A POVERTY PROFILE FOR SIERRA LEONE

The World Bank

Poverty Reduction & Economic Management Unit

Africa Region

Statistics Sierra Leone

Currency Equivalents

Currency Unit = Sierra Leonean Leone

US$1 = 4,340 Le.

(As of May 5, 2014)

Acronyms and Abbreviations

AfP	Agenda for Prosperity
CPI	Consumer Price Index
EA	Enumeration Area
GDP	Gross Domestic Product
NEC	National Election Commission
PPP	Purchasing Power Parity
SLIHS	Sierra Leone Integrated Household survey
SSL	Statistics Sierra Leone

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1. Poverty Profile

Executive Summary

Between 2003 and 2011, Sierra Leone has experienced continued macroeconomic growth, though still lags behind the sub-Saharan African average GDP per capita. This growth has generally translated into poverty alleviation. The poverty headcount has declined from 66.4 percent in 2003 to 52.9 percent in 2011. The overall reduction was led by strong growth in rural areas, where poverty declined from 78.7 percent in 2003 to 66.1 percent in 2011, yet this figure was overall still higher than urban poverty. Urban poverty declined from 46.9 percent in 2003 to 31.2 percent in 2011. This decline was despite an increase from 13.6 percent to 20.7 percent in the capital, Freetown. District level poverty analysis showed that by 2011 most districts had converged to poverty levels between 50 and 60 percent, with the exceptions being Freetown at 20.7 percent and levels above 70 percent in Moyamba and Tonkolili. Underlying this poverty reduction was an annualized 1.6 percent per capita increase in real household expenditure from 2003 to 2011. While steady positive progress is encouraging, much higher growth rates will be necessary to meet government's 4.8 percent targets outlined in the new Agenda for Prosperity.

The characteristics of poor households varied between urban and rural areas in 2011. In rural areas, households in which the head's primary occupation is agriculture were more likely to be poor as well as those with smaller landholdings. Those growing rice were neither more nor less likely to be poor. In addition, households in which the head has at least some secondary or post-secondary education were less likely to be poor. In urban areas, education was a more important determinant of poverty status, as the increasing levels of education of the household head consistently reduced a household's probability of being poor. In addition, those households which were engaged in a non-farm enterprise and female headed households in urban areas were less likely to be poor.

Following stronger growth rates in districts with higher poverty rates and in rural areas compared to urban areas, the overall level of inequality has declined. Only urban areas outside Freetown showed higher inequality while both rural areas and Freetown have decreased. The areas where the largest decreases in inequality have been demonstrated have been between urban and rural areas, as rural areas have narrowed the gap with urban areas, and between different urban areas, reflecting the strong growth in urban areas outside Freetown compared with declines in the capital.

Demographically, Sierra Leone remains a rural and extremely young country. The majority of the population lived in rural areas in 2011, with most districts outside Freetown being more than three-quarters rural. In addition, the majority of the population was below the age of 20 and more than 75 percent are below the age of 35. Population growth has declined sharply from 2003 to 2011, though fertility has remained high at around four births per woman. Most children under five were born at home in 2011, though this percentage appears to have declined since the implementation of the Free Health Care Initiative in April 2010.

Educational completion rates are low by international standards, which is troublesome given the relationship between education and poverty. According to the 2011 SLIHS, 56 percent of adults over the

age of 15 have never attended formal school. Current enrollment indicators show mixed results from 2003 to 2011. Both net and gross primary enrollment rates have decreased, but some caution should be taken in interpreting these results as the 2003 survey was conducted in the immediate post-conflict period before the situation in many areas had fully normalized. Higher level education indicators have improved, however, as greater numbers of students were attending junior, secondary, and post-secondary education. They were also attending at ages more closely appropriate to grade level expectations. In addition, gender parity has almost been reached in primary education, though gaps do open as female students approach child bearing age. Substantial gaps remain across income groups and between urban and rural areas.

Access to public services was low overall, but particularly in rural areas, where individuals had to travel long distances to reach facilities.

INTRODUCTION

1.1 **This poverty profile has been prepared as part of the World Bank's Poverty Assessment of Sierra Leone.** The key objective of the poverty update is to provide inputs to the government of Sierra Leone's policy making process. The first chapter presents an overview of poverty, demographics, livelihoods, education, and health in Sierra Leone, and measures progress in these indicators compared to the 2003 Poverty Assessment. The five remaining chapters cover agriculture, labor, education, rice prices, and the impact of changes in fuel prices in more detail.

1.2 **The data on which this profile is based are two rounds of the Sierra Leone Integrated Household Survey (SLIHS) conducted by Statistics Sierra Leone (SSL).** The first was implemented between March 2003 and April 2004, and the second between January and December 2011. Both surveys are nationally representative, with sample sizes of 3,714 and 6,727 respectively.

1.3 **The analytic work underlying this chapter was produced in collaboration between SSL and the World Bank.** Tasks undertaken jointly include the compiling and cleaning of survey data, the construction of the consumption aggregate, the development of a poverty line with appropriate spatial and regional deflators, and the calculation of poverty statistics. Details on the methodology employed are available in appendix 1.

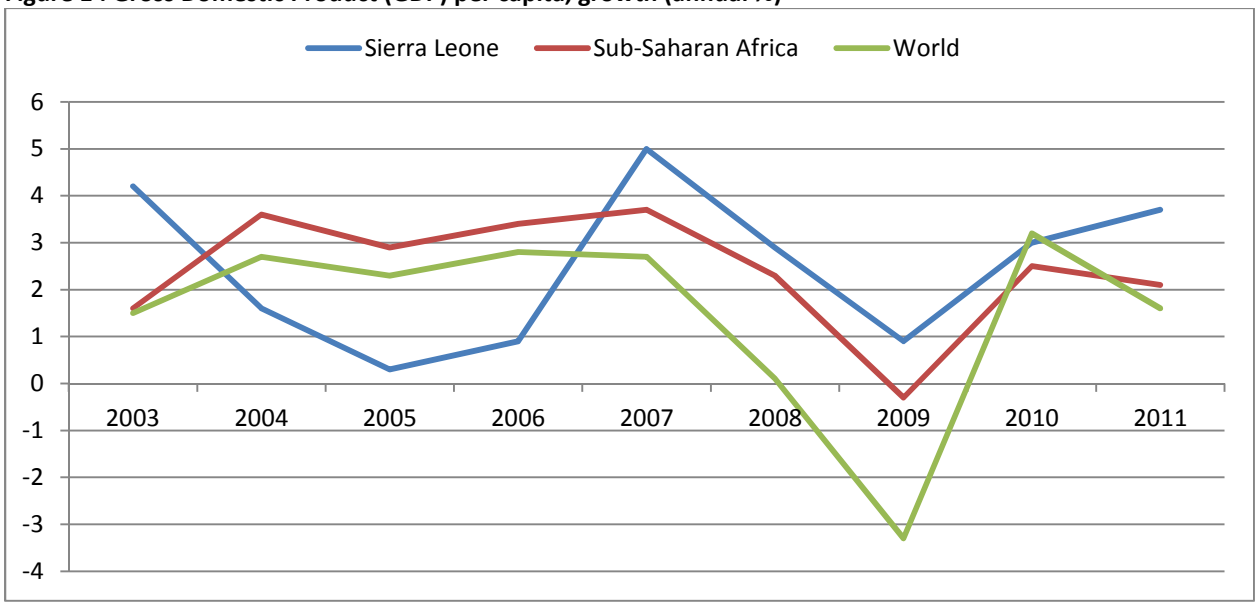
1.4 **The profile uses consumption as the starting measure for household well-being following the standard in poverty analysis for developing countries.** This consumption-based approach reflects a harmonized set of food and non-food items from the 2003 and 2011 surveys. A consumption aggregate was then computed at the household level. A poverty line was developed for the 2003 survey, which reflects the monetary value of a minimum set of food and non-food items to fulfill basic needs. For the 2011 analysis, this poverty line was increased to correspond with inflation during this period.

1.5 **The profile is divided into two sections: the main text and the appendices.** The main text includes 20 key figures with accompanying explanations and analysis. The appendices include supporting information, including a series of tables of more detailed statistics and technical notes on the construction of the consumption aggregate and poverty lines.

MACROECONOMIC TRENDS SINCE 2003

1.6 **GDP per capita has shown above-average growth since 2003.** The average annual growth rate in Sierra Leone was 2.5 percent between 2003 and 2011, which was slightly higher than the sub-Saharan average of 2.4 percent during this period, and well above the global average of 1.5 percent. The highest overall GDP growth levels occurred during the immediate post-conflict period as the situation stabilized and economic activity was reestablished, but this also coincided with a period of high population growth which offset per capita gains. As the population growth rate declined, per capita growth increased, though in 2009 Sierra Leone was impacted by the global financial crisis and a spike in global food prices. Since that time, the growth rates have largely recovered.

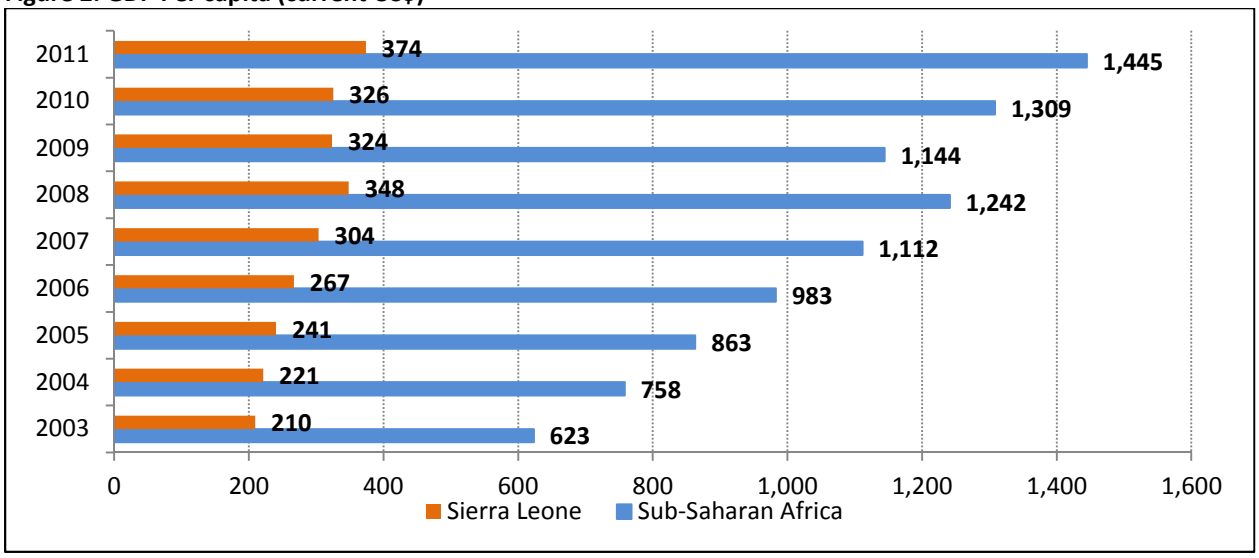
Figure 1 : Gross Domestic Product (GDP) per capita, growth (annual %)



Source: World Bank Word Development Indicators

1.7 **But Sierra Leone remains a poor country**. Despite recent growth, a decade of war continues to have an impact, as overall GDP per capita levels still lag behind the sub-Saharan African average. During the period from 2003 to 2011, the GDP per capita, as measured in current USD, increased 78 percent from 210 to 374. Over the same period, the sub-Saharan average increased 132 percent, from 623 to 1,445 USD.

Figure 2: GDP Per capita (current US$)



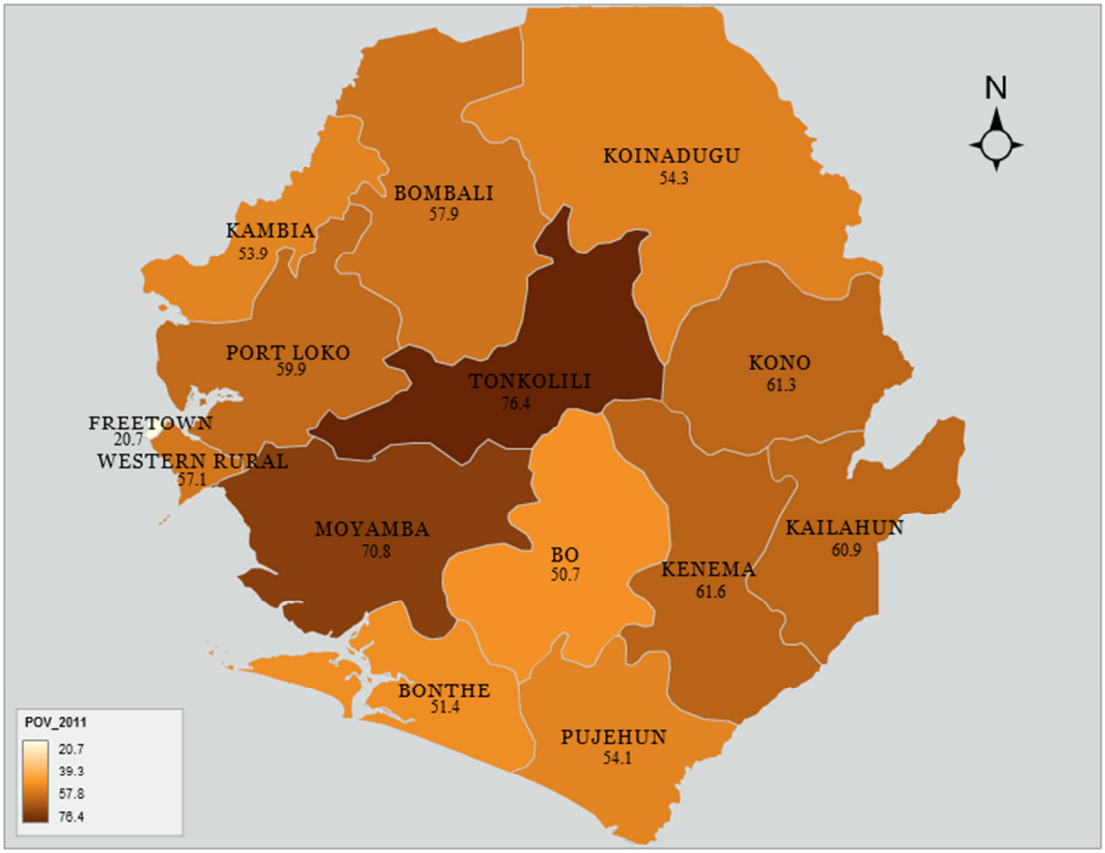
Source: World Bank and Africa Development Indicators

POVERTY AND GROWTH

1.8 **Overall, the poverty incidence was 52.9 percent in 2011, a decline from 66.4 percent in 2003.** The poor were individuals living in households with per adult equivalent consumption below 1,625,568 Leones per year in 2011. In 2003, this was equivalent to 750,326 Leones per adult equivalent per year. Using these poverty lines, the urban poverty rate was substantially lower than the rural poverty rate, and has also showed a sharper decline over this time period. Rural poverty was 66.1 percent in 2011, compared with 78.7 percent in 2003. Urban poverty was 31.2 percent in 2011, a decline from 46.9 percent in 2003, despite an increase in poverty in the country's largest metropolitan area, Freetown, from 13.6 to 20.7 percent.

1.9 **District level poverty rates for 2011 show the geographic divisions of prosperity and poverty.** Figure 3 shows the distribution of the poor in 2011 by district. The lowest levels of poverty were found in the capital city of Freetown. Outside of the capital, poverty was relatively consistent across the country. Eleven of the 13 remaining districts had a poverty headcount ranging between 50 and 62 percent, with the lowest being in Bo district with 50.7 percent and the highest in Kenema with 61.6 percent. The two exceptions, which showed higher poverty levels, were Moyamba district with 70.8 percent and Tonkolili district, with 76.4 percent.

