0.02	0.13	0.0	1.0
Trader	3437	0.08	0.27	0.0	1.0
Self employed other	3437	0.06	0.24	0.0	1.0
Self employed_a	3437	0.44	0.50	0.0	1.0
Unpaid_na	3437	0.02	0.15	0.0	1.0
Unpaid_a	3437	0.26	0.44	0.0	1.0
Rice	3716	0.65	0.48	0.0	1.0
Cocoa	3716	0.09	0.29	0.0	1.0
Cassava	3716	0.41	0.49	0.0	1.0
Coffee	3716	0.07	0.26	0.0	1.0

<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>St. Dev</b>	<b>Min</b>	<b>Max</b>
Palm oil	3716	0.00	0.05	0.0	1.0
Cotton	3716	0.01	0.08	0.0	1.0
Groundnut	3716	0.30	0.46	0.0	1.0
<b>Assets</b>					
Own land	3720	0.70	0.46	0.0	1.0
Farm own	3720	0.43	0.50	0.0	1.0
Farm own_d	3720	0.12	0.33	0.0	1.0
Farm no.	3720	1.81	1.72	0.0	10.0
Goats	3720	0.08	0.27	0.0	1.0
Sheep	3720	0.05	0.22	0.0	1.0
House	3611	0.55	0.50	0.0	1.0
Land_crop	3720	3.5	24.7	0.0	500.0
Land_acre	3720	11.9	117.8	0.0	6222.0
<b>War</b>					
Disabled	3522	0.01	0.10	0.0	1.0
Lost prop.	3522	0.33	0.47	0.0	1.0
House burnt	3522	0.34	0.47	0.0	1.0
Rel killed	3522	0.21	0.41	0.0	1.0
Displaced	3522	0.07	0.25	0.0	1.0
Refugee	3600	0.27	0.45	0.0	1.0
Refugee_gl	3600	0.08	0.28	0.0	1.0
<b>Other</b>					
Remittances	3720	0.57	0.50	0.0	1.0
Community	3709	0.81	0.39	0.0	1.0
Urban	3720	0.35	0.48	0.0	1.0

The survey included a total of 3720 households.

Table 5.1 shows that some variables are missing observations. These result from a non-response to the survey question. The largest number of missing values is in response to the questions of whether the spouse of the head lives in the household (spouse) and the parental education of the head of the household (edu father, edu mother). Otherwise, the number of missing observations is not very large. However, in the case of the aforementioned variables, the issue of missing values is addressed by including a dummy variable as an indicator for the missing values. This is a commonly used approach, also relied upon by Simler et al. (2004) and involves the construction of dummy variables that take the value of one if the household is missing data for a particular variable, and zero otherwise. The original variable is then also modified, by substituting a value of zero for the missing value. This approach increases the number of observations that can be utilised, and thus reduces the potential of sample-selection bias. However, the variables for which the approach is used turn out to be statistically insignificant, and their removal altogether would not affect the results. After including such dummies, the variables with the highest numbers of missing values relate to occupation categories, with 3437 households out of 3720 having a value. This is not a very significant loss of observations. However, once all variables are considered together in the regression, the fact that missing values do not coincide, causes the total number of available observations to drop to 3066 (see Chapter 6).

## Chapter 6: Regression Results

Table 6.1 shows the results for the OLS regression model (2) for the following specifications:

- Column (1) includes all available household observations. The model includes a dummy variable for each district as well as one for urban areas. The total number of observations in the regression is 3066.
- Column (2) includes only households in Freetown and the Western Area. Variables on crops harvested by households and livestock are excluded in this specification, since they are not very relevant and turn out to be statistically insignificant.
- Column (3) includes all urban households, excluding households in Freetown and the Western Area. Dummy variables for districts are included.
- Column (4) includes all rural households, apart from households in Freetown and the Western Area. Dummy variables for districts are included.

**Table 6.1 Regression results: dependent variable: ln (household adult equivalent expenditure)**

	ALL	Freetown and WA	Urban	Rural
<b>Hh composition</b>				
Hh size	-0.142 [0.017]***	-0.108 [0.048]**	-0.227 [0.033]***	-0.135 [0.019]***
(Hh size)^2	0.005 [0.001]***	0.003 [0.003]	0.011 [0.002]***	0.005 [0.001]***
Head female	0.034 [0.051]	-0.365 [0.212]*	-0.021 [0.109]	0.096 [0.056]*
Age hh	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
Spouse	-0.006 [0.062]	-0.290 [0.193]	-0.072 [0.119]	0.040 [0.075]
Proportion female	0.118 [0.055]**	0.375 [0.195]*	0.197 [0.112]*	0.102 [0.067]
Adult student	0.099 [0.033]***	0.256 [0.095]***	0.074 [0.057]	0.074 [0.042]*
Children (share)	0.164 [0.071]*	-0.673 [0.279]**	0.215 [0.142]	0.214 [0.081]***
Adults (share)	-0.003 [0.076]	-0.694 [0.304]**	-0.077 [0.157]	0.055 [0.088]
<b>Education</b>				
Head read	0.036 [0.038]	0.044 [0.136]	0.003 [0.066]	0.089 [0.049]*
Edu father	-0.003 [0.034]	0.107 [0.146]	-0.028 [0.064]	0.021 [0.041]
Edu mother	0.004 [0.039]	-0.078 [0.110]	-0.038 [0.066]	0.046 [0.051]
Female primary (years.)	0.024 [0.013]*	0.049 [0.025]*	0.037 [0.021]*	0.019 [0.020]
Male primary (years)	0.020 [0.010]**	0.032 [0.027]	0.025 [0.017]	0.017 [0.013]
<b>Work</b>				
Self employed_e	0.041	0.074	-0.103	0.144