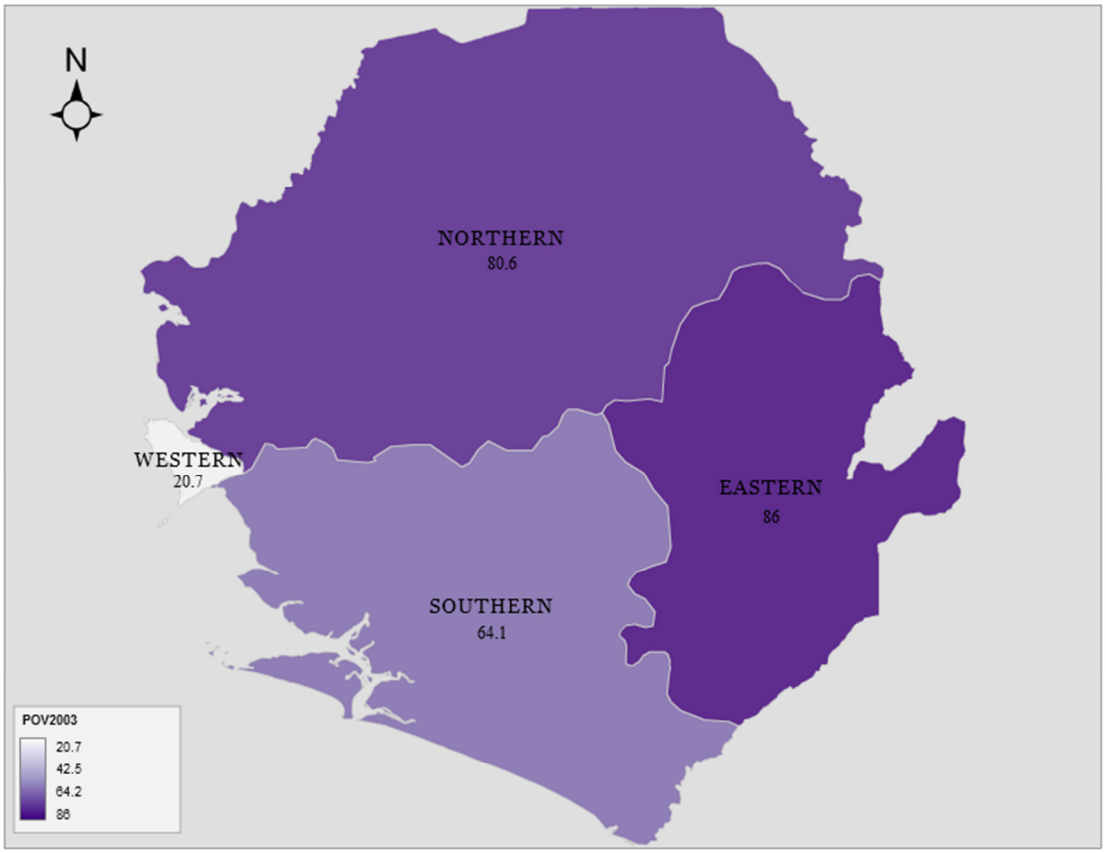
Figure 3 : Poverty Headcount by District (2011)



Source: Calculations based on SLIHS (2011)

1.10 **Poverty declined in the Northern, Eastern, and Southern regions, but increased in the Western Region.** Poverty declined from 86.0 to 61.3 percent in the Eastern region, from 80.6 to 61.0 percent in the Northern region, and from 64.1 to 55.4 percent in the Southern region. Poverty increased in the Western region from 20.7 to 28.0 percent. The 2003 survey is not representative at the district level, but it is possible to note statistically significant drops in poverty in Bonthe, Kailahun, Kenema, Port Loko, Bombali, Kambia, and Koinadugu due to the magnitude of the change.

Figure 4 : Poverty Headcount by Region (2003)



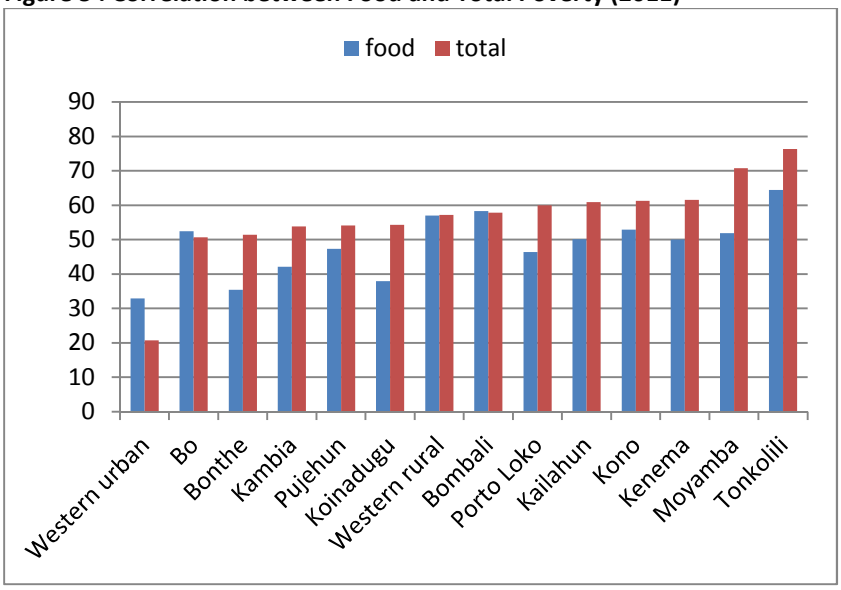
Source: Calculations based on SLIHS (2003)

1.11 **Food poverty is correlated with total poverty but gaps do exist.** There was a 72 percent positive correlation between food poverty and total poverty[1]. For example, food poverty was higher than total poverty in Freetown. This was likely attributable to the fact that food is not home-produced in this area, and household may have opted, either out of preference or necessity, to purchase non-food items with limited resources. In contrast, in the Moyamba district, which was more than 90 percent rural, total poverty was much higher than food poverty. This likely indicates that food needs could be met more readily through home production, but that disposable income may have be more limited for non-food purchases. See figure 5 for further details.

[1] Total poverty includes both food and non-food consumption. See appendix for a detailed explanation of the methodology.

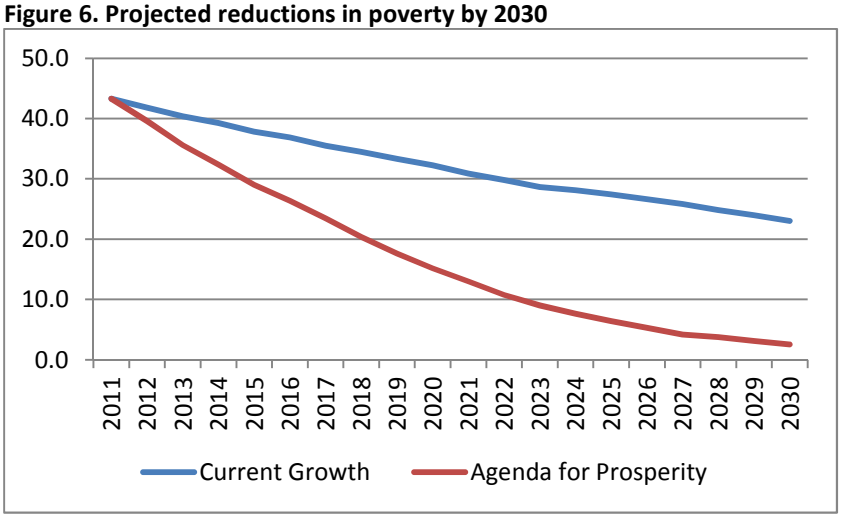
1.12 **In order to meet poverty reduction targets in the Agenda for Prosperity (AfP), the government must accelerate poverty reduction.** Comparing expenditure in purchasing power parity (PPP) adjusted dollars, per capita expenditure increased by 1.2 percent per year between 2003 and 2011. In rural areas, per capita expenditure increased by 1.6 percent, and in urban areas outside Freetown, it increased by 2.8 percent. In Freetown itself, per capita expenditure on average decreased by 0.9 percent. This growth in per capita expenditure translated into an approximately 3.7 percent annual decrease in poverty. At this current trend, the national poverty level would be at approximately 23 percent in 2030, excluding population growth. The AfP target of 4.8 percent per capita expenditure growth, also excluding inflation and population growth, would bring national poverty down to just under three percent. This would also meet the international goal of reducing poverty below three percent by 2030. Per capita growth of this magnitude would require GDP growth of around nine percent, substantially higher than the average 6.4 percent achieved since 2003. Much greater emphasis would be needed in the coming years than in past years on pro-poor growth however to meet these ambitious targets.

Figure 5 : Correlation between Food and Total Poverty (2011)



Source: Calculations based on SLIHS (2011)

Figure 6. Projected reductions in poverty by 2030



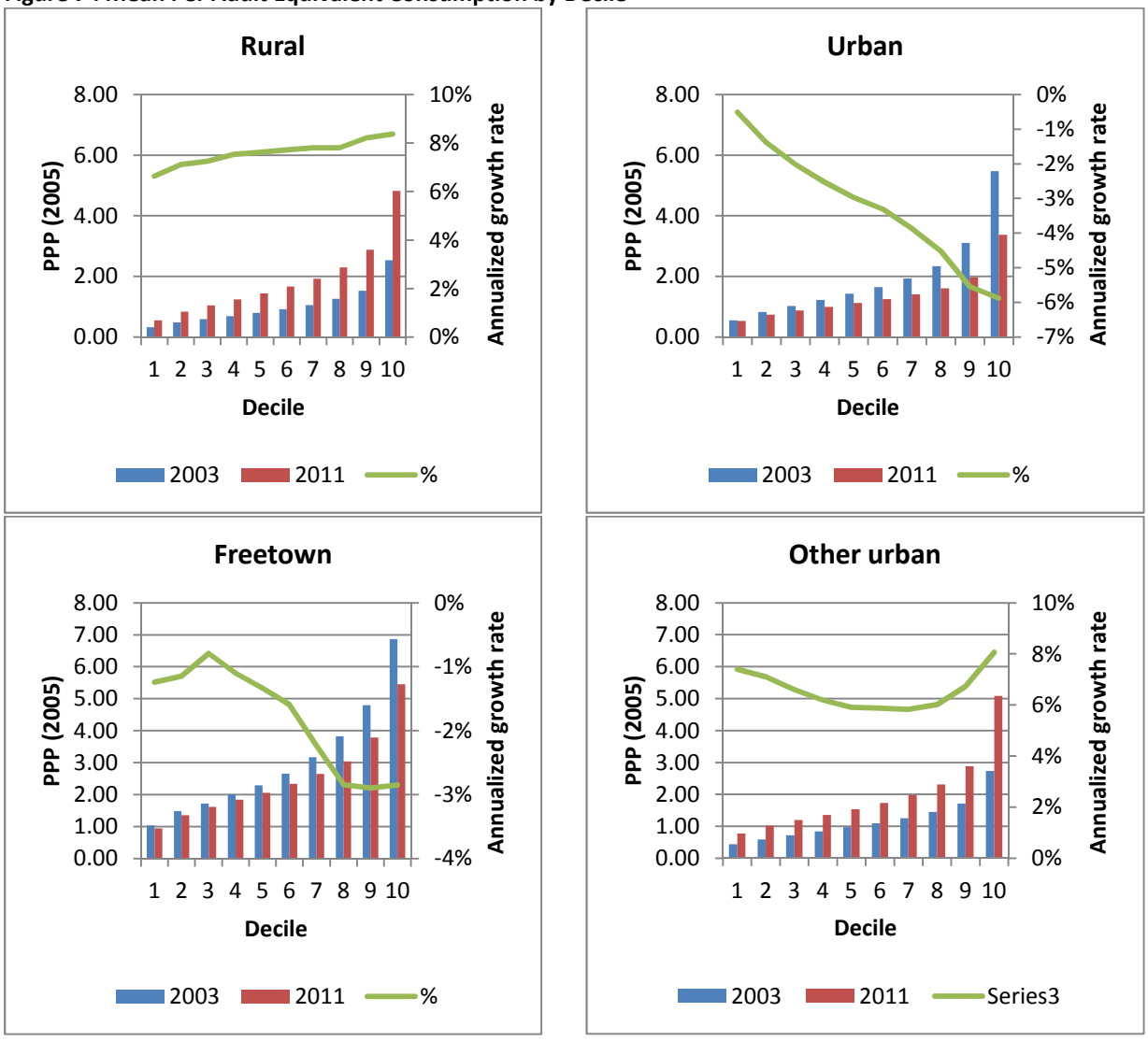
Source: Calculations based on SLIHS (2003 & 2011)

1.13 **Fertility has been declining and a continued reduction could enhance poverty-reducing effects of growth.** The above calculations assume no change in population growth, but the population growth rate decreased from an estimated five percent per year in 2003 to 2.2 percent in 2011 (WDI, 2012). This reduction increases the ratio of economically productive adults to dependents in the population. Delaying the age at first birth and increasing access to family planning options expand opportunities for

female labor force participation. It also frees more resources for investment, both in new economic activities as well as within the household for health and education. Though results vary by country context, the economics literature estimates that between 25 and 40 percent of the rapid growth seen in recent decades in East Asia was attributable to the "demographic dividend" creating by falling fertility rates (Bloom et al, 2003, pp 45).

1.14 **The growth in Sierra Leone from 2003 to 2011 has been pro-poor.** Comparing annualized growth rates for per capita expenditure adjusted for PPP, the growth rate was the highest for the lowest decile of the distribution, at six percent, and steadily declines until the top decile, which is just over one-half percent. With regard to shared prosperity, an indicator used to measure the inclusiveness of growth, the annualized growth rate was 5.1 percent for the bottom 40 percent, compared with 2.9 percent at the mean. The higher growth rate was further evidence of pro-poor growth. Complete growth incidence curves can be found in figure A2 in the appendix.

Figure 7 : Mean Per Adult Equivalent Consumption by Decile



Note: Deciles defined within subgroup.

Source: Calculations based on SLIHS (2003 and 2011)

1.15 **Overall the growth rate was around eight percent in rural areas, but negative in urban areas.** When growth rates were disaggregated, however, between Freetown and other urban areas, only the Freetown growth rates were negative, particularly for the highest deciles. Growth rates in other urban areas were only slightly below those of rural areas.

1.16 **Decile growth rates within rural, Freetown, and other urban sub-groups showed high levels of variation.** Rural growth showed a steady upward sloping, pro-poor trend across all deciles. The urban growth rate was declining sharply across deciles; however, after disaggregating urban growth into its Freetown and other urban components, the patterns diverge. First, the growth rates at the mean were negative for Freetown but comparable with rural areas for other urban areas. Also, the trends were very different. Growth rates for Freetown peaked at the third decile before falling off sharply for the upper deciles. In other urban areas, growth was higher for the top and bottom declines with those in the top decline having the highest growth rates. This indicates that growth in other urban areas has favored the upper deciles. It should be noted when discussing the decline of per capita PPP expenditure, the decrease was not necessarily the entire population decreasing in wealth. See box below for a further discussion on poverty in Freetown.

What's going on in Freetown?

One of the more unexpected findings from the discussion of the 2011 SLIHS data related to the increase in poverty levels in the Western region. Poverty increased 52 percent in the city of Freetown and 35 percent overall in the Western region. While this is an important finding, unfortunately limitations in the data restrict further analysis into its causes. First, only cross-sectional data is available, meaning different individuals were interviewed in 2003 and 2011. This means that it is not possible to follow the rise or fall in prosperity of individual households, only of population groups in general.

Second, since the last population census was almost ten years ago, it has become difficult to estimate the share of population living in urban and rural areas within each district. Census projections of population focus on population growth, but internal migration was also a very important component and much harder to approximate. Finally, there may be non-response issues that impacted the results..

Figure 7 shows the average adult equivalent consumption by decile. It shows that while overall levels of consumption in Freetown were higher, the growth rates there were negative compared with rates between seven and eight percent in rural and other urban areas. It also shows that the average per adult equivalent consumption was lower in 2011 that it was in 2003 in Freetown (excluding inflation). Despite the limitations noted above, there are a number of possible hypotheses.

Migration into Freetown: Many developing countries have seen large inflows of population into urban areas in recent years. In 1960, about 15 percent of the population of sub-Saharan Africa lived in urban areas, but by 2010, that percentage had risen to over 35 percent (UN, 2012). People come from the countryside to the capital for a variety of reasons, including the better availability of public services and the perception of better employment options. Those arriving may oftentimes lack necessary education or skills to find good jobs, and therefore may end up in menial labor or small scale trading. Also, since those in rural areas were poorer overall, their arrival into Freetown increased the number of people at the lower end of the distribution, consequentially lowering overall average incomes. As mentioned previously, updated population shares will not be available until after the 2014 census, but it may be possible to proxy changes in population using voter registration records. While these records are not an ideal substitute due to possible double counting or under-representation in some areas, changes in voter rolls usually are well-correlated with changes in population. According to the National Election Commission [NEC] in Sierra Leone, there was a 65 percent increase in the number of registered voters in Freetown between 2004 and 2012, compared with only a 24 percent increase estimated by the population projections. This difference translates into a difference in population of more than 135,000 people.

In order, however, to see an overall drop in mean such as the one seen between 2003 and 2011, more than 135,000 people would have to have moved to Freetown. If the arrivals came equally from all ten deciles of the rural population, approximately 384,000 would have had to arrive in Freetown during this period. In the extreme case where all migrants came from the poorest decile in rural areas, it would still require 220,000 new arrivals. While internal migration of this magnitude is certainly possible, 384,000 would represent only about 10 percent of the rural population in 2011, the voter registration data does not support a change of this size. If the internal migration hypothesis were to be true, it would likely be only part of the full explanation. For example, new migrants could be putting downward pressure on wages for all Freetown residents, thereby also reducing the incomes of existing residents. It should also be noted that a change in population shares would also impact the overall headline poverty numbers, as poverty rates vary between districts. The impact, however, would be small, as most residents remain in rural areas where there is less variation. A recalculation made based on the population shares from the NER would reduce the national poverty headcount from 52.9 to 52.2 percent. The levels within sub-regions would remain the same.

	Census Projections	Voter Registration
District	2011	2012
Bonthe	2.7%	2.8%
Pujehun	5.3%	3.0%
Moyamba	4.3%	4.8%
Koinadugu	5.2%	5.0%
Kambia	5.3%	5.2%
Kailahun	7.5%	5.5%
Western Rural	4.1%	6.1%
Kono	4.9%	6.1%
Tonkolili	6.9%	7.0%
Bombali	7.8%	8.3%
Port Loko	8.8%	8.8%
Kenema	10.2%	9.2%
Bo	10.4%	9.3%
Western Urban	16.6%	18.9%
Total	100.0%	100.0%

Out Migration from Freetown: In addition to the in-migration of relatively poorer people into Freetown, it is also possible that relatively more well-off people left Freetown. Though exact statistics are not available, the population of Freetown is believed to have swelled to many times its current level during the civil war. The 2003 SLIHS survey was conducted after the majority of the population had returned to their original districts, but likely some still remained. Since those in Freetown were relatively better off than those in rural areas, this out-migration could help explain some of the large gains seen in rural and other urban areas. It is unlikely, however, that this hypothesis encompasses the whole explanation as the population of Freetown is relatively small compared to the rural population. Nearly the entire population of Freetown would have needed to move to the countryside to fully explain the gains in rural areas.

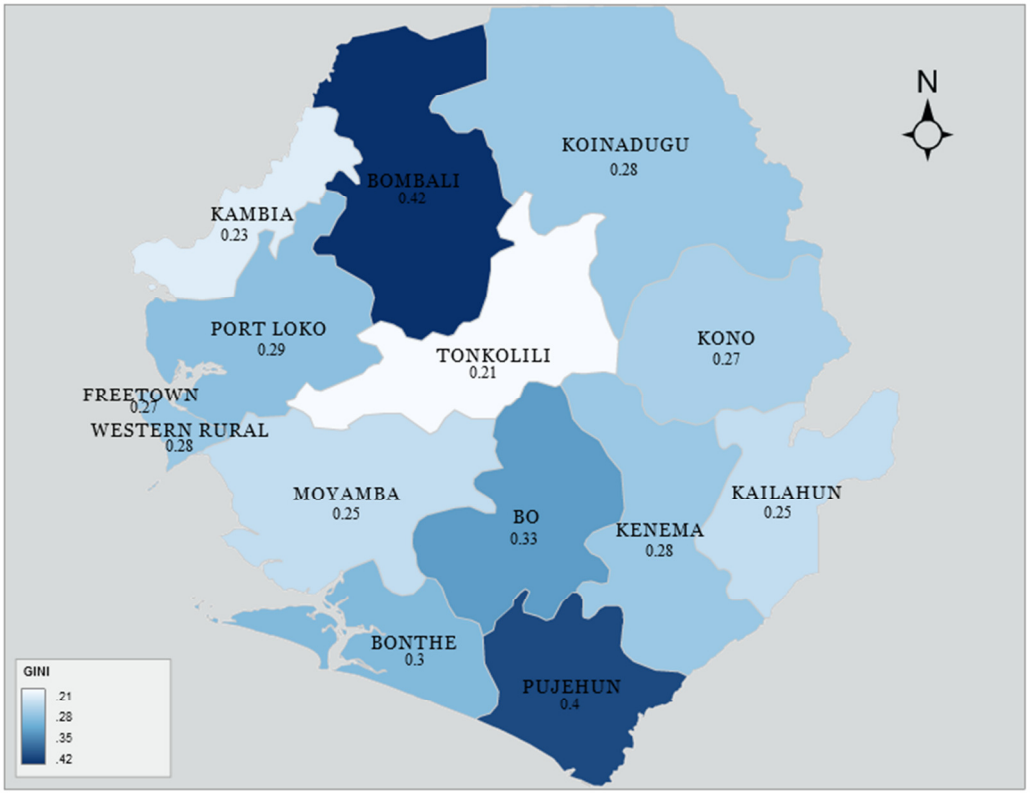
Non-Response: There are two types of non-response, unit and item non-response. Unit non-response occurs when entire households refuse to participate. As documented by Mistiaen and Ravallion (2003), respondents are less likely to participate as incomes rise. Also higher employment rates among more well-off populations decrease the probability of finding members at the household, and those with more assets may be less likely to discuss their finances with strangers. Even if replacement households were chosen from the same EA, the data would still be biased based on this non-response. It is also very difficult to calculate adjustment factors during the weighting process as very little auxiliary information is available for non-responding households. This type of non-response introduces an upwards bias in poverty numbers and a downward bias in Gini coefficients. Item non-response relates to households not responding to all questions in the questionnaire. If households became bored or tired, they may neglect to mention all items in the consumption module, biasing poverty upwards. Since item non-response is also linked to the opportunity cost of time, this would be more pronounced in wealthier areas. If either type of non-response increased in Freetown between 2003 and 2011, it could be partially responsible for the increases in poverty found in the SLIHS 2011, particularly since the largest declines are at the highest deciles of the consumption distribution.

Conclusion: It is likely that all three reasons listed above, as well as possibly other unknown dynamics, have played a part in in the increase in poverty see in Freetown. In the absence of panel data or updated demographic information, it is difficult to draw conclusions regarding the full causes with certainty. This report should serve to highlight, however, that there are substantial changes occurring in Freetown, and particular attention should be paid to these areas in future data collection and analysis activities.

INEQUALITY

1.17 **Overall from 2003 to 2011, national inequality levels have decreased.** The Gini coefficient, calculated for per-capita consumption, decreased from 0.39 in 2003 to 0.32 in 2011. The 2011 levels of inequality vary substantially, however, across districts. The highest level is in Bombali district, with a value of 0.42, and the lowest in Tonkolili, with a value of 0.21. Inequality is also relatively low in the capital Freetown, with a Gini coefficient of 0.27. Figure 8 shows the Gini values by district.

Figure 8 : Gini Coefficient by District (2011)



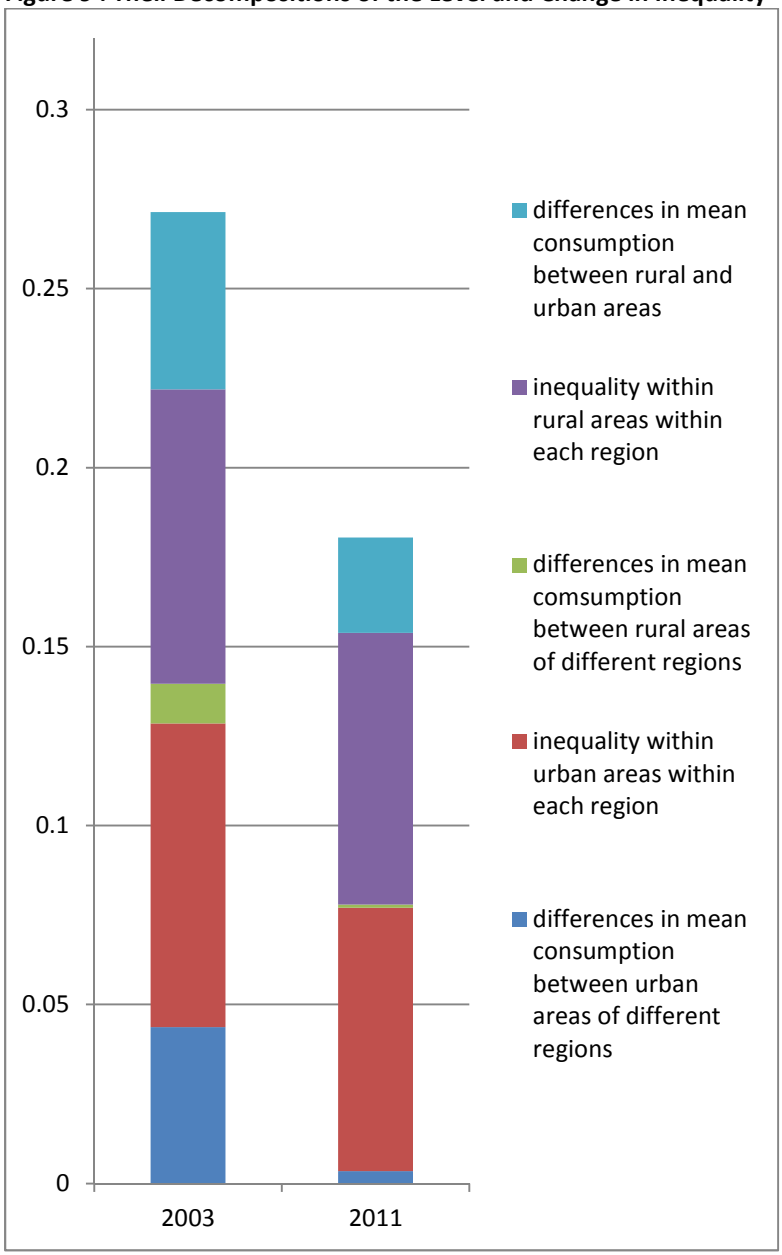
Source: Calculations based on SLIHS (2011)

1.18 **Inequality has increased only in other urban areas.** The decrease in the Gini coefficient was from 0.32 to 0.29 in rural areas, and from 0.31 to 0.27 in Freetown. In other urban areas, there was a small increase in inequality from 0.29 to 0.31. See figure 7 in the previous section for further details.

1.19 **The contribution of differences in per capita consumption between urban and rural areas and between regions can further explain the decrease in inequality.** For this analysis, a Theil index is used instead of the Gini coefficient due to its decomposable properties. The Theil index can be split into five components: (a) differences in mean per capita consumption between rural and urban areas nationally, (b) differences in mean per capita consumption between rural areas of different regions, (c) inequality within rural areas within each region, (d) differences in mean per capita consumption between urban areas in different regions, and (e) inequality within urban areas within each region.

1.20 **The overall decrease in inequality can largely be attributed to convergence between Freetown and other urban areas, and by rural areas catching up with urban areas generally.** Between 2003 and 2011, all five components of inequality decreased. The share attributable to differences in mean per capita consumption between rural and urban areas nationally decreased substantially, as rural areas experienced overall higher levels of growth and these areas have a much larger share of the total population. Modest decreases in inequality occurred within urban areas and within rural areas within each region. The remaining decrease in inequality was driven largely by the final two components. First, there was a sharp decrease in inequality between urban areas of different regions, which can be explained by the narrowing gap between Freetown and other urban areas. This narrowing was driven both by increases in other urban areas and by declines in Freetown. The final component of inequality, differences between rural areas of different regions, has almost completely disappeared. While there are a number of possible explanations, a key factor in this convergence was the post-war return and recovery of small farmers to the most affected areas.

Figure 9 : Theil Decompositions of the Level and Change in Inequality

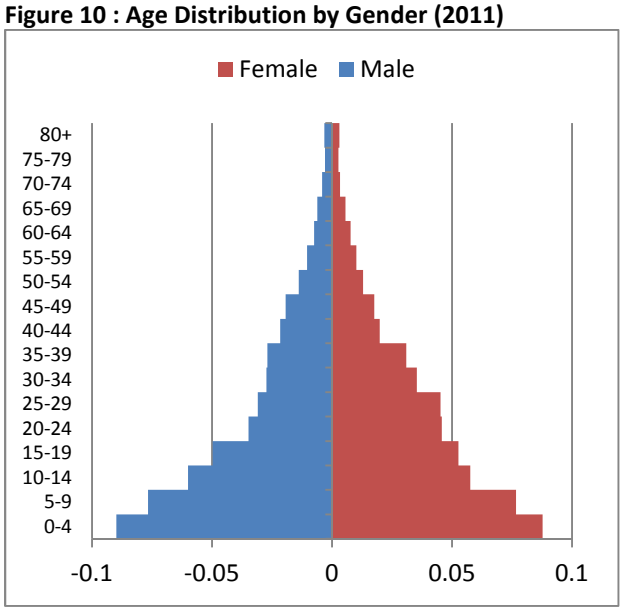


Source: Calculations based on SLIHS (2003 and 2011)

DEMOGRAPHICS

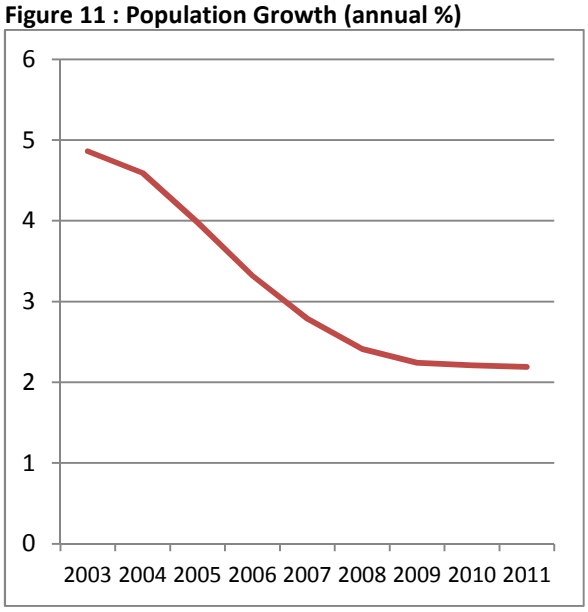
1.21 **Sierra Leone is an extremely young country, with more than 75 percent of the population below the age of 35 in 2011.** Figure 10 shows the distribution of male and female population by age.[2]

Figure 10 : Age Distribution by Gender (2011)



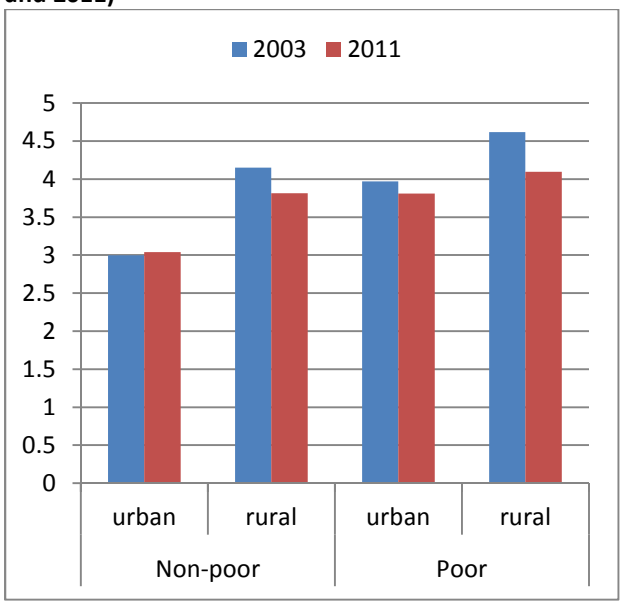
Source: Calculations based on SLIHS (2011)

Figure 11 : Population Growth (annual %)