	<b>ALL</b>	<b>Freetown and WA</b>	<b>Urban</b>	<b>Rural</b>
Unpaid na	[0.105] -0.163 [0.075]**	[0.166]	[0.127] -0.168 [0.095]*	[0.162] -0.096 [0.147]
Self employed agriculture	-0.143	-0.187	-0.029	-0.138
Unpaid agriculture	[0.051]** -0.163 [0.051]**	[0.297] 0.500 [0.660]	[0.086] -0.037 [0.092]	[0.071]* -0.167 [0.072]**
Trader	-0.084 [0.051]*	-0.147 [0.103]	-0.052 [0.077]	0.044 [0.111]
Self employed other	0.032 [0.059]	0.026 [0.131]	-0.013 [0.081]	0.136 [0.105]
Rice	0.022 [0.043]		0.012 [0.076]	0.037 [0.048]
Cocoa	-0.167 [0.043]**		-0.294 [0.106]**	-0.116 [0.048]**
Cassava	0.047 [0.022]*		-0.005 [0.057]	0.070 [0.025]**
Coffee	0.021 [0.042]		0.270 [0.121]**	-0.019 [0.049]
Palm oil	0.026 [0.115]		-0.179 [0.545]	0.102 [0.203]
Cotton	0.224 [0.153]		0.734 [0.318]**	0.221 [0.125]*
Groundnut	0.049 [0.026]*		-0.027 [0.063]	0.072 [0.030]*
<b>Assets</b>				
Own land	-0.107 [0.052]**	0.191 [0.398]	-0.203 [0.086]**	-0.027 [0.060]
Land acre	0.000 [0.000]	-0.151 [0.094]	0.001 [0.003]	-0.000 [0.000]
Land crop	0.001 [0.000]**		0.037 [0.014]**	0.001 [0.000]**
Own farm with deed	-0.042 [0.035]	1.507 [1.028]	0.159 [0.086]*	-0.106 [0.040]**
Own farm without deed	0.109 [0.024]**	0.835 [0.495]*	0.163 [0.065]**	0.093 [0.029]**
No. of farms	0.010 [0.008]	-0.322 [0.306]	-0.004 [0.021]	0.010 [0.009]
Goats	0.007 [0.039]		0.117 [0.142]	-0.008 [0.042]
Sheep	0.037 [0.045]		-0.233 [0.129]*	0.066 [0.053]
House	0.011 [0.023]	0.099 [0.125]	0.027 [0.045]	-0.001 [0.026]
<b>War</b>				
Disabled	-0.244 [0.125]*	-0.057 [0.329]	-0.220 [0.189]	-0.360 [0.154]*
Lost prop.	-0.119 [0.063]*	-0.055 [0.151]	-0.231 [0.105]**	-0.058 [0.075]
House burnt	-0.106 [0.062]*	0.023 [0.149]	-0.244 [0.107]**	-0.065 [0.074]
Rel killed	-0.205 [0.064]**	0.103 [0.151]	-0.369 [0.107]**	-0.146 [0.077]*
Displaced	-0.130 [0.072]*	0.119 [0.177]	-0.281 [0.156]*	-0.089 [0.085]

	<b>ALL</b>	<b>Freetown and WA</b>	<b>Urban</b>	<b>Rural</b>
Refugee	-0.099 [0.028]***	0.187 [0.192]	-0.005 [0.051]	-0.147 [0.032]***
<b>Other</b>				
Remittances	0.016 [0.024]	0.088 [0.078]	0.084 [0.049]*	-0.013 [0.029]
Community	-0.093 [0.030]***	0.025 [0.075]	-0.063 [0.060]	-0.118 [0.040]***
Urban	0.159 [0.029]***	0.178 [0.139]		
Constant	14.041 [0.144]***	14.695 [0.416]***	14.533 [0.285]***	13.782 [0.183]***
Observations	3066	259	757	2050
R-squared	0.34	0.27	0.29	0.26
District dummies	YES		YES	YES

\* = significant at 90%; \*\* = significant at 95%; \*\*\* = significant at 99%. Standard errors in brackets. Each regression passes the Ramsey test for omitted variables and heteroskedasticity is of concern only in the first regression, which is the reason for using robust standard errors (adjusted for heteroskedasticity) in this first model. A missing dummy is included for variables: spouse and edu mother and edu father. Variables 'Land crop' and 'Unpaid na' drop out in the model for Freetown and WA.

The regression results confirm many of the hypotheses. The explanatory power in the first regression ( $R^2$ ) is 0.34. As a general observation, the coefficient on the urban area dummy is positive and statistically significant, implying that households in urban areas were generally better-off by 16–18%. The coefficients on the district dummies are not shown, but most of them are statistically significant in the first regression model. In the urban areas (excluding Freetown and Western Area) regression, Tonkolili and Bonthe have a statistically significant negative coefficient, implying that urban households in this area are generally poorer than in the comparison district (Moyamba) and only Kono had a statistically significant positive coefficient. The latter could have been partly due to the concentration of mining in the area. In the rural regressions, Bombali, Kailahun, Kenema, Kambia, Port Loko and Tonkolili all have a statistically significant negative coefficient, the comparison district again being Moyamba. This implies that households in the rural areas of these districts are generally poorer than in rural areas in Moyamba.

Starting with household composition, larger households consume less per adult equivalent; depending on model specification, one additional member lowered consumption by 15–23%. However, the effect is non-linear, and as household size increases, the negative effect of the size diminishes. This negative effect is larger in urban than in rural areas, although in Freetown and the Western Area the effect is smaller than in rural areas.

Female-headed households have a statistically significant negative effect on welfare only in Freetown and the Western Area; where female-headedness lowers consumption by as much as 37%. We control for spouseless households, so this may not explain the result, although the 'spouse' variable has a relatively large number of missing observations. On the other hand, female-headed households are statistically better-off in rural areas, and interestingly the proportion of women in the household has a significantly positive coefficient in all models, except for the rural regressions. A 10 percentage point higher share of women is associated with 4% higher expenditure

in Freetown. The share of children aged 10 or below is significantly negatively associated with welfare in Freetown, but positively elsewhere. This positive coefficient is statistically significant both in the regression with all households and in the regression using rural households. This might indicate that children are more likely to be engaged in productive work in areas outside of Freetown, whereas in Freetown such opportunities may not be as easily available and households with a larger share of small children were worse-off. The cost of raising children may also have been relatively higher in Freetown.

Other variables, such as the share of adults in the household, or the age of the household head and age squared (last not shown in the table), are mainly statistically insignificant; having an adult student in the household is associated with a higher level of welfare, the coefficient being statistically significant in the regression with all households. This could, however, be an indication of wealth rather than implying causation.

The significance of education of adults varies somewhat depending on the variables used. If the dummy variables on the presence of an educated male or female (either primary or secondary school, but not both together) are used, only female education has a significantly positive coefficient. However, in the model versions shown in Table 6.1, the variable on the average years of primary school education is used. Female education is significant in all but the 'rural' regression, but male education only in the first regression for all households. As could be expected, the return to primary school education is higher in Freetown than in other areas. A one-year increase in the average years of female primary education in the household raises expenditure by 5% in Freetown and 4% in other urban areas. These education variables are only significant in models 1-3. This finding is similar to that of Bruck (2001a) who found that education was not a significant factor affecting poverty levels in rural Mozambique. However, if the dummy variables for female and male education are used instead for the model for rural households (separate models including primary and secondary), the presence of a female with primary or secondary education raises household welfare by as much as 15% and 17% respectively. The coefficients are significant at the 95% levels. The same does not hold for male education, which is insignificant. The variable on whether the head's parents had no education is not statistically significant, but the ability of a household head to read is significant in the 'rural' regression.

The results also reveal the importance of the role of agriculture in household poverty. The occupational group that is excluded from the regressions is those in paid employment. If the head of the household is associated with unpaid agricultural work, household welfare is 16% lower, and if he or she is self-employed in agriculture, welfare is 14% lower than for paid workers in the first regression. This is not unexpected. Unpaid non-agricultural work is also associated with a lower level of welfare.