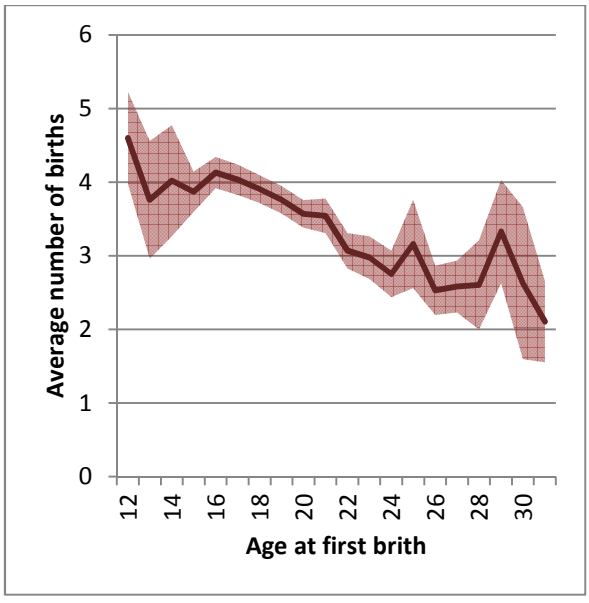
Source: WDI (2012)

Figure 12 : Average Number of Births Per Woman (2003 and 2011)



Source: Calculations based on SLIHS (2003 and 2011)

Figure 13 : Average Number of Births By Age (2011)



Source: Calculations based on SLIHS (2011)

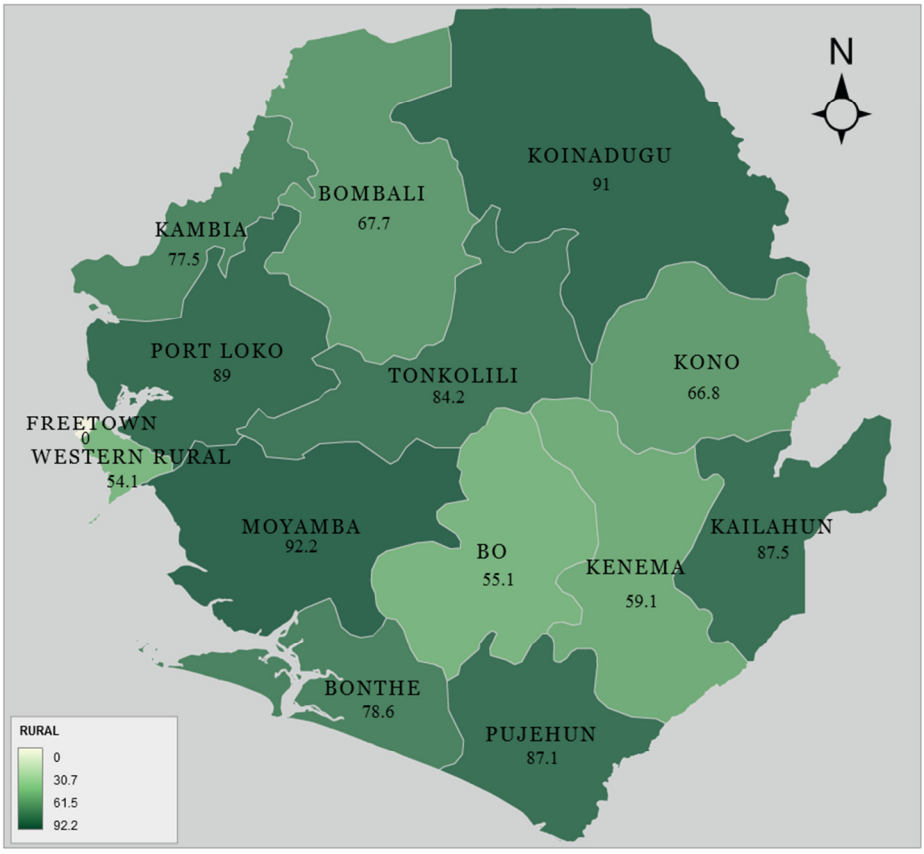
[2] Note: considerable weaknesses in the data, including age heaping and under-reporting of children under 5, necessitated substantial extrapolation to arrive at the above figure. See the population pyramid section in the appendix for a more detailed discussion.

1.22 **Fertility has declined between 2003 and 2011, with the largest decreases among the rural poor.** Overall population growth has declined from a high of approximately five percent per year in 2003 to 2.2 percent in 2011 (WDI, 2012). The average number of births per woman was 4.1 in 2003 and 3.7 in 2011, nearly a 10 percent decrease overall. There was a decrease from 4.5 births per woman to 4.0 in rural areas, but this was partially offset by a marginal increase in the urban non-poor population. See figures 11 and 12 above.

1.23 **Women that delay their first birth have fewer children overall.** The median age for the first birth was 19 years old in 2011. The average number of total births was almost double for a woman that had her first child at 16 as opposed to 31. See figure 13.

1.24 **The majority of Sierra Leoneans live in rural areas.** Despite that new population figures will only be available following the implementation of the 2014 population census, the SLIHS survey indicates the majority of the population still lives in rural areas, though urban populations are increasing. Survey results show the district with the highest urban population outside of the Western region was Bo, which was almost half urban. This was in comparison with neighboring Moyamba, which was almost completely rural at 92 percent. Figure 14 shows the percentage of rural households in each district.

Figure 14 : Rural Households by District (2011)



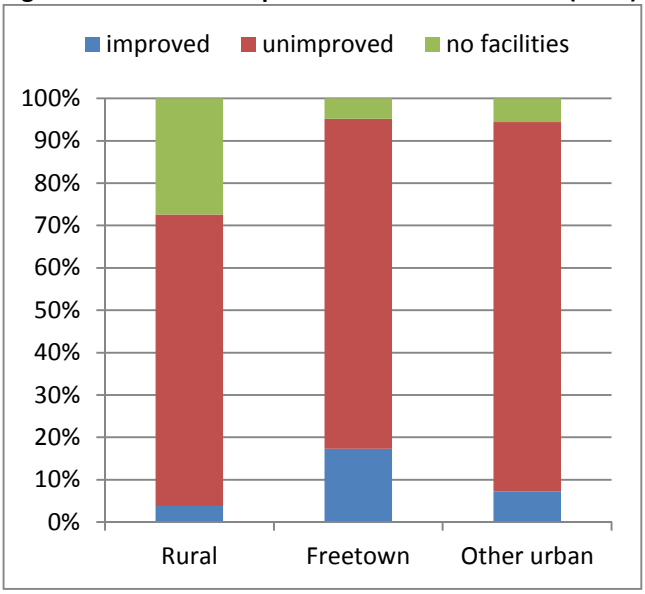
Source: Calculations based on SLIHS (2011)

1.25 **Female headed households show lower poverty rates than male headed households in 2011.** Female headed households comprised 17.5 percent of total households in 2003 and 25.8 percent in 2011. In 2003, there was not a significant difference in poverty levels between the two groups, with 61.3 percent of male headed household and 59.8 percent of female headed households living below the poverty line. By 2011, however, the difference was significant, 47.5 and 43.8 percent of households respectively. Disaggregation by rural/urban status shows, however, that female-headed households in urban areas are doing about the same, with approximately one-quarter of both groups of households being poor. In rural areas, female headed households are doing better than male-headed households, with 61.4 percent of male headed households below the poverty line compared to 57.1 percent of female headed-households.

PUBLIC SERVICES

1.26 **Access to electricity and sanitation was limited in remote areas.** Less than one percent of households in rural areas listed electricity as the main source of lighting, compared with 57.7 percent in Freetown and 12.7 percent in other urban areas. Though the majority of the population in all three areas had access to only unimproved sanitation facilities, the highest prevalence of improve facilities was in Freetown at 17.3 percent.[3] The availability was the worst in rural areas, where 27.4 percent of the population had no access to sanitation facilities, either improved or unimproved. Figure 15 has further detail.

Figure 15 : Access to Improved Sanitation Facilities (2011)



Source: Calculations based on SLIHS (2011)

1.27 **Public services were also more difficult to access in rural areas.** Almost half of rural respondents lived more than one hour from the nearest food market, a finding with strong implications on the household's ability to participate in the agricultural economy. Ten percent of other urban residents and less than three percent of Freetown residents were more than one hour from a food market. Access to a primary school was relatively good across the country, with less than 10 percent of rural residents being more than one hour away, and only 0.9 percent and 1.7 percent of Freetown and other urban residents, respectively. Access to a secondary school was also fairly good in urban areas, with less than ten percent of residents in both Freetown and other urban areas being more than one hour away. Rural areas were at a disadvantage, however, as 57.4 percent of residents were more than one hour's travel from a secondary school. Access to health facilities was also much better in urban

[3] Definitions for sanitation facilities are as follows: "improved" : flush to piped sewer system; flush to septic tank; flush to pit latrine; flush to somewhere else; VIP latrine; composting toilet. "unimproved" : pit latrine with slab; open pit latrine (no slab); hanging toilet/latrine; other. "none" : no facilities / bush / field; bucket.

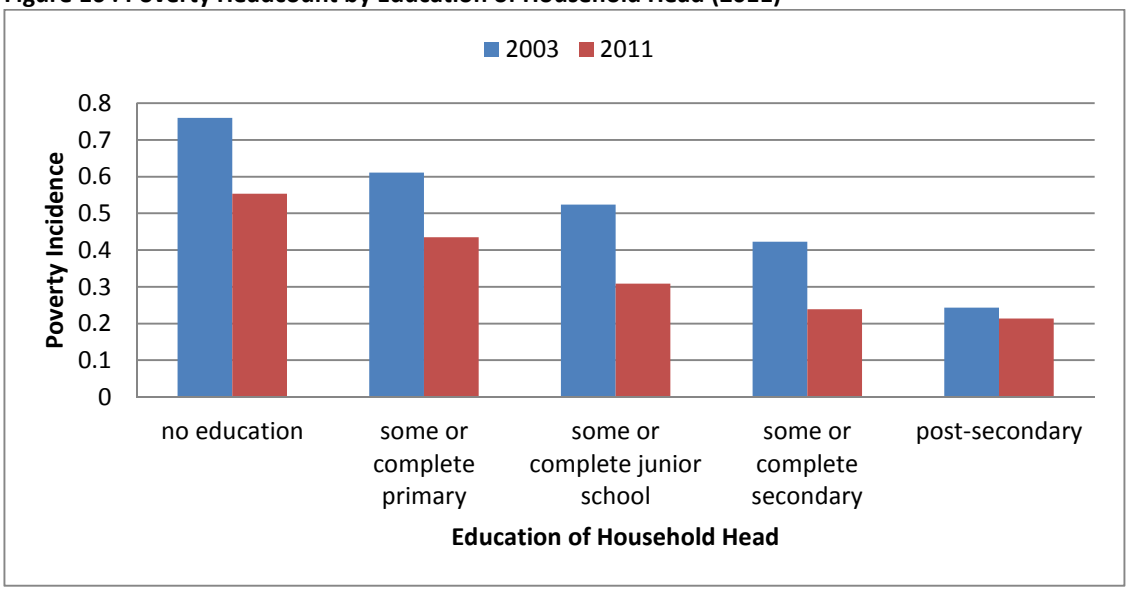
areas. Of rural residents, 35.5 percent lived more than one hour from a clinic and 71.7 percent more than one hour from a hospital. Less than 5 percent in urban areas were more than one hour from a clinic, and those more than an hour away from a hospital were 10.4 percent and 22.3 percent in Freetown and other urban areas, respectively. Table A7 in the appendix gives further detail on the distribution of travel times.

EDUCATION

1.28 **Educational completion rates were low by international standards.** According to the 2011 SLIHS, 56 percent of adults over the age of 15 have never attended formal school. The percentage of adults without access is higher for women than for men, 64 percent versus 47 percent, and higher in rural areas compared to urban, 73 percent versus 31 percent.

1.29 **Households with lower levels of education of the head were more likely to be poor.** Though poverty levels decreased across all five education categories shown in figure 16, the largest percentage reductions were for post-primary levels of education. Poverty decreased 27.1 percent for households in which the head has no education, but 43.6 percent for households in which the head had some or complete secondary education.

Figure 16 : Poverty Headcount by Education of Household Head (2011)



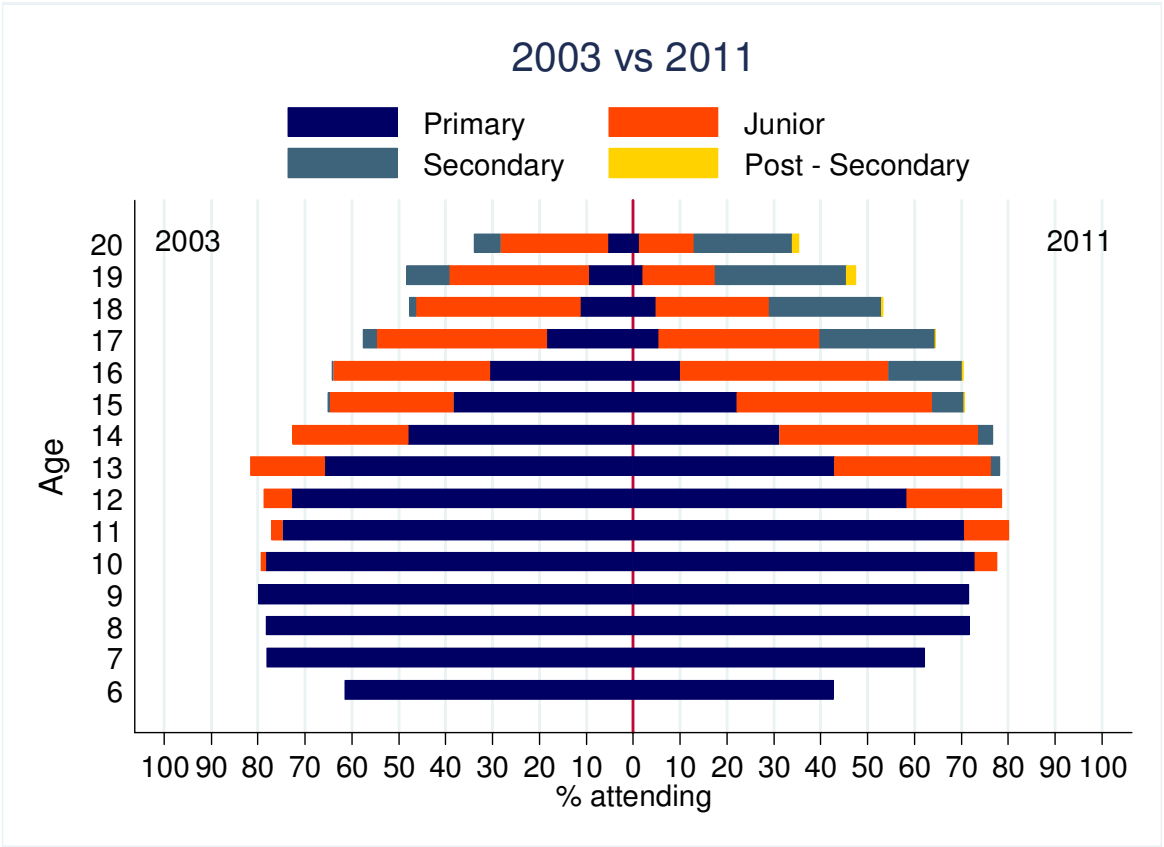
Source: Calculations based on SLIHS (2011)

1.30 **Current enrollment indicators show mixed results from 2003 to 2011.** During this period, both net and gross primary enrollment rates have decreased, from 75.6 to 65.6 and 124.0 to 89.3 percent, respectively.[4] Some caution should be taken in interpreting these results however, as the 2003 survey

[4] As in many developing and post-conflict countries, the lack of administrative records leads to inaccuracies in age reporting, particularly heaping on ages such as 5, 10, etc. This is particularly problematic for gross enrollment reporting. As part of the more complex analysis of the education chapter, smoothing factors have been applied to

was conducted in the immediate post-conflict period. Many children were entering and re-entering the system in 2003 after a prolonged period of absence, and the system might not have yet normalized to representative enrollment figures. Despite this, there was a decline in new enrollments of six year olds, from 62 percent in 2003 to 43 percent in 2011, indicating weaknesses in the system. During this period, however, there have also been improvements in age appropriate schooling and in enrollments in higher levels of schooling. In 2003, 18 percent of 17 year olds, who should have been in their final year of secondary school, were enrolled in primary school, compared with three percent in secondary. By 2011, only six percent of 17 year olds were enrolled in primary school, compared with 24 percent in secondary school. Also, the net enrollment rate for junior school increased from 14.0 to 30.7 percent from 2003 to 2011. The number of secondary school enrollments tripled to approximately 240,000 students, and there was a more than ten-fold increase in post-secondary enrollments to nearly 50,000. Figure 17 shows the attendance profile for students aged 6 to 20 for 2003 and 2011.