As district-specific factors are controlled for with the use of dummy variables, it is interesting to see what happens to the variables on crops grown. These variables are not included in the regression for Freetown as they were not significant. The hypothesis that the growers of the export crop, cocoa, are poorer, is confirmed. In the rural areas, household welfare is 12% lower if the household harvests cocoa than if it does not. On the other hand, it is 22% higher if the rural household harvests cotton, 7% higher if it harvests groundnuts, and 7% higher if it harvests cassava. Those who say that they harvest coffee and cotton and reside in an urban area are better-off. This

might refer to owners rather than farmers. The growing of cotton is, not a widespread activity, however, since less than 1% of households harvest it.

Livestock or the ownership of a house is not statistically significantly associated with poverty status. However, the peculiar observation that land ownership correlates with poverty (that was found in the poverty profile) persists. A more careful look reveals that the coefficient is only statistically significant in the urban area regression, and not in the rural. On the other hand, the area of land owned, when measured in cropping rate, is associated with higher household welfare. Thus, it appears to be the area, not the ownership, which is linked with lower poverty. The other peculiarity is that farm ownership without deeds correlates positively with household welfare and ownership with deeds negatively. However, the significantly negative coefficient on ownership with deed only appears in the rural, not the urban regression. There were considerably fewer household, which own a farm with deeds than without. Ownership without deeds is associated with 9% higher expenditure in the rural model (4) and 16% higher in the urban model (3). The square of the area of land owned is not statistically significant and is thus not included in the regressions.

The variables on the war are particularly interesting, as many turn out to be statistically significant. A household with a war refugee is approximately 10% worse-off than one without. However, the breakdown into urban and rural areas reveals that the effect is statistically significant only in the rural areas. In rural areas, households where all or some members, fled their homes because of the war, and then returned, are approximately 15% poorer than those without such refugees. The result was similar if the variable on those who fled to Guinea or Liberia in particular is used.

The effects of the war are uneven. The war-related variables turn out to be insignificant in Freetown. As shown in the poverty profile, fewer households in Freetown said that they were directly affected by the war than elsewhere. The loss of property, having one's house burnt down as a result of war, the household being displaced and having a relative killed during the war all have a statistically negative coefficient in the urban (excluding Freetown) regression. Having had a relative killed, is associated with 36% lower household expenditure and have one's house burnt with 24% lower expenditure. Disability and having a relative killed are significantly negatively associated with poverty in rural areas. The expenditure of a household with a disabled member is as much as 36% lower than that of one without.

Finally, the receipt of remittances is found to have a significant association with household welfare only in the urban areas (model 3), where it raises household expenditure by 8%. The participation in community programmes is negatively associated with household welfare. This latter effect is only significant in the regression with all households and in the rural regression. As speculated above, the negative effect may arise if community action is more prevalent in poorer, rural areas leading to simultaneous causality.



## Chapter 7: Conclusions

This paper has provided an analysis of the determinants and factors associated with poverty based on the Sierra Leone Household Income and Expenditure Survey in 2003. It is expected that this survey will be followed by another using the same methodology in a few years time to provide a dynamic picture of poverty in Sierra Leone.<sup>10</sup>

Poverty in Sierra Leone in 2003 was extremely high. The survey revealed that almost 80% of individuals in rural households were poor, and urban poverty outside of the capital city of Freetown was also significant at 71%. Poverty was also greater in the more remote districts of the country. In Kailahun over 90% of the population was living below the poverty line. The poverty gap was greater in rural and remote districts, as was the severity of poverty. The ultra poverty gap and poverty severity levels were worst in Bombali.

The analysis of the determinants of poverty provides some interesting findings. First, as expected, households in urban areas were generally better-off, even when controlling for other variables. The findings also support the assertion that the determinants of poverty are different in rural areas from urban areas, particularly Freetown and the Western Area. Second, both the descriptive and the regression analysis suggest that low levels of education, and especially of female education, are associated with higher levels of poverty. Interestingly, households with more children are worse-off in Freetown, but better-off in rural areas. Female-headed households are also better-off in rural areas, and worse-off in Freetown. However, household welfare rises with the share of women in the household.

Unsurprisingly, agricultural work (particularly unpaid agricultural work) is also associated with higher poverty in rural areas, as is the cultivation of cocoa. Self-employed individuals engaged in agricultural activities are clearly poorer than waged employees, and the poor are clearly more often engaged in agricultural activity as opposed to wage employment than the richer households. The growers of cocoa, a previously income-generating export crop, are found to be poorer than other households. This crop was badly damaged during the war and the results suggest that investment in the revival of this activity would be important in alleviating poverty. The ownership of a farm without deeds is associated positively with household welfare, as is the area of land held in rural areas.

The effects of the war are spread unevenly, but the results prove that the consequences of the war are reflected in poverty levels and that the effects can be large. In Freetown, none of the war-related variables examined are significantly related to poverty. On the other hand, households with war refugees in rural areas are found to be poorer than others and disability resulting from the war is also related to poverty in rural areas. In turn, the loss of or damage to property due to the war is negatively associated with poverty only in the urban areas (excluding Freetown and the Western Area). This may suggest that assets play a different role in urban and rural areas.

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<sup>10</sup> This analysis should also be reworked once up-to-date weightings have been made available.

The government of Sierra Leone has begun to address a number of the issues raised here with its Poverty Reduction Strategy Paper (PRSP), agreed by the Boards of the World Bank and International Monetary Fund in mid-2005. In particular, the strategy has focused on strengthening governance, improving pro-poor growth and developing human capital (GoSL, 2005). However, there are some findings that result from our analysis that should be addressed in future iterations of the PRSP.

A key component of the current PRSP is promoting food security by encouraging farm families to increase production and improve the availability of food through increased investment in the agricultural sector, targeted extension support, the diversification and intensification of production and support for credit (GoSL, 2005). This may help to reduce poverty amongst rural agriculturalists; however, one area not specifically addressed in the PRSP is the high poverty levels of cocoa producers and this will require specific programmes. Furthermore, specific programmes will also need to be targeted to self-employed agricultural workers.

Another pillar of the PRSP is the expansion of education and training. Our results regarding the roles of female education and women in the household suggest that the focus on increasing female literacy, including adult female literacy, is appropriate. Since returns to education appear to be higher in urban areas, this initiative would have a greater poverty-reducing impact if economic opportunities for the educated are improved in the rural areas.

While the PRSP also indicates support for the vulnerable, our study shows the need to provide specific support for war refugees and households affected by the war, in particular in the rural areas. As expected, recovering from such a traumatic event takes time and requires additional support.

Finally, the PRSP indicates support for strengthening Statistics Sierra Leone. Such additional support will help to strengthen follow-up surveys and will allow policy-makers to analyse the impact of their policies on poverty levels and to gain a more dynamic understanding of the nature of poverty in Sierra Leone.

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## Annex 1: Poverty Profile

An important step in developing hypotheses for the regression analysis involved a descriptive analysis of bivariate correlates of poverty and household and individual characteristics. This section highlights the main findings of the descriptive analysis. The focus is restricted primarily to areas covered in the regression analysis, but some other interesting findings uncovered during the course of our analysis are also included.<sup>11</sup> It is important to remember that correlations between poverty and the various characteristics may result from other factors, such as the urban-rural divide. This issue is addressed with the regression analysis that includes all factors simultaneously in the model.

### Household Composition

A number of household composition variables were examined to determine if they were correlated with poverty. Surprisingly, the poor and non-poor did not differ significantly in terms of these variables. In Sierra Leone, 67% of female-headed households fell below the poverty line compared with 68% of male-headed households. Similarly, the age of the household head did not differ significantly between the poor and the non-poor. Household heads in the poorest quintile were on average 45.9 years old compared with 46.9 years for those in the richest quintile. One area that did differ between the poor and the non-poor was household size. Poor households are on average slightly larger. The average size of poor households is 6.5 individuals and that of non-poor 5.5. All of these variables were included in the regression to ascertain if they were determinants of poverty.

### Education

Improving education is widely considered to be a critical component of poverty alleviation efforts in developing countries. The education sector in Sierra Leone, once the envy of West Africa, suffered immensely during the war, particularly in the rural areas. The survey showed that, while Sierra Leoneans were in general poorly educated, there were some signs of improvement in the sector, particularly in reducing gender inequality.

The levels of numeracy and literacy were low even amongst those who had attended school, and were correlated with gender. Only 34% of men and 19% of women above the age of 14 were able to read in English, the primary language of the education system. In the same age group, 33% of men and 18% of women could write in English and 37% of men and 21% of women could do written calculations. Up to 25% of individuals who said that they had completed grade 3 of primary school could not read

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<sup>11</sup> The tables show data on an individual or household basis for all available observations. The statistics are based mainly on age groups for which the questions are most applicable and only those individuals or households to whom the questions were directed are included. Some questions in the survey include larger shares of missing observations, where the question was applicable, but in the case of the areas examined here and the tables included, the share of missing values ranges between 0 and 2%. Missing values will be discussed, only when they are a source of concern. It is useful to know that the number of individuals in the survey between the ages of 15 and 65 is 12m160 out of the total of 23,022. As a reminder, there are 3713 households with expenditure data.



in English and 18% could not do written calculations. Approximately 18% of respondents indicated that they had repeated some portion of their primary schooling.

Unsurprisingly, literacy and numeracy skills were correlated with poverty. The ability to read and write in English and do written calculations increased with expenditure quintile (Table A1). In the poorest quintile, only 15% of respondents could read and 13% could write in English and 18% could do written calculations, whereas the respective shares for the richest quintile range around 50%. This correlation could be to some extent driven by the urban-rural divide. For example, the ability to read in the poorest quintile was higher in the urban (35%) than rural areas (10%), but in both, the share of individuals able to read rises with the quintile.

**Table A1 Literacy and numeracy by quintile, age over 14 (%)**

<b>Read in English</b>	<b>Expenditure quintile</b>				
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Yes	14.6	16.9	19.9	26.3	48.8
No	85.1	82.5	79.7	72.9	50.6
Missing	0.3	0.6	0.3	0.8	0.6
Total Number	2,482	2,539	2,492	2,587	2,809
<b>Write in English</b>	<b>Expenditure quintile</b>				
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Yes	13.4	16.3	19.5	24.8	48.1
No	86.0	82.9	79.5	74.3	50.9
Missing	0.6	0.8	1.1	0.9	1.1
Total Number	2,482	2,539	2,492	2,587	2,809
<b>Do written calculations</b>	<b>Expenditure quintile</b>				
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Yes	17.6	19.8	23.8	28.4	50.1
No	81.8	79.4	75.1	70.7	48.8
Missing	0.6	0.8	1.1	0.9	1.1
Total Number	2,482	2,539	2,492	2,587	2,809

For expenditure quintile, 1 refers to the lowest quintile and 5 to the highest.

On a positive note, gender inequality in education may be decreasing. 40% of females between the ages of 10 and 13 can do written calculations, compared with 23% of women between the ages of 20 and 30. In contrast, the percentage of men able to do written calculations was fairly similar in both age groups (Table A2).

**Table A2 Ability to do written calculations, (%)**

<b>Age group</b>	<b>10-13</b>		<b>20-30</b>	
	<i>Male</i>	<i>Female</i>	<i>Male</i>	<i>Female</i>
Yes	41.9	40.3	42.6	22.5
No	57.8	58.6	55.7	76.6
Missing	0.3	1.1	1.7	0.9
Total	1,427	1,315	1,552	2,352

School attendance for those aged 15 and above was also correlated with both poverty and gender. Up to 82% of poor women, aged 15 and over, and 61% of poor men, had not attended any educational institution at all. The respective shares for the non-poor were 57% for women and 39 for men (Table A3). Among respondents aged 15 and above, 21% of non-poor males had completed senior secondary school, whereas only 6% of poor males had done so. The differences in primary school completion between the poor and non-poor were not as large.

**Table A3 Highest class of education completed, for individuals aged 15 and above, % by gender**

	Poor		Non-Poor	
	<i>male</i>	<i>female</i>	<i>male</i>	<i>female</i>
None	60.9	81.6	38.8	56.6
Primary 1	1.1	0.4	0.5	0.3
Primary 2	1.8	1.2	1.0	0.9
Primary 3	2.6	1.7	2.0	1.5
Primary 4	4.4	2.0	2.3	2.6
Primary 5	4.0	2.5	3.3	3.2
Primary 6	5.9	2.8	5.4	4.6
Junior Secondary 1-3	10.0	5.3	18.4	14.2
Senior Secondary 1-3	5.8	1.7	20.6	12.9
Vocational	0.0	0.2	0.2	1.0
tech/training	1.1	0.3	2.1	1.2
Technical	0.1	0.0	0.5	0.0
Nursing	0.0	0.1	0.1	0.2
Polytechnic	0.0	0.0	0.2	0.1
University	0.2	0.0	2.4	0.3
Koranic	1.8	0.1	1.8	0.2
Other	0.1	0.0	0.4	0.1
Missing	0.6	0.6	0.4	0.8
Total	4,065	492	1,869	2,049

\* The class completed is named as it is in the survey. A household (and individual member) is classified as poor according to the food + non-food poverty line.

Similarly, school attendance for children was also correlated with poverty, although the gender gap again appears to be closing. Poor children continued to have lower levels of school attendance than non-poor across grades, but more so at higher grades, probably due to pressures to join the workforce and help the family. It could also be due to the introduction of school fees after grade 8. There was some gender differential in gross enrolment, but not much in net enrolment, with females surprisingly having a slightly higher enrolment rate than males (Table A4).