Figure 17 : School Attendance by Age (2003 & 2011)



Source: Calculations based on SLIHS (2003 & 2011)

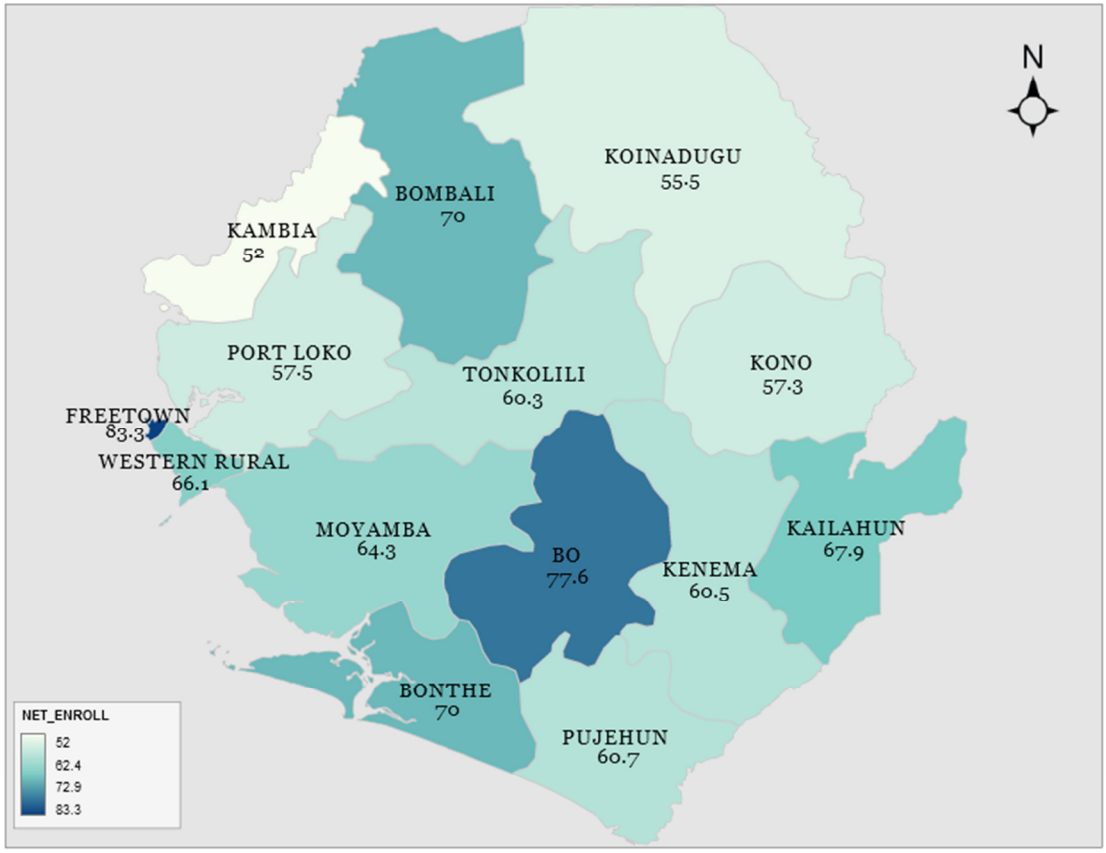
1.31 **Gender parity has almost been reached in education, but substantial gaps remain across income groups and between urban and rural areas.** Figures A3 and A4 in the appendix show school

attempt to replicate the actual age distribution. The primary gross enrollment rate using the smoothed data is was 138.4 percent for 2003 and 107.7 percent for 2011. Therefore as the values are different, the trends remain the same. Further technical discussion is available in the appendix of the education chapter.

attendance rates overall and for three subgroups: by gender, by urban and rural status, and comparing the first and fifth quintiles of household consumption. With regard to gender, there is very little difference between boys and girls in primary school, with 98 girls enrolled for every 100 boys in 2003, and 106 girls for every 100 boys in 2011. Gaps do begin to open in higher levels of education, but the magnitude of these gaps has decreased from 2003 to 2011. Rural areas lag considerably behind urban areas in terms of enrollments, particularly at the secondary and post-secondary levels. Comparing the first and fifth quintiles of the household consumption distribution, the wealthiest quintile had higher enrollment rates across all levels in both 2003 and 2011. During this time period, however, the gap has narrowed for primary and junior education, but expanded for the secondary and post-secondary levels.

1.32 **Net primary enrollment rates vary substantially by district.** The highest primary enrollment rates were found in Freetown and Bo district, and the lowest in Kambia and Koinadugu. Figure 18 shows net primary enrollment rates by district.

Figure 18 : Net Primary Enrollment by District (2011)



Source: Calculations based on SLIHS (2011)

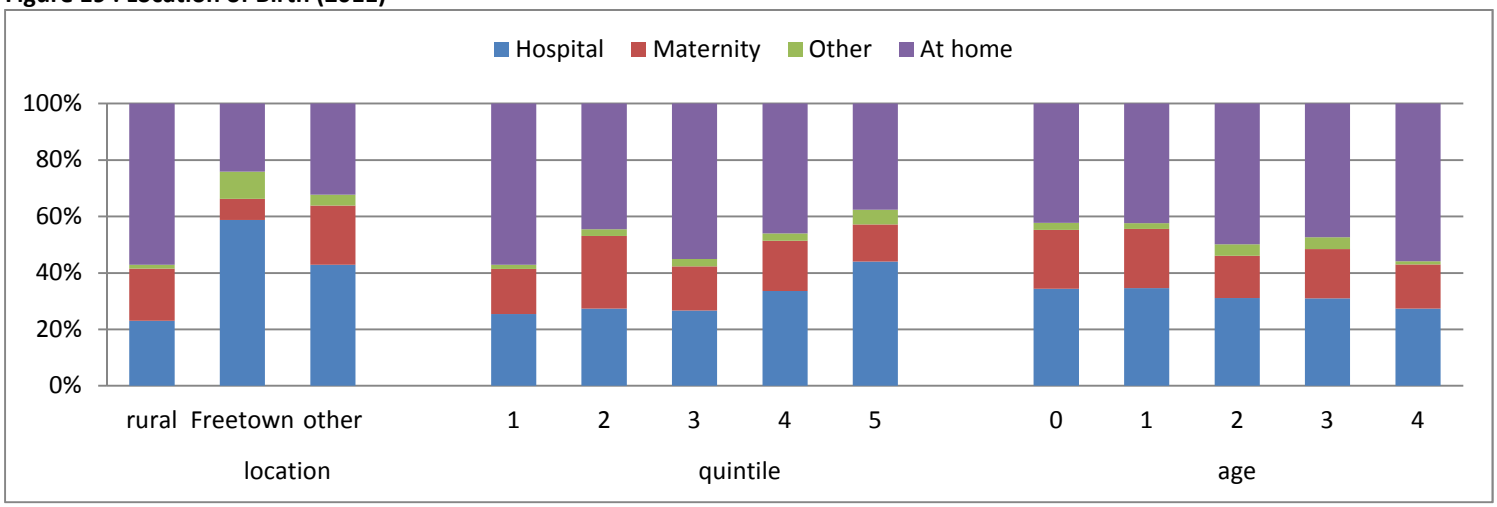
HEALTH

1.33 **Nearly half of children under 5 were born at home.** Comparing the location of birth for children under age 5 in the 2011 SLIHS, 57 percent of children living in rural areas were born at home,

compared with 32 percent in other urban areas and 24 percent in Freetown. Overall, 31 percent of children under age 5 were born in hospitals and 17 percent in maternity centers, though in Freetown, nearly 60 percent were born in hospitals. Comparing across quintiles, 57 percent of children living in households in the lowest quintile were born at home, which is significantly less than 38 percent of children in the highest quintile.

1.34 **Younger children are less likely to be born at home.** In April 2010, the government introduced the Free Health Care Initiative, targeted to pregnant women, new mothers, and children under five. Comparing children under the age of 5, those born after April 1, 2010 were less likely to be born at home than those born prior to that date. This difference is statistically significant despite a likely lag in the implementation of the project in many areas. Comparing four year old children at the time of the survey to those less than a year old, 55 percent of four year olds were born at home, compared with only 42 percent of those under one year of age. See figure 19 for further details.

Figure 19 : Location of Birth (2011)



Source: Calculations based on SLIHS (2011)

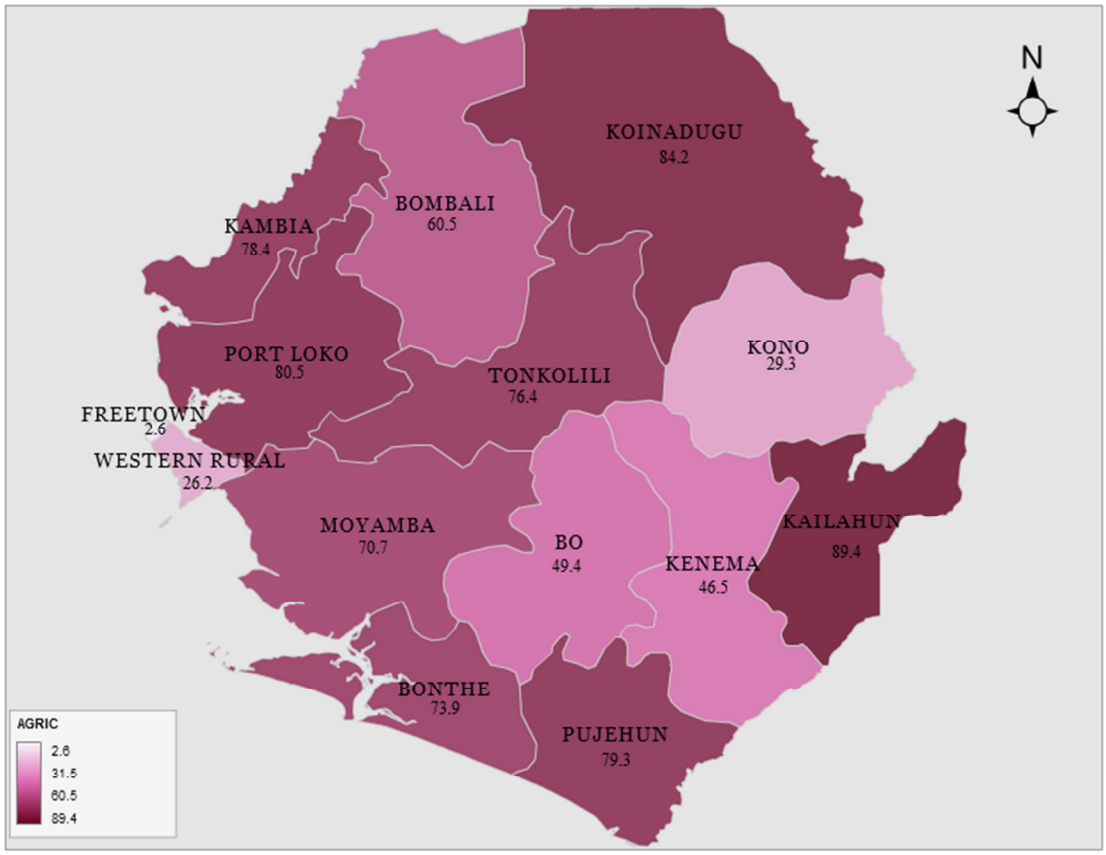
AGRICULTURE & RURAL LIVELIHOODS

1.35 **Agriculture remains the dominant livelihood throughout the majority of Sierra Leone.** In 52.4 percent of all households, the head listed their main occupation as agriculture. In rural areas, this percentage was 78.3 percent. Male household heads were more likely to have agriculture as their primary occupation, 55.2 percent versus 44.6 percent respectively. This difference was also found in rural areas, with 80.9 percent of male headed households and 70.6 of female headed households listing agriculture as their main occupation. With the exception of Western, Kono, Kenema, and Bo districts, agriculture remains the main activity for household heads throughout the country. Figure 20 shows the percentage of household heads listing agriculture as their main activity by district.

1.36 **Households in which agriculture is the primary occupation of the household head are poorer than other occupations.** The poverty headcount for agricultural households showed an 18.5 percent decrease from 74.6 in 2003 and 60.8 in 2011, while other households showed a 25.5 percent decrease from 41.2 to 30.7 percent. This is true even within rural areas, where the poverty headcount was 62.7

percent for agricultural households, compared with 51.7 percent for other primary occupations of the household head.

Figure 20 : Agriculture as Main Livelihood by District (2011)



Source: Calculations based on SLIHS (2011)

1.37 **Rice was the most common crop grown by rural agricultural households, both poor and non-poor, though poor farmers have smaller plots.** The average landholding for poor households was approximately five acres in 2011, compared with almost seven for non-poor households. Seventy-five percent of rural households generally and 87 percent of rural agricultural households specifically, reported growing rice in 2011, but there was almost no difference in these figures between poor and non-poor households. About 20 percent of rural agricultural households reported growing cash crops, including cocoa, coffee, tobacco, wood, cotton, and sugar cane, but similarly there was no difference between poor and non-poor.

DETERMINANTS OF POVERTY

1.38 Tables A3 and A4 in appendix 2 present findings from simple regressions of per capita consumption and poverty on household variables for 2003 and 2011. The first regression, table A3, demonstrates, holding all other factors constant, the relationship between a given characteristic and the average per-capita consumption, and provides a useful summary of the correlates of poverty for urban and rural areas. Table A4 shows the change in the likelihood of being in poverty for a hypothetical household based on its characteristics. This model is useful to estimate the predicted change in poverty status based on a change in a given characteristic.

1.39 Holding all other factors constant, larger households had lower per-capita consumption, and generally higher probabilities of being poor. The remaining household composition variables were significant in only a few cases. For example, in both rural and urban areas in 2011, higher percentages of children under 15 increased the probability of a household being poor.

1.40 The age and gender of the household head overall do not seem to have a significant correlation with consumption or poverty, though, in 2011, older household heads in rural areas were more likely to be poor. Higher levels of education, however, were strongly associated with higher consumption and lower poverty. For example, in rural areas in 2003, households in which the head had no education had an 84 percent likelihood of being poor. This decreased to 74 percent if the head has some or complete secondary education, and to 7 percent if the head had post-secondary education. Similarly in urban areas in 2011, heads with no education had a 33 percent likelihood of being poor, which decreases to 18 percent with some or complete primary education, and to 13 percent with post-secondary education.

1.41 Despite the fact that Sierra Leone is a predominantly rural country, the roles of agricultural and land variables in determining poverty and consumption outcomes are not straightforward. In 2003, none of the three variables examined (primary occupation of household head is agriculture, household being landless, and landholdings) had a significant correlation with poverty in either rural or urban areas. In 2011, households in which the household head's primary occupation was agriculture were about 15 percent more likely to be poor compared with other households in rural areas. Households with no landholding are not significantly more likely to be poor, but they do have lower overall household consumption levels. In addition, for every 20 percent increase in landholdings from the mean, there is an estimated five percent decrease in the likelihood of being poor.

1.42 Other sources of income, including non-farm enterprise and transfer payments also played a role in household welfare. Transfer payments from outside of the household were associated with higher consumption and lower poverty only in urban areas in 2003. Households receiving these payments were 15 percent less likely to be poor. Having a non-farm income source was associated with higher consumption in rural areas in 2003 and urban areas in 2011, but only in the latter was the likelihood of being poor lower.

1.43 In addition, certain districts had higher or lower poverty levels compared to the reference category, and these probabilities varied substantially between 2003 and 2011. In both cases, however, the lowest likelihood of being poor was found in Freetown.