**Table A4 Primary school enrolment by gender, % by quintile**

Quintile	Gross		Net	
	Male	Female	Male	Female
1	105.0	91.8	66.4	66.5
2	103.1	100.2	70.5	70.6
3	108.7	103.0	72.9	75.0
4	112.0	107.0	79.9	80.0
5	111.1	112.0	82.8	83.4

Interestingly, primary school enrolment does not correlate very clearly with mothers' education. Of those enrolled in primary school, 61% had mothers without any education, whereas the corresponding figure for those not enrolled, is 69% (Table A5). The question on parental education has a quite high number of missing values due to missing replies. The share of mothers without any education declines with expenditure quintile, but even in the richest quintile 63% of respondents had mothers with no formal education. These observations together with the evidence on the decline in gender inequality in skills (Table A2), suggest a certain independence from historical patterns.

**Table A5 Mother's education and primary school enrolment, (%) shares**

Education status of mother	Enrolled in Primary School?	
	Yes	No
None	60.77	68.81
Primary, not completed	3.49	2.46
Primary, completed	2.52	0.96
Post-primary	8.65	2.59
Missing	24.57	25.19
Total	4,407	1,465

However, one worrying finding resulting from the survey was that students were continuing to be charged school fees, even though free primary education was introduced in 2001. According to the survey, half of those attending a government or publicly owned primary school reported paying school registration fees in 2003.

### Occupation

Employment and occupation were also found to be correlated with poverty. Agriculture and petty trading (wholesale and retail trade) were the most common forms of employment amongst both the poor and the non-poor, but a larger share of non-poor were involved in wholesale trade and services and a lower share in agriculture (Table A6). The survey (Table A7) confirms that the poor work mostly in agriculture either for the family or as self-employed farmers. The majority of non-poor individuals also work in agriculture, but higher numbers of non-poor work for the government or in the private sector.

Regionally, rice farming or production employed the largest share of people in all districts except Freetown and the Western Area where government services and wholesale and retail trade were the largest employers. Economic activity appeared to be inherited, especially among poorer individuals and in the rural areas, where 75% of individuals aged 15 to 65 indicated that they were doing the same type of work as their parents.

**Table A6 Main area of economic activity over previous 12 months, 15 - 65 years (only major ones shown) (%)**

	Poor	Non-poor
Rice	47.0	24.6
Wholesale or retail trade	7.9	11.8
Other agriculture	6.8	3.4
Groundnut	5.0	2.9
Cassava	2.9	2.2
Cocoa	2.4	0.7
Other industrial activities	1.8	4.1
Government services	1.5	4.8
Mining	1.0	1.8
Services	1.0	4.3
Economically inactive	21.3	36.1
Total	8,431	3,715

**Table A7 Sector of work for those who have remained in the same employment for 12 months (%)**

Sector of Work	Expenditure Quintile				
	1	2	3	4	5
Working on own or family agric. activity	87.8	84.3	79.7	70.6	50.0
Unpaid work in family business	4.6	6.7	6.7	7.7	6.3
Self-employed without employees	3.7	5.1	7.5	13.0	21.0
Self employed with employees	0	0	0.2	0.3	0.6
Private sector non-agricultural	0.4	0.6	0.8	2.2	6.6
Government sector	0.9	1.4	2.5	3.7	9.2
Parastatal	0	0.1	0.2	0.3	1.5
NGO	0.2	0.1	0.4	0.7	2.0
Total	2,176	2,058	1,995	1,971	1,673

Rice was the most commonly cultivated crop grown by 78% of households in the poorest quintile and 38% in the richest quintile (Table A8). The survey indicated a slight shift in cultivation, with fewer farms planting rice and more planting groundnut and cassava within the year. The poor on average had a greater variety of plots of each crop type. This may have been because they had less opportunity to specialise and produced more food for their own consumption. The value of harvested produce sold by farmers in the richest quintile was still almost 10 times higher than that of farmers in the poorest quintile.

**Table A8 Crops harvested on plots in past 12 months (%)**

<b>Crop</b>	<b>%</b>
Rice	48.8
Ground nut	12.6
Cassava	9.4
Pepper	4.7
Cocoa	4.3
Coffee	3.4
Palm oil	2.6
Sweet potatoes	1.6
Okra	1.6
Beans/peas	1
Other	8.5
<b>Total</b>	<b>6,256</b>

*The total refers to the number of plots*

The cultivation of cocoa and coffee, both export crops, was particularly concentrated in poor households. Cocoa and coffee plantations suffered during the war, and this could have been a contributing factor to the high levels of poverty found in the Kailahun district, as the majority of coffee and cocoa growers were in Kenema and Kailahun. This finding is surprising, as one would normally have expected those producing export crops to be less poor than subsistence farmers. One explanation is that the plantations and market channels had not recovered from the war (these two districts were amongst the last to be declared safe). Alternatively, the correlation could arise because of regional effects. Crop type is included as a variable in the regression analysis to examine its association with poverty.

Wage employment was not common in Sierra Leone and the survey revealed that only 10% of respondents between the ages of 15 and 65 worked for a wage or other payment. However, self-employment for pay (trading) in cash or in kind was more common (see Table A9). Wage employment was more common among richer individuals and slightly more common among men than women. Again, this varied by region, as roughly a quarter of individuals between the ages of 15 and 65 reported being in wage employment in Freetown compared with only 1% in Koinadugu.

**Table A9 Work over the past 12 months by quintile, age 15 – 65, (%)**

<b>Quintile</b>	<b>Working for wages</b>	<b>Self-employment for pay*</b>	<b>Agricultural work</b>	<b>Unpaid labour</b>
1	4.9	13.9	72.9	2.2
2	8.8	21.3	68.8	2.2
3	8.8	25.3	65.0	3.6
4	11.2	27.9	56.5	4.5
5	16.3	22.5	30.2	3.5
<b>Total</b>	<b>1233</b>	<b>2685</b>	<b>7005</b>	<b>387</b>

\* in cash or kind. Unpaid work refers to work for an enterprise belonging to a member of the household.

Education did not guarantee employment, as 63% of the non-poor aged 15 to 65 with a junior secondary school degree and 56% with a senior secondary school degree reported that they were economically inactive. The figures for the poor were 54% and 44% respectively, but the inactivity shares were somewhat higher for those who had completed only a few years of primary school. Among the few respondents with a university degree, a lower share (20%) were economically inactive.

Self-employment was more common in richer quintiles than poorer, but the obstacles facing businesses did not differ significantly with expenditure quintile. Over 80% of respondents stated that access to capital and credit was the most difficult issue in establishing their business. The survey included 1643 non-farm enterprises, of which 60% were in urban areas. The majority of non-farming respondents were petty traders. This was consistent across all districts. 31% of enterprises belonged to households in the richest quintile, as richer households tended to be less involved in agriculture and to operate their own enterprises.

**Table A10 Difficulties in setting up a business, % shares by quintile**

Difficulty	Expenditure Quintile				
	1	2	3	4	5
No difficulty	6.3	12.0	10.6	9.5	11.8
Capital/credit	84.0	79.1	85.2	84.8	80.2
Technical	7.6	2.7	2.0	2.8	3.3
Government regulation	0.0	1.2	0.3	0.0	1.2
Other	2.1	5.0	2.0	2.8	3.5
Total	144	258	303	422	516

*The replies are by farm, 1,242 households had a total of 1,643 farms.*

Over 70% of businesses had no employees regardless of poverty status, but those in the top expenditure quintiles operated the largest enterprises in terms of number of workers. Employment was generally on an informal basis as only one-third of hired workers had employment contracts. This is unsurprising, given that 80% of employees came from within the household. Similarly, only one-third of employees received benefits such as sick pay.

### **Asset ownership**

According to the survey, over 51% of Sierra Leoneans lived in a single-family house with the number of residents decreasing with expenditure quintile. The rich were much more likely than the poor to live in flats or apartments, which is not surprising, given that the rich were more likely to live in urban areas. Surprisingly, a higher percentage of those in the poorest quintile (66%) owned their homes, compared with 44% in the richest quintile. These findings are likely to reflect the fact that the majority of the poor lived in rural areas and, given the abundance of land, it was not difficult for even the poorest people to build their own, albeit substandard homes.

26% of households reported having had land allocated to them in the previous 12 months. Almost half of those who reported receiving land indicated that they paid nothing for it, and in more than 80% of cases, farm land was distributed by the village or family, both for the poorest and the richest households. Households in the poorest

quintile had the highest allocation of land, which reflects the fact that this group was the one most engaged in agricultural activity. A surprisingly large number of respondents (almost 60%) indicated ownership of more than one farm or farm plot. However, farm ownership appears to be somewhat precarious, as over 50% of respondents indicated that they had no right to sell the farm that they had operated or owned over the previous year or to use it as security. Farm ownership rises, but only slightly, with expenditure quintile (Table A11). Over 73% of respondents indicated owning their farms, although 61% of them did not have the deeds to their farms.

**Table A11 Farm ownership, % shares by quintile (by farm)**

Farm Ownership	Expenditure Quintile				
	1	2	3	4	5
Yes with deeds	18.9	11.7	9.6	10.8	12.3
Yes without deeds	52.4	62.1	65.1	61.7	67.1
No	28.6	26.2	25.4	27.6	20.6
N	1,421	1,552	1,507	1,477	767

*By farm, not household.*

Another potentially important household asset is livestock. The raising of livestock was not particularly widespread amongst survey respondents, and the differences between the poor and the non-poor were not significant in this regard. Approximately half of the households raised livestock. Among those households that raised livestock, sheep were raised by 11% and goats by 16%, with a higher share of richer households raising these animals. Only 1.5%, most of them in Koinadugu, raised cattle and, similarly, only 1.5% stated they raised other livestock. Chickens, however, were raised by 95% of households with livestock. Other poultry was raised by only 15%. The survey showed that most farms were un-mechanised, with hand hoes and cutlasses being the most widely owned equipment.

As expected, the poor owned fewer assets than the non-poor. In particular, the poor possessed less furniture and fewer electrical appliances than the non-poor. Over 80% of all assets were less than 10 years old and 67% were less than five years old. Unsurprisingly, most electrical appliances were less than five years old, while furniture, houses and land tended to be older.

### **War experience**

It is difficult to understate the impact of the civil war on the people of Sierra Leone. The vast majority of households stated that they were directly affected by the war, although the extent varied by income and location. Over 98% of households in the poorest quintile indicated that they were affected by the war, compared with 87% of the richest households. The war also affected the various regions differently. In Kambia, Port Loko, Bombali and Tonkolili, 99% of respondent households indicated that they had been directly affected by the war. The numbers in other areas were almost as high, whereas in Freetown only 72% of respondents indicated that they were directly affected by the war.

**Table A12** Were you affected by the war? (by Expenditure quintile)

	Expenditure Quintile					<i>Total</i>
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	
Yes	98.3	97.5	97.1	93.6	87.0	94.3
No	1.7	2.5	2.9	6.4	13.0	5.7
Total	640	689	719	831	828	3,707

Almost two-thirds of respondents indicated that they were directly affected by the war, having lost property or had their houses burned down. Another 20% indicated that they had lost relatives during the conflict. There was little differentiation across quintiles with the richest quintile being less affected than the poorest (Table A12).

**Table A13** How affected by war by expenditure quintile

How Affected by War	Expenditure Quintile				
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Household lost property	18.7	19.7	19.3	22.4	19.9
House was burnt	17.8	19.6	21.2	23.1	21.0
Relatives lost or killed	11.9	12.2	12.5	13.0	13.5
Limbs lost	0.6	1.0	0.5	0.8	0.4
Household member molested or raped	1.6	0.8	1.6	1.4	1.3
Household displaced	2.7	3.8	4.3	5.4	4.5
Total	630	674	703	783	727

Sierra Leoneans viewed the war as a key factor in their poverty, despite the fact that the country was underdeveloped prior to the outbreak of hostilities. A quarter of respondent households thought that the loss of property due to the war was the main cause of their poverty (Table A13).



**Table A14 Reason for poverty (%)**

<b>Loss of property due to war</b>	<b>25.5</b>
<b>Cannot afford/lack agricultural inputs</b>	<b>12.25</b>
<b>Lack of capital for own business</b>	<b>7.08</b>
Hard economic times	7.03
Low agricultural production	6.38
Lack of agricultural capital	5.39
Salary is too low	5.06
Lack of employment ops	4.74
Lack credit facilities for own business	3.31
Agricultural inputs not available	3.26
Other	3.23
Prices too high	2.96
Agricultural inputs misappropriated	2.96
Prices for agricultural products too low	2.26
Lack of credit facilities	2.07
Loss of employment due to war	1.59
Drought	1.02
Low profit from business	0.73
Business not doing well	0.7
Lack of adequate land	0.48
Lack of buyers for agricultural products	0.46
Lack of cattle	0.43
Loss of limbs due to war	0.32
Too much competition	0.08
<b>Total Number</b>	<b>3,714</b>

The war also led to a significant amount of migration both within Sierra Leone and to neighbouring countries. The survey found that in Bonthe, Kailahun, Kenema and Kono a majority of respondents reported that they had not always lived in the same village, whereas in all other districts a majority of respondents reported that they had always lived in the same village. Poor people appear to be more mobile than non-poor (see Table A15). However, this could also reflect the fact that migration tends to be from rural areas to urban areas. A clear majority of respondents named drought or war as the main reason for moving (Table A16). Unfortunately, these two options were not separated in the survey. However, drought is not particularly common in Sierra Leone, so it is more than likely that most migration was due to the war.