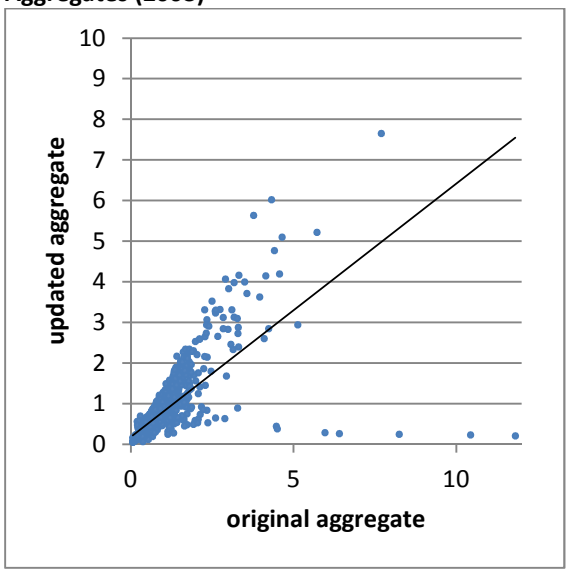
APPENDIX 1. METHODOLOGY FOR POVERTY ANALYSIS

A1.1 The concept of poverty can refer to many different aspects of deprivation, such as food poverty, social exclusion, lack of access to basic public services, inability to access markets, etc. While each of these is an important aspect of a multidimensional problem, it is necessary for the purposes of comparability and analysis to simplify the concept of poverty to a single measureable dimension. In the context of this report, household consumption will be considered as a representative measure of well-being.

A1.2 In the context of sub-Saharan Africa, a consensus has emerged among analysts to use consumption-based measures over income measures as it is seen as better able to capture utility and well-being. First there is a substantial contribution of home production to household consumption. Also, households are better able to smooth consumption as opposed to income, which is important in places with large seasonal shifts in the availability of employment. The volatility of the income indicator can therefore lead to large over- (or under-) estimations of welfare. Finally, despite well-known difficulties in some aspects of the collection of consumption data, it is generally considered more straight-forward than income data. While wage workers need only to recall their last paycheck, those who are self-employed or working in informal sectors must aggregate many small transactions. In addition, there are difficulties in valuing in-kind payments or labor sharing arrangements, separating entwined household and business expenses, and overcoming respondent reluctance to discuss income.

A1.3 It should be noted that the 2003 poverty figures presented in this report differ slightly from those calculated at the time findings from those data were originally disseminated. There are a number of reasons for this discrepancy. First, the 2003 data was originally presented before the weighting calculations were finished. Also, more rigorous data cleaning methods were applied to both the 2003 and 2011 data prior to the analysis. The scatterplot in figure A1 shows outlier points in the original data that have been addressed in the revision. Additionally, the data sets were harmonized to ensure comparability. For example, items appearing in only the 2003 questionnaire were not included in the harmonized aggregates. The impact on the poverty numbers, however, is minimal, and roughly even across regions and other sub-categories.

Figure A1 : Original and Revised Consumption Aggregates (2003)



Source: Calculations based on SLIHS (2003)

A1.4 There are three elements required to perform poverty analysis:

a. A single dimensional, measureable welfare indicator that can be used to rank the population according to well-being.

b. An appropriate poverty line on the same scale as the above welfare measure that can be used to classify individuals as poor or non-poor.
c. A set of measures that aggregate and describe the combination of the welfare indicator and poverty line.

Adult Equivalent Measures

A1.5 For the purposes of comparison, aggregate household consumption measures are often divided by a measure of household size. For the purposes of the poverty statistics presented in this report, per adult equivalent measures are used, instead of a per-capita measure to take into account differences in household composition. Therefore even households with the same number of members can have different adult equivalent values. The table at the left summarizes the adult equivalent measures used for infants, children, adults, and the elderly, with separate measures by gender. These measures are based on a modified version of the standard FAO adult equivalent scales which have been used in Ghana since 1998, and are therefore considered more relevant to the West African context.

Age range	Male	Female
0-1 years	0.25	0.25
1-3 years	0.45	0.45
4-6 years	0.62	0.62
7-10 years	0.69	0.69
11-14 years	0.86	0.76
15-18 years	1.03	0.76
19-50 years	1.00	0.76
51+ years	0.79	0.66

A1.6 As mentioned above, welfare is measured by aggregate household consumption over the last twelve months. The aggregate incorporates food consumption, non-food consumption, housing, and benefit derived from durable goods. Some irregular expenditures, including expenses for ceremonies, births, deaths, etc., as well as rare events, such as hospitalization, are omitted from the aggregates under the assumption that they do no accurately reflect welfare therefore should not affect the ranking of individuals, particularly since it is possible that the household received outside resources to meet the expenses.

Food Consumption

A1.7 Both market and non-market transactions are included in food consumption, which has a number of implications for the construction of the aggregates. First, it must be assumed that all food expenditures are consumed within the reference period. This is generally a valid assumption where access to refrigeration and other food storage mechanisms is limited. Also, in settings where the majority of the population is below the poverty line, it is unlikely that households would retain large stocks of purchased items. Second, a market price must be derived for home-produced items. The market price is assumed to be the mean price of a given item in a given unit quantity in a given region during a given survey month. In circumstances where the number of observations in the dataset does not permit all dimensions of the formula to be used, the imputation calculation is limited by removing

the month of interview, followed by the region. Also, non-standard units are valued as they appear in the dataset, instead of being converted and valued globally.

A1.8 The 2003 SLIHS contained 103 food items in the consumption section, while the 2011 SLIHS contains 162. These items are organized in 19 categories in the 2011 survey: grains and flours; starchy roots, tubers and plantains; pulses, nuts and seeds; fats and oils; fresh fruits and juices; canned/powdered fruits and juices; fresh vegetables; canned vegetables; poultry and poultry products; meat; fresh fish and shell fish; canned fish and seafood; milk and milk products; coffee, tea, cocoa, and like beverages; canteen, restaurants and hotel prepared meals; sugar, sweets and confectionary; other miscellaneous foods; non-alcoholic drinks; and alcoholic drinks.

A1.9 Since the number of included items differs between the two surveys, only those items which appear in both questionnaires are included in the consumption aggregate. This is done to maintain comparability between the two surveys. Some items appear in both surveys though the level of disaggregation is different. For example, the 2003 item "fish fresh/frozen" has been split into two categories in 2011. They are retained in the analysis.

Non-Food Consumption

A1.10 Non-food consumption was divided into two categories, frequently purchased items and infrequent non-food items. The frequently purchased items included lighting; refuse; water; sewage; tobacco; gas, kerosene, charcoal; firewood; palm kernel oil petrol, diesel for generators; other solid fuels; non-durable goods for household maintenance; domestic services; petrol; diesel; lubricants; transport repairs / maintenance; storage and warehousing costs; public transportation; communication; entertainment; insurance, licenses; and miscellaneous. Infrequent consumption items include clothing; footwear; maintenance; transport; communication; recreation; jewelry; other sporting goods. The method for calculating the value of the non-food expenditure listed above was straightforward. All items were included and normalized to a common reference period (one year). The quantities of these items were not collected as many categories are heterogeneous, so only the total value was used in the calculations.

A1.11 In addition to the items above, a few additional categories of non-food consumption warrant special mention. First, housing costs were included in the aggregate, even though the value is frequently missing from the survey as the household owns their home or receives free housing. In the 2011 SLIHS, 18 percent of household rented their dwellings. In the remainder of the cases, the rental value of the property was imputed. The imputation used a generalized linear model which imputed the log rent from the log number of rooms, the square log number of rooms, region/sector, water source, electricity, primary cooking material, toilet facilities, wall material and floor material. The resulting expectations were transformed and substituted for the missing values.

A1.12 The inclusion of household spending on education can be a controversial measure when constructing the consumption aggregate. It is possible interpret education as an investment, since the benefits are distributed throughout the life of the student even though spending is concentrated. Therefore current students may appear to be better off due to education spending, but this would

actually be a life-cycle effect rather than a true difference in welfare. One method to address this would be to smooth the spending on education across the life cycle, but this is not feasible in a cross sectional survey. It is also necessary to consider the supply of public education. If the entire population can access affordable public education, the decision to spend additional resources on private school would be based on quality considerations, strengthening the case for inclusion. Exclusion would also not allow the distinction between households that have one school age child enrolled in school and households that have multiple school age children, only one of which is enrolled. As the primary goal of a consumption aggregate is to order households based on well-being, this analysis follows standard practice and includes education spending in the aggregate. Included education expense are school fees and registration; school repairs and upkeep by PTA; uniforms and sports clothes; books and school supplies; transportation to and from school; food, board and lodging at school; extra tuition; other expenses; Quran costs; other expenditures on education; and education insurance.

A1.13 Spending on health care can also be seen as an investment, particularly in the case of preventative care. In addition, there are other factors which may distort comparisons, such as uneven access to free or heavily subsidized health care services, or health insurance, though insurance coverage rates are generally low in Sierra Leone. Similar to education expenditures, it was decided to include most health care expenses as their exclusion would make it impossible to distinguish between a household that sought care and one that did not when a member fell ill. An exception to this, however, is in the case of hospitalization. Since hospitalization is a rare even the cost of which is rarely borne completely by the household, with donations frequently coming from family members and the larger community, this expense is excluded from the aggregate. Expenses included with related to health are consultation, transport, medicines (over-the-counter and prescription), vaccinations, pre-natal costs, post-natal costs, contraceptive costs, therapeutic equipment, transportation costs, health insurance, and vitamins and other supplements.

A1.14 The ownership of durable good is also an important component of the welfare of households. These goods are purchased at a singular point in time, but the household receives benefits from them over the course of their ownership. The utility from these items cannot be measured, but is represented in the aggregate by the use value, a measure proportional to the current value of the good. To calculate the use value, first a median depreciation rate is calculated by item using data on the purchase price, the current sale price, and the age of the item. The use value is then defined as the current sale price multiplied by the median depreciation rate plus the real interest rate. In instances where the item was purchased in the last 12 months, the current use value was included in the aggregate instead of the sale price. For the purposes of comparison, only the following goods which appear in both surveys are included: furniture, sewing machine, stove, refrigerator, air conditioner, fan, radio, radio cassette, record player, 3-in-One Radio, video equipment, washing machine, TV, camera, electric iron, bicycle, motorcycle, and car.

A1.15 Transfers outside the household are also excluded from the consumption aggregate to avoid double counting, as it is assumed these goods would be counted as consumption in the recipient household.

A1.16 The median non-food expenditure was 36 percent overall. In rural areas 30 percent of the total consumption aggregate was non-food spending compared with 47 percent in urban areas.

Price Adjustment

A1.17 In order to compare welfare across different areas of the country, the total consumption aggregate must be adjusted for differences in the cost-of-living. Also in addition to spatial deflators, it was necessary to calculate temporal deflators as the data for the two surveys was collected over 12 month periods, from November 2002 to October 2003 in the case of the 2003 SLIHS, and from January to December 2011 in the case of the 2011 SLIHS. Monthly spatial deflators were calculated by constructing a Laspeyres price index for a given bundle of goods in each of the four regions of the country (Eastern, Northern, Southern, and Western). The bundle of goods was defined as the average food consumption bundle for the lower 70 percent of the population, excluding those items with less than a five percent share. The Laspeyres price index follows the formula:

$$L_i = \sum_{k=1}^{n} w_{0k} \left(\frac{p_{ik}}{p_{0k}} \right)$$

where w_{0k} is the national budget share of item *k*, p_{ik} is the mean price of item *k* in region *i*, and p_{0k} is the national mean price of item *k*. The national price was constructed, also on a monthly basis, by using a population weighted share of the item price for each of the four regions.

A1.18 The bundle of goods used to construct the Laspeyres indices was derived separately for each survey year to reflect the consumption patterns of that year, though they do not differ substantially in composition or share between the two rounds.

A1.19 Non-food items were treated as a single item and received the same monthly deflators calculated for food consumption in the four regions.

Poverty Line

A1.20 The poverty line is defined as the monetary cost to a given person, at a given place or time, corresponding to a reference level of welfare (Ravallion, 1998). The actual process of defining this poverty line can be complicated, however, by determining the minimum level of welfare as well as costing that bundle of goods and services. For the purposes of this analysis, three poverty lines are defined: the food poverty line, defined as the line below which individuals cannot meet their basic food needs; the total poverty line, defined as the line below which individuals cannot meet their food and non-food minimum needs, and the extreme poverty line, defined as the line below which individuals' total food and non-food consumption falls below the minimum food requirements. This analysis is mainly concerned with overall poverty, and therefore focuses on the total poverty measurement.

A1.21 To ensure comparability between the two surveys, the poverty line is constructed for the 2003 SLIHS and then inflated to the appropriate 2011 prices using the national CPI for food and non-food expenditures. Since national CPI data was not collected until 2004, the comparison groups are January to March 2004 and January to March 2011.

A1.22 In order to define the food poverty line, it is necessary to determine the nutritional requirements to be a healthy and active participant in society. The minimum calorie requirements range commonly from 2100 to 3000 calories per day, depending on the climate and general level of activity. Sierra Leone remains a country based mainly on rural subsistence agriculture, and therefore the minimum calorie requirements are determined to be 2700 per day. (Sensitivity analysis of the poverty statistics to higher and lower minimum calorie requirements was performed, a summary of which is available upon request.)

A1.23 Once the minimum calories are defined, a food bundle for these calories must also be determined that reflect the consumption patterns in the country. It was decided to use an average food basket as defined for the bottom 70 percent of the country, as ranked by real per adult equivalent consumption, as using the lower portion of the distribution is more likely to accurately reflect the preferences of the poor. Items receiving less than a five percent share are excluded from the basket. Tobacco, meals eaten outside the household, and other consumption are excluded from these calculations. The remaining food items are assigned a caloric equivalent, and the bundle scaled proportionally to achieve 2700 calories per person per day.

A1.24 There are a number of different proposed methods for calculating the non-food component of the poverty line, including regression analysis, an Engel's curve, and the upper and lower poverty lines (Ravallion, 1998). Sensitivity analysis was performed comparing the above methods, and a modified version of the Ravallion upper poverty line was chosen. This is a simple non-parametric method which begins by estimating the non-food consumption of the population whose food expenditures line within one percent above and below the food poverty line. This calculation is then repeated for two percent above and below, three, etc., up to ten percent. Then these ten values are averaged to obtain the final non-food poverty line. This is added to the food poverty line to obtain the total poverty line.

A1.25 Following the above methodology, the total poverty line (encompassing both food and non-food spending) was 732,869 Le in 2003 and 1,587,746 Le in 2011.

Purchasing Power Parity

A1.26 Purchasing power parity is a common adjustment to facilitate comparisons in the relative exchange rate between countries. It is necessary since market exchange rates of currencies are often volatile, and while they may have a fairly immediate impact on the price of imported good, these changes may not be immediately felt by the population. In particular, the poor would be less immediately impacted since they consume lower quantities of imported goods. Therefore, a 20 percent decrease in the value of the local currency would not immediately cause the population to become 20 percent poorer. In order to make comparisons across countries and across time, consumption measures are then adjusted using PPP.

CPI	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*
Sierra Leone	66.2	77.1	84.5	92.0	108.0	119.5	127.2	148.6	172.4
United States	95.1	97.3	100.0	103.4	106.7	109.8	113.8	116.3	120.1

Source: http://data.worldbank.org/indicator/FP.CPI.TOTL.ZG

A1.27 The formula for PPP benchmarks the purchasing power and inflation, as measured by the consumer price index (CPI), against a comparator country and year. Since the 1.25 USD per day poverty line was computed using 2005 dollars, this is the most common benchmark for these calculations. Therefore for example for Sierra Leone in 2003, the calculation would be:

$$PPP_{2003} = \frac{PPP_{SL2005} \cdot \frac{CPI_{SL2003}}{CPI_{SL2005}}}{PPP_{US2005} \cdot \frac{CPI_{US2003}}{CPI_{US2005}}}$$

where *PPP* is the purchasing power parity exchange rate, *CPI* is the consumer price index, and using 2005 as the benchmark year. Taking PPP_{US2005} to be the benchmark (with a value equal to one), the calculation for 2003 would be:

$$PPP_{2003} = \frac{PPP_{SL2005} \cdot \frac{CPI_{SL2003}}{CPI_{SL2005}}}{PPP_{US2005} \cdot \frac{CPI_{US2003}}{CPI_{US2005}}} = \frac{1396.2 \cdot \frac{66.2}{84.5}}{1 \cdot \frac{95.1}{100}} = 1150.2$$

And 2011 would be :

$$PPP_{2011} = \frac{PPP_{SL2005} \cdot \frac{CPI_{SL2011}}{CPI_{SL2005}}}{PPP_{US2005} \cdot \frac{CPI_{US2011}}{CPI_{US2005}}} = \frac{1396.2 \cdot \frac{172.4}{84.5}}{1 \cdot \frac{120.1}{100}} = 2371.8$$

Poverty Measures

A1.28 Following the calculation of the consumption aggregate and the poverty line, it is necessary to have a system of analysis to examine the relationship of these variables. Though a number of different options exist in the literature, this analysis will focus on those proposed the Foster, Greer, and Thorbecke (1984). This family of measure can be represented by the following equation:

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

Where α is some non-negative parameter, most commonly 0, 1, or 2, *z* is the poverty line, y_i is the consumption for individual *i*, n is the total population below the poverty line, and *N* is the total population.