**Table A11 Have you always lived in this village? (Age over 15:% shares by quintile)**

<b>Expenditure Quintile</b>	<b>yes</b>	<b>no</b>
1	55.2	44.2
2	61.1	38.3
3	62.4	36.8
4	68.7	30.3
5	74.7	24.8
	8,354	4,476

**Table A16 Reason for moving from last residence, % shares**

<b>Reason for moving</b>	
Drought/war	70.4
Other family reasons	5.4
Other	3.6
Marriage	2.4
Own employment	1.1
School	0.9
Spouse's employment	0.3
Missing	16.0
Number	4,476

There is no direct way of identifying war refugees, but individuals were asked whether they had moved away from their current area for more than 12 months and returned, and if so, where they had lived before returning. Of the returnees, 47% returned from within the country, but around 27% returned from outside the country, mostly from neighbouring countries. Many of the returnees were likely to be war refugees, with 17% coming from Guinea and 9% from Liberia. 83% of the internal returnees were poor and 92% of those returning from abroad (Table A17).

**Table A17 Shares of poor and non-poor by region or country from which returned (%)**

<b>Country/Region from which returned</b>	<b>Poverty status</b>	
	<i>Poor</i>	<i>Non-poor</i>
Southern	85.3	14.8
Eastern	77.3	22.7
Northern	67.5	32.5
Western	0.0	100.0
Guinea	83.2	16.8
Ivory Coast	66.7	33.3
Nigeria	75.0	25.0
Ghana	100.0	0.0
Liberia	92.2	7.8
Gambia	75.0	25.0
Total	3,083	675

## **Social capital**

Social capital refers to the social networks and other associations that bind a community together. Social capital is generally believed to be inversely correlated with poverty. The survey found that poor and rural households were more likely than non-poor and urban to participate in community and labour-intensive public works programmes, but in both cases participation was high. Maintenance of roads and bridges was the main form of participation in community and labour-intensive public works among the poor whereas community development activities were the main form among the non-poor.

Participation in local elections was limited, with only 10% of the poor and 16% of the non-poor indicating that they voted in community elections. However, this low level may be due to the fact that few community elections were held during the timeframe of the survey.

## **Remittances**

Remittances can be important sources of income in poor countries, and over 50% of individuals indicated that they had sent remittances to other people, with lower rates of sending them in the poorer regions of Pujehun, Kailahun and Koinadugu. Over 80% of those sending remittances indicated that they planned to send them in the future, indicating that remittances in Sierra Leone were often sporadic. This was particularly the case in Bonthe, Bo, Kono and Port Loko. Unsurprisingly, the highest rate of outgoing remittances was from Bo and Freetown. Over 30% of respondents send their remittances to rural areas. Again, unsurprisingly, richer individuals send more remittances than poorer.

The majority of those sending remittances (54%) indicated that the recipients used the money for current consumption, with over 70% of the poor using the funds for necessities. However, there was also some variation in the use of the funds. Urban recipients in Bo, Freetown and abroad were more likely than those residing in the same village as the sender or in other rural areas to use them for schooling. Respondents in the third and fourth quintiles received the most remittances. Non-poor individuals tended to receive remittances more regularly than the poor, indicating that they had a wider social network.

## **Other findings**

During our analysis of the survey, a number of other areas were examined, that are not reflected in the regression analysis. A few interesting ones are highlighted below.

### **Perceptions of poverty**

The survey asked Sierra Leoneans to state whether or not they were very poor, average poor or not poor. The results show that they were aware of their poverty, although this perception varied according to poverty status, district, and whether or not the respondent lived in a rural or an urban environment. In terms of poverty status, 45% of households in the poorest quintile thought of themselves as being only average poor, while 42% of households in the richest quintile thought of themselves as being very poor. Very few households of any quintile thought of themselves as not being poor (Table A18).

**Table A18 Perception of poverty by expenditure quintile by household (%)**

		1	2	3	4	5	Total (N)
<b>Very poor</b>	% row	18.1	19.3	21.7	23.1	17.9	1,937
	% col	54.7	54.3	58.4	53.8	41.8	52.3
<b>Average poor</b>	% row	16.6	17.7	17.0	21.9	26.8	1,744
	% col	45.2	44.9	41.3	45.9	56.5	47.1
<b>Not poor</b>	% row	3.9	23.1	7.7	11.5	53.9	26
	% col	0.2	0.9	0.3	0.36	1.7	0.7
<b>Total</b>	N	640	689	719	831	828	3,707
	% row	17.3	18.6	19.4	22.4	22.3	100

1 = lowest expenditure quintile, 5 = highest expenditure quintile

### Health and sanitation

Health indicators and sanitary conditions were found to be poor, and, as with education, they tend to decline with income status. Health indicators were not included in the regression analysis, since finding a proper household or community-level health indicator was not easy, and many individual health characteristics can be determined by poverty status. Girls living in poorer households tended to be shorter. However, the same does not hold for boys. A higher percentage of non-poor (64%) than poor (43%) consulted a practitioner when they were ill, and only 6% of the poor consulted a doctor as opposed to 26% of the non-poor.

There were some positive health indicators as well. 74% of children aged 5 or under had received medical care over the previous 12 months, 80% in the richest quintile and 70% in the poorest. Over 93% of children aged 7 and under had been vaccinated, with the non-poor having only a slightly higher vaccination rate. Also, for women aged 15-49 who were currently pregnant or had been pregnant in the last 12 months, 82% received pre-natal care. Almost all reported paying for it, despite the introduction of free health care for pregnant mothers and children under five.

### Environmental factors

There were many differences in the types of homes owned by the poor and the non-poor. Over 70% of homes in the poorest three quintiles had mud floors compared with only 42% in the richest quintile, whereas over 50% of those in the richest quintile had cement floors compared with 20% in the poorest quintile. Wood was the primary source of fuel across expenditure quintiles, although its use decreased with each quintile. Over 90% of those in the poorest four quintiles used wood as their primary source of fuel compared with 80% in the richest quintile. Charcoal was the second most common type of fuel used and its use was much higher in the richest quintile (14%) than the poorest (1%). Unsurprisingly, the use of flush toilets was much higher amongst the richest quintile (8%) than the poorest (less than 1%). Streams or rivers were the primary source of water for most households, both poor and non-poor.

Electricity use in Sierra Leone is limited. Kerosene and gas lamps were found to be the main source of lighting in all districts, except for Freetown, where 60% of households reported using electricity for lighting. Outside Freetown there was very little use of electricity.

**Finance**

Given the underdeveloped nature of the banking system and the small scale of businesses, it is unsurprising that very few respondents (less than 2%) obtained capital from the banking system. Household savings, loans from relatives and friends, and farm proceeds were the primary sources of capital for over 75% of respondents. Relatives and friends were the source for 46% of loans. In most cases, no guarantees were required for loans.

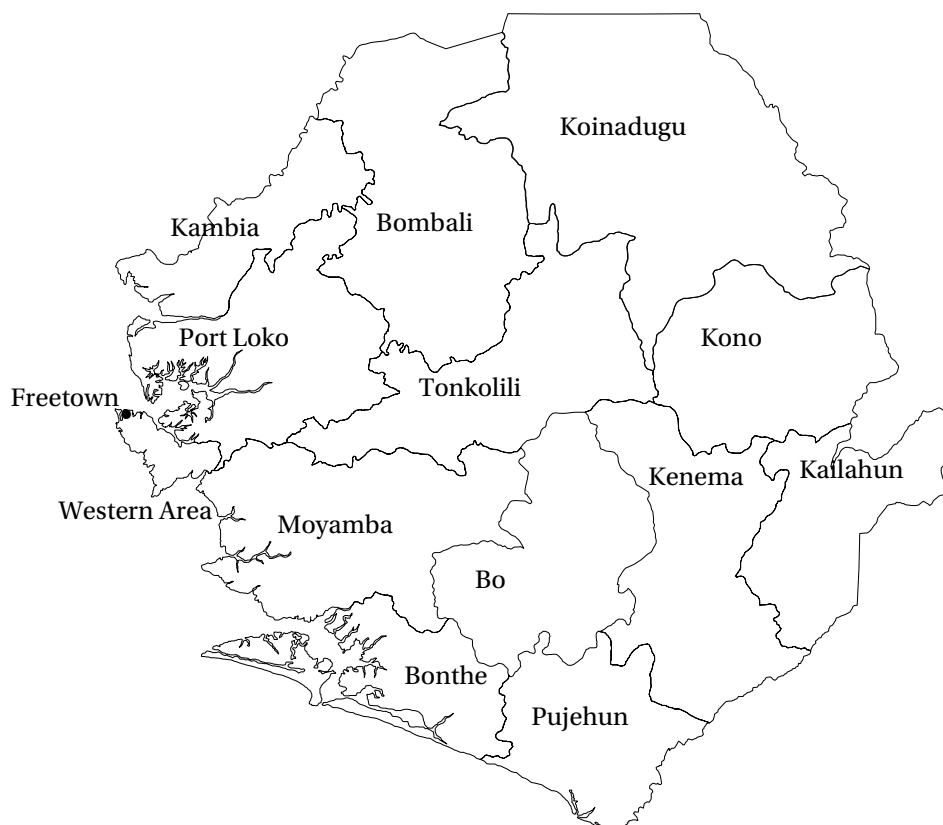
Savings were more common among richer households; 46% of those in the richest quintile had a savings account or participated in an Osusu, a revolving savings and credit scheme. In the poorest quintile, the share was 26%. Of those who had a savings arrangement, over 80% reported not having added to their savings in the previous 12 months.

## Annex 2: Table of Adult Equivalences

Category	Age (years)	Average energy allowance per day (kcal)	Equivalence Scale
Infants	0-0.5	650	0.22
	0.5-1.0	850	0.29
Children	1-3	1300	0.45
	4-6	1800	0.62
	7-10	2000	0.69
Males	11-14	2500	0.86
	15-18	2750	1.03
	19-25	2700	1.00
	25-50	2700	1.00
	51+	2300	0.79
Females	11-14	2200	0.76
	15-18	2200	0.76
	19-25	2200	0.76
	25-50	2200	0.76
	51+	1900	0.66

Source: Statistics Sierra Leone

## Annex 3: Map of Sierra Leone and Description of Districts



### *National Recovery Strategy 2002–3*

Sierra Leone is made up of thirteen districts. This section highlights some of the key features of the various districts as outlined in the 2002–3 *National Recovery Strategy*.

**Bo:** Bo is located in the centre of the country and is the home to Bo, the second largest city in Sierra Leone. It consists of fifteen chiefdoms. Trading is the major economic activity for the district, with gold and diamond mining, rice growing, and coffee, cacao and oil palm production other major economic activities. Bo district has also received a number of displaced persons from less secure parts of the country.

**Bombali:** Bombali District, located in the central north of Sierra Leone, is the second largest district in the country and has thirteen chiefdoms. The district headquarter town of Makeni is also the provincial capital for the northern region. Bombali was a principal former rebel stronghold.

**Bonthe:** Bonthe lies in the south of Sierra Leone and has eleven chiefdoms. The primary economic activities include fishing, rice growing and oil palm plantations. It also has home to rutile and bauxite mines, which were abandoned during the war.

**Kailahun:** Kailahun lies in the east of Sierra Leone and has fourteen chiefdoms. The district headquarters is Kailahun town. Primary economic activities include small-scale mining and production of coffee, cacao and rice.

**Kambia:** Kambia District lies in the northwest of Sierra Leone. Main economic activities include small-scale mining, livestock (small ruminants) and food crops (cashew nuts). These activities including farming and informal commercial activity were severely disrupted during the war

**Kenema:** Kenema District is situated in the Eastern Region of Sierra Leone and comprises sixteen chiefdoms. The district headquarters is Kenema town. Primary economic activities include gold and diamond mining, and production of coffee, cacao and rice. The economic base suffered enormous damage as warring factions fought to occupy the diamond-mining areas.

**Koinadugu:** Koinadugu is the largest and most remote district in Sierra Leone. It borders Guinea to the north and has limited road access. Subsistence farming is the primary economic activity.

**Kono:** Kono lies in the east of Sierra Leone and has fourteen chiefdoms. The district headquarters is Koidu town. Primary economic activities include diamond and gold mining, rice growing, and coffee and cacao plantations. It suffered significantly during the war.

**Moyamba:** Moyamba lies in the south of Sierra Leone and has fourteen chiefdoms. The main economic activities include mining (rutile and bauxite), fishing, rice growing and oil palm plantations. In the coastal chiefdoms, salt production has also traditionally been an important economic activity.

**Port Loko:** Port Loko lies in the north west of Sierra Leone and comprises ten chiefdoms. The primary economic activities include small-scale mining and the production of food crops (rice, cassava and sweet potato, in particular).

**Pujehun:** Pujehun lies in the south of Sierra Leone and has twelve chiefdoms. The primary economic activities include diamond mining, fishing, coffee and cacao plantations.

**Tonkolili:** Tonkolili is located in the centre of Sierra Leone and comprises of eleven chiefdoms. The district headquarters town is Magburaka. Subsistence agriculture and mining are the primary economic activities.

**Western Area:** The Western Area of Sierra Leone, which hosts the capital city Freetown, it is divided into Western Rural and Western Urban. All ethnic groups in Sierra Leone are found in the Western Area, but the Creole ethnic group makes up the highest proportion. The Western Area, and Freetown in particular, was home to a large number of Internally Displaced Persons during the war.