A1.29 The headcount index (α=0) gives the share of the poor in the total population and is probably the most familiar of the three measures. It does have some limitations in that it does not account from the degree to which an individual is below the poverty line. The poverty gap (α=1) is the average consumption shortfall of the population relative to the poverty line. Finally, the poverty severity (α=2) accounts for the distribution of consumption among the poor. A transfer between two poor households therefore would impact the poverty severity but not the poverty headcount or poverty gap.

A1.30 In addition to the poverty measures discussed above, inequality measures are used to study changes in the composition of the consumption distribution. The Gini coefficient (Gini, 1921) measures the inequality across the frequency distribution of household consumption. A Gini coefficient of zero indicates perfect equality, while a Gini coefficient of one indicates that all consumption within the distribution is by a single household. Therefore higher Gini coefficients indicate more unequal distributions.

A1.31 One limitation of the Gini coefficient is that it cannot be decomposed to study the components of inequality. Therefore, in addition to the Gini, the general entropy Theil L measure is used following Mookherjee and Shorrocks (1982). The general formula for the GE(1) model is :

$$I_1 = \frac{1}{n}\sum_i \frac{y_i}{\mu}\log\frac{y_i}{\mu}$$

Where *n* is the total number of households, μ is the mean household consumption, and $y_i$is the consumption of household *i.* This can be decomposed into :

$$I_1 = \sum_k \nu_k \lambda_k I_1^k + \sum_k \mu_k \log \lambda_k$$

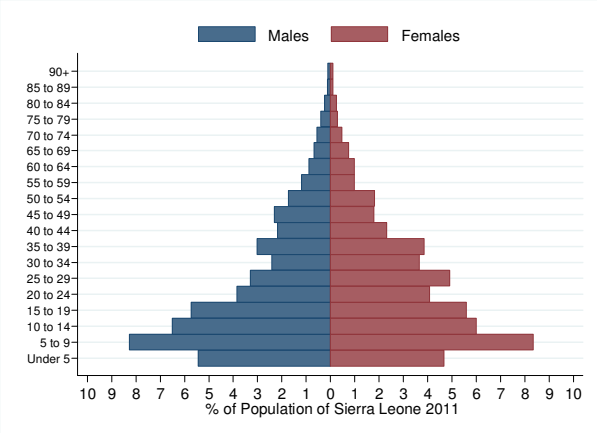
Where $\upsilon_k = \frac{n_k}{n}$ is the proportion of the population in subgroup *k* and $\lambda_k = \frac{\mu_k}{\mu}$ is the mean consumption of group k relative to the population. The first term of the equation represents the within-group inequality and the second term the between group.

Population Pyramids

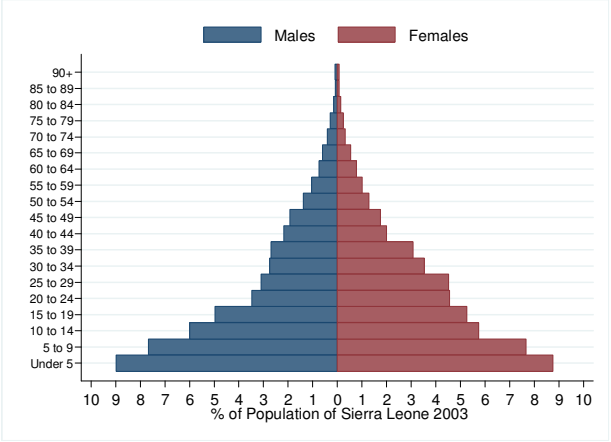
A1.32 There are considerable difficulties in collecting high quality age data in Sierra Leone. As in many post-conflict settings, birth dates are unknown and therefore age estimates are approximate. This leads to heaping on round figures, such as 20, 30, 40, etc., and to a lesser degree, 25, 35, 45, etc. In addition, there is chronic under-reporting of children under five in Sierra Leone. This phenomenon has been demonstrated in the 2003 and 2011 SLIHS surveys, as well as the 2004 population census and the 2009 Demographic and Health Survey. Further research into the causes is ongoing. To address these issues in the analysis, two steps have been taken. First, a 0.2 smoothing factor adjustment has been applied to the age data to mitigate the effects of heaping. Then the growth rate for children aged five to ten was used to impute values for children aged four and below. The figure below shows the comparison between the original and the edited data. Note that these changes were only applied for the purposes

of the construction of the age pyramid. Ages and weights for individual data were left unaltered in the remainder of the analysis.

Raw 2011 SLIHS age data



With Smoothing / Imputation of Under-5 Population



References

Bloom, D. E., Canning, D., & Sevilla, J. (2003). The demographic dividend: A new perspective on the economic consequences of population change (Vol. 5, No. 1274). Rand Corporation.

Gini, Corrado (1921). Measurement of Inequality of Incomes. *The Economic Journal (Blackwell Publishing)* 31 (121): 124–126. doi:10.2307/2223319.

Foster, J., Greer, E., and Thorbecke, E. (1984). A class of decomposable poverty measures. *Econometrica*, 52 (3): 761-766.

Mistiaen, J., and Ravallion, M. (2003). Survey compliance and the distribution of income. World Bank policy research working paper 2956.

Mookherjee, D., and Shorrocks, A. (1982). A decomposition analysis of the trend in UK income inequality. The Economic Journal, 92(368), 886-902.

Ravallion, M. (1998). Poverty lines in theory and practice, World Bank Publications, 133.

United Nations, Department of Economic and Social Affairs, Population Division (2012). World Urbanization Prospects: The 2011 Revision, CD-ROM Edition.

World Bank (2012). World Development Indicators. Retrieved from http://data.worldbank.org/indicator on June 11, 2013.

APPENDIX 2 : TABLES & FIGURES

Table A1 : Total poverty (2003)

	Pα=0	Poverty Gap Pα=1	Severity of Pα=2	% of population	Contribution of Poverty Pα=0	Pα=1	Pα=2	Gini co-efficient (total)	Population size	Number of total poor
National	**66.4**	**27.0**	**14.0**	**100.0**	**100.0**	**100.0**	**100.0**	**0.3881**		
Region										
Eastern										
Total	***86.0***	***38.9***	***21.0***	***22.5***	***29.1***	***32.3***	***33.6***	***0.2781***	***1,079,971***	***929,217***
Kailahun	93.0	45.1	25.1	7.4	10.4	12.4	13.3	0.2483	357,247	332,243
Kenema	88.1	39.3	20.9	9.9	13.2	14.4	14.9	0.2596	477,987	421,306
Kono	71.8	28.9	14.9	5.1	5.5	5.4	5.4	0.2912	244,737	175,667
Northern										
Total	***80.6***	***32.8***	***17.0***	***35.7***	***43.3***	***43.3***	***43.3***	***0.2956***	***1,714,779***	***1,381,703***
Bombali	86.1	43.8	25.8	8.4	10.9	13.6	15.5	0.3438	404,487	348,104
Kambia	71.2	22.9	9.6	5.8	6.2	4.9	3.9	0.2278	276,675	197,005
Koinadugu	77.5	32.8	17.6	4.9	5.7	5.9	6.1	0.2811	233,837	181,237
Porto Loko	80.8	30.0	13.9	9.5	11.5	10.5	9.4	0.2902	454,638	367,294
Tonkolili	83.5	31.4	16.2	7.2	9.0	8.3	8.3	0.2774	345,142	288,062
Southern										
Total	***64.1***	***24.2***	***12.0***	***22.3***	***21.5***	***20.0***	***19.2***	***0.3174***	***1,073,044***	***687,864***
Bo	63.2	25.0	13.1	9.5	9.1	8.8	8.9	0.3595	458,388	289,907
Bonthe	89.3	39.7	21.1	2.7	3.6	3.9	4.0	0.3085	127,628	113,922
Moyamba	68.2	24.2	11.3	5.3	5.5	4.8	4.3	0.2764	256,522	174,875
Pujehun	47.4	13.9	5.7	4.8	3.4	2.5	2.0	0.2162	230,505	109,160
Western										
Total	***20.7***	***6.2***	***2.8***	***19.6***	***6.1***	***4.5***	***3.9***	***0.3337***	***940,225***	***194,753***
Western rural	54.9	23.8	12.7	3.4	2.8	3.0	3.1	0.3401	161,965	88,842
Western urban	13.6	2.5	0.8	16.2	3.3	1.5	0.9	0.3053	778,260	105,911
Area of residence										
Rural	***78.7***	***33.8***	***18.0***	***61.3***	***72.7***	***76.7***	***78.7***	***0.3172***	***2,949,629***	***2,322,028***
Urban	***46.9***	***16.3***	***7.7***	***38.7***	***27.3***	***23.3***	***21.3***	***0.3875***	***1,858,390***	***871,509***
Freetown	13.6	2.5	0.8	16.2	3.3	1.5	0.9	0.3053	778,260	105,911
Other urban	70.9	26.3	12.7	22.5	24.0	21.8	20.4	0.2911	1,080,130	765,598

Table A2 : Total poverty (2011)

	Pα=0	Poverty Gap Pα=1	Severity of Poverty Pα=2	% of population	Contribution of Poverty Pα=0	Pα=1	Pα=2	Gini co-efficient (total)	Population size	Number of total poor
National	**52.9**	**16.1**	**6.7**	**100.0**	**100.0**	**100.0**	**100.0**	**0.3207**	**5,838,160**	**3,090,961**
Region										
Eastern										
Total	***61.3***	***18.4***	***7.5***	***22.5***	***26.1***	***25.8***	***25.2***	***0.2688***	***1,315,474***	***805,987***
Kailahun	60.9	16.9	6.5	7.5	8.6	7.9	7.2	0.2467	435,381	264,969
Kenema	61.6	19.3	8.2	10.2	11.9	12.2	12.5	0.2812	596,081	366,964
Kono	61.3	19.0	7.7	4.9	5.6	5.7	5.5	0.2737	284,013	174,054
Northern										
Total	***61.0***	***18.9***	***8.1***	***34.1***	***39.3***	***40.0***	***41.0***	***0.3063***	***1,989,626***	***1,213,215***
Bombali	57.9	22.7	11.7	7.8	8.5	11.0	13.6	0.4157	456,125	263,887
Kambia	53.9	13.6	4.6	5.3	5.4	4.5	3.7	0.2340	311,454	167,774
Koinadugu	54.3	14.5	5.0	5.2	5.3	4.7	3.9	0.2787	304,140	165,151
Porto Loko	59.9	21.0	10.0	8.8	10.0	11.5	13.1	0.2926	515,312	308,927
Tonkolili	76.4	19.1	6.5	6.9	9.9	8.2	6.6	0.2057	402,595	307,476
Southern										
Total	***55.4***	***17.4***	***7.4***	***22.7***	***23.7***	***24.5***	***24.9***	***0.3409***	***1,001,299***	***554,764***
Bo	50.7	16.1	6.7	10.4	9.9	10.4	10.4	0.3311	459,037	232,640
Bonthe	51.4	12.9	4.4	2.7	2.6	2.1	1.8	0.2958	119,668	61,557
Moyamba	70.8	22.4	10.1	4.3	5.8	6.0	6.5	0.2527	190,575	134,868
Pujehun	54.1	17.9	7.9	5.3	5.4	5.9	6.2	0.4041	232,019	125,543
Western										
Total	***28.0***	***7.5***	***2.9***	***20.7***	***11.0***	***9.7***	***9.0***	***0.2953***	***1,209,594***	***338,502***
Western rural	57.1	18.2	7.2	4.1	4.5	4.7	4.4	0.2796	241,103	137,778
Western urban	20.7	4.9	1.8	16.6	6.5	5.0	4.6	0.2744	968,491	200,725
Area of residence										
Rural	***66.1***	***21.1***	***9.1***	***62.3***	***77.7***	***81.9***	***84.3***	***0.2891***	***3,636,011***	***2,403,048***
Urban	***31.2***	***7.7***	***2.8***	***37.7***	***22.3***	***18.1***	***15.7***	***0.3007***	***2,202,148***	***687,913***
Freetown	20.7	4.9	1.8	16.6	6.5	5.0	4.6	0.2744	968,491	200,725
Other urban	39.5	10.0	3.5	21.1	15.8	13.1	11.1	0.3067	1,233,657	487,189

Table A3: Determinants of Per-Capita Consumption (OLS)

	2003				2011			
	rural		**urban**		**rural**		**urban**	
	coef	**se**	**coef**	**se**	**coef**	**se**	**coef**	**se**
Household composition								
household size	-0.111***	0.031	-0.082**	0.039	-0.063***	0.020	-0.020	0.034
active household members 15-64	0.023	0.030	-0.042	0.036	-0.041**	0.020	-0.089***	0.035
dependents younger than 15	0.056*	0.029	0.057	0.047	-0.015	0.020	-0.043	0.032
Characteristics of Household Head								
female household head	-0.040	0.031	-0.015	0.031	0.006	0.023	0.040	0.024
age	0.001	0.001	0.001	0.002	-0.001*	0.001	0.000	0.001
Reference: No Schooling								
some or complete primary	0.128**	0.063	-0.019	0.059	0.037	0.047	0.146***	0.037
some or complete junior	0.118***	0.044	0.080*	0.047	0.109***	0.040	0.160***	0.036
some or complete secondary	0.206***	0.058	0.239***	0.050	0.118***	0.040	0.205***	0.034
some or complete post-secondary	0.749***	0.172	0.521***	0.068	0.155***	0.040	0.388***	0.040
Agriculture								
primary occupation of head is agriculture	-0.015	0.044	0.060	0.062	-0.105***	0.031	-0.056	0.070
household has no land	0.013	0.065	0.054	0.069	-0.059*	0.031	0.057	0.050
log landholdings	0.031	0.021	0.009	0.039	0.070***	0.016	0.057**	0.027
Other income sources								
household receives transfer income	0.025	0.033	0.109**	0.050	-0.032	0.025	0.076**	0.035
non-farm enterprise	0.098**	0.045	0.098	0.077	0.035	0.037	0.106***	0.038
District (Reference: Bo)								
Kailahun	-0.414***	0.158	-0.458**	0.198	0.031	0.075	-0.122	0.123
Kenema	-0.467***	0.157	-0.363**	0.149	0.046	0.074	-0.214*	0.112
Kono	-0.154	0.182	0.052	0.158	0.013	0.087	-0.152	0.097
Bombali	-0.446***	0.167	0.007	0.180	-0.017	0.111	0.173	0.139
Kambia	0.161	0.160	0.099	0.168	0.357***	0.078	0.058	0.108
Koinadugu	-0.050	0.183	-0.175	0.175	0.223***	0.077	-0.046	0.152
Port Loko	-0.021	0.171	-0.054	0.181	0.167*	0.089	0.019	0.163
Tonkolili	-0.059	0.164	-0.622**	0.254	0.048	0.064	-0.119	0.141
Bonthe	-0.173	0.173	-0.385**	0.155	0.239**	0.104	-0.073	0.105
Moyamba	-0.079	0.161	-0.078	0.220	0.017	0.073	-0.026	0.116
Pujehun	0.213	0.166	0.027	0.135	0.325**	0.138	-0.401***	0.104
Western other	0.180	0.287	-0.311**	0.128	0.133	0.124	-0.143*	0.084
Western urban			0.595***	0.141			0.067	0.083
constant	12.906***	0.090	12.941***	0.210	14.447***	0.071	14.463***	0.114
Number of observations	2,391		1,317		4,295		2,422	

note: *** p<0.01, ** p<0.05, * p<0.1

Table A4: Determinants of Poverty (Logit)

	2003				2011			
	rural		**urban**		**rural**		**urban**	
	coef	**se**	**coef**	**se**	**coef**	**se**	**coef**	**se**
Household composition								
household size	0.425**	0.167	0.312	0.201	0.114	0.095	-0.047	0.195
active household members 15-64	-0.062	0.157	0.002	0.205	0.183*	0.099	0.295	0.186
dependents younger than 15	-0.048	0.175	-0.180	0.215	0.320***	0.095	0.323*	0.183
Characteristics of Household Head								
female household head	0.150	0.154	-0.094	0.172	-0.068	0.101	-0.076	0.154
age	-0.001	0.005	0.002	0.008	0.010***	0.004	0.001	0.006
Reference: No Schooling								
some or complete primary	-0.595**	0.295	0.059	0.223	0.184	0.152	-0.653***	0.204
some or complete junior	-0.208	0.403	-0.334	0.221	-0.273	0.180	-0.699***	0.201
some or complete secondary	-0.730**	0.319	-0.787***	0.227	-0.377*	0.207	-0.760***	0.178
some or complete post-secondary	-4.179***	0.805	-1.811***	0.466	-0.483**	0.245	-1.230***	0.220
Agriculture								
primary occupation of head is agriculture	-0.015	0.244	-0.102	0.252	0.631***	0.138	0.166	0.307
household has no land	0.117	0.293	-0.211	0.267	0.170	0.147	-0.336	0.283
log landholdings	-0.071	0.104	0.022	0.166	-0.304***	0.066	-0.342**	0.149
Other income sources								
household receives transfer income	-0.082	0.155	-0.566**	0.231	0.054	0.119	-0.240	0.173
non-farm enterprise	-0.370	0.251	-0.304	0.209	0.029	0.169	-0.380**	0.184
District (Reference: Bo)								
Kailahun	2.199***	0.526	1.473**	0.673	-0.051	0.322	0.714	0.498
Kenema	2.322***	0.507	1.335**	0.582	-0.112	0.301	0.832**	0.419
Kono	0.620	0.643	-0.379	0.631	0.178	0.389	0.735*	0.411
Bombali	1.497**	0.713	0.217	0.829	0.058	0.383	-0.641*	0.365
Kambia	-0.482	0.574	-0.510	0.826	-1.180***	0.335	-1.221*	0.703
Koinadugu	-0.072	0.590	0.911	0.790	-0.694**	0.339	0.586	0.455
Port Loko	0.529	0.552	0.255	0.699	-0.857**	0.336	-0.565	0.703
Tonkolili	0.640	0.490	1.924***	0.744	0.622*	0.328	0.379	0.702
Bonthe	1.303*	0.775	1.593***	0.578	-0.638*	0.381	0.219	0.716
Moyamba	0.195	0.499	0.086	0.777	0.140	0.332	0.213	0.514
Pujehun	-0.902	0.631	-0.506	0.523	-0.841**	0.401	1.713***	0.584
Western other	-0.598	0.749	1.175**	0.482	-0.228	0.420	0.128	0.475
Western urban			-2.026***	0.533			-0.448	0.320
constant	1.033**	0.464	1.078*	0.653	-2.001***	0.354	-0.905*	0.488
Number of observations	2,391		1,317		4,295		2,422	

note: *** p<0.01, ** p<0.05, * p<0.1

Table A5 : Poverty Statistics (2011)

Characteristic	Characteristic	Poverty Headcount Pα=0	*se*	Poverty Gap Pα=1	*se*	Severity of Poverty Pα=2	*se*
Geography							
	Rural	0.661	*0.016*	0.211	*0.009*	0.091	*0.005*
	Freetown	0.207	*0.029*	0.049	*0.012*	0.018	*0.006*
	Other Urban	0.395	*0.030*	0.100	*0.010*	0.035	*0.004*
Gender of Household Head							
	Male	54.1	*1.3*	16.7	*0.7*	7.1	*0.4*
	Female	49.8	*2.3*	14.4	*0.9*	5.8	*0.5*
Education			0.0	*0.0*	0.0	*0.0*	0.0
	No education	61.3	*1.4*	19.1	*0.8*	8.1	*0.5*
	Primary	48.2	*3.0*	13.6	*1.1*	5.3	*0.5*
	Junior	37.0	*2.9*	11.1	*1.1*	4.6	*0.6*
	Secondary	29.5	*2.7*	7.6	*0.9*	2.9	*0.4*
	Post-Secondary	27.5	*2.8*	6.7	*1.0*	2.4	*0.5*
District							
	Kailahun	60.9	*4.0*	16.9	*1.8*	6.5	*0.9*
	Kenema	61.6	*3.9*	19.3	*1.8*	8.2	*1.0*
	Kono	61.3	*4.8*	19.0	*2.7*	7.7	*1.4*
	Bombali	57.9	*4.9*	22.7	*3.3*	11.7	*2.2*
	Kambia	53.9	*5.3*	13.6	*1.8*	4.6	*0.9*
	Koinadugu	54.3	*5.7*	14.5	*2.0*	5.0	*0.8*
	Port Loko	59.9	*5.1*	21.0	*3.3*	10.0	*2.2*
	Tonkolili	76.4	*3.5*	19.1	*1.5*	6.5	*0.7*
	Bo	50.7	*3.7*	16.1	*1.6*	6.7	*0.8*
	Bonthe	51.4	*7.2*	12.9	*2.8*	4.4	*1.2*
	Moyamba	70.8	*4.6*	22.4	*2.6*	10.1	*1.7*
	Pujehun	54.1	*7.1*	17.9	*3.1*	7.9	*1.6*
	Western other	57.1	*7.0*	18.2	*3.3*	7.2	*1.6*
	Western urban	20.7	*2.9*	4.9	*1.2*	1.8	*0.6*
Total		52.9	*1.7*	16.1	*0.8*	6.7	*0.4*

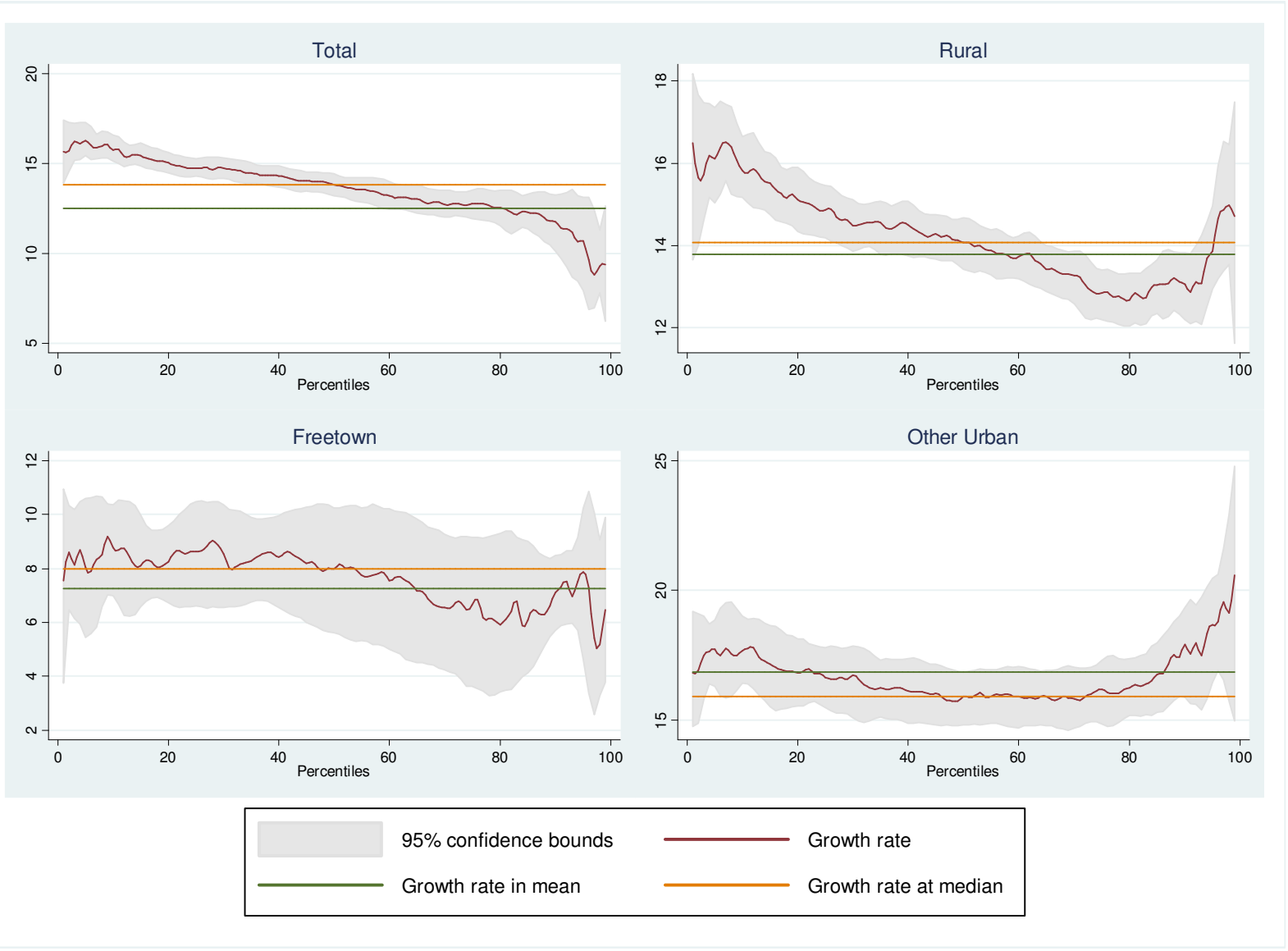
Table A6 : Educational Attainment of Household Head by Quintile of Consumption, Gender, and Residence Location

	no education		primary school		junior school		secondary school		post-secondary		total
quintile	mean	se	mean	se	mean	se	mean	se	mean	se	
1	81.1	*1.6*	6.4	*0.8*	5.9	*0.8*	3.8	*0.7*	2.8	*0.6*	100
2	76.7	*1.5*	8.7	*1.0*	5.1	*0.7*	4.5	*0.7*	5.0	*0.9*	100
3	68.6	*1.8*	8.4	*1.0*	8.1	*1.0*	7.6	*0.8*	7.4	*0.9*	100
4	59.5	*2.1*	7.9	*1.0*	11.5	*1.2*	11.6	*1.0*	9.4	*1.1*	100
5	41.2	*1.9*	10.8	*1.2*	12.7	*1.3*	16.1	*1.2*	19.1	*1.6*	100
gender of household head											
male	64.9	*1.0*	8.6	*0.6*	8.8	*0.6*	9.2	*0.5*	8.6	*0.5*	100
female	75.3	*1.5*	7.4	*0.9*	6.6	*0.8*	4.7	*0.7*	6.0	*1.0*	100
residence location											
Rural	82.6	*1.0*	6.8	*0.6*	4.6	*0.4*	3.1	*0.3*	2.9	*0.3*	100
Freetown	33.5	*2.3*	9.1	*1.2*	16.6	*1.5*	23.0	*1.5*	17.8	*1.6*	100
Other urban	50.3	*2.6*	11.8	*1.3*	12.5	*1.4*	10.7	*1.1*	14.7	*1.5*	100
Total	67.6	*0.9*	8.3	*0.5*	8.2	*0.5*	8.0	*0.4*	7.9	*0.5*	100

A7 : Access to Public Services and Residence Location

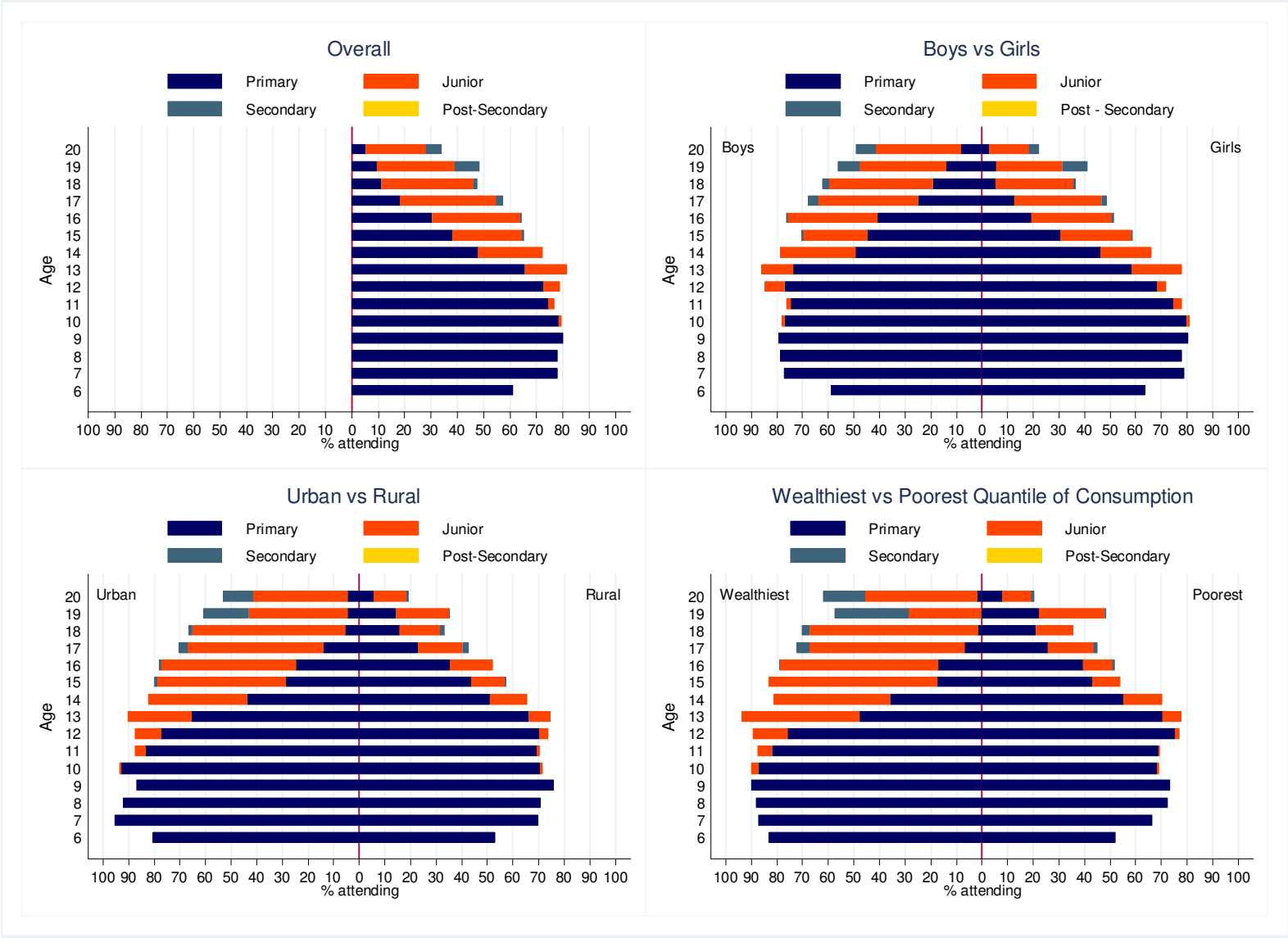
	0-14 minutes		15-29 minutes		30-44 minutes		45-59 minutes		60-179 minutes		Over 180 minutes		total
	mean	se	mean	se	mean	se	mean	se	mean	se	mean	se	
Supply of Drinking Water													
Rural	65.8	*0.9*	20.8	*0.8*	8.4	*0.6*	2.9	*0.3*	1.6	*0.2*	0.5	*0.1*	100.0
Freetown	68.4	*1.8*	21.2	*1.5*	5.1	*0.9*	1.5	*0.5*	3.8	*0.7*	0.1	*0.1*	100.0
Other urban	76.0	*1.5*	17.1	*1.3*	5.1	*0.7*	1.4	*0.4*	0.4	*0.2*	--	--	100.0
Nearest Food Market													
Rural	20.6	*0.8*	12.5	*0.6*	8.4	*0.6*	10.5	*0.6*	23.2	*0.8*	24.8	*0.8*	100.0
Freetown	36.5	*1.9*	38.3	*1.8*	18.7	*1.4*	3.7	*0.7*	2.7	*0.6*	--	--	100.0
Other urban	24.2	*1.4*	31.0	*1.7*	23.2	*1.7*	12.0	*1.3*	7.9	*1.0*	1.7	*0.4*	100.0
Primary School													
Rural	44.2	*0.9*	20.8	*0.8*	16.6	*0.7*	8.3	*0.6*	7.2	*0.5*	2.9	*0.3*	100.0
Freetown	42.7	*1.9*	33.7	*1.8*	20.2	*1.5*	2.6	*0.6*	0.9	*0.3*	0.0	*0.0*	100.0
Other urban	51.1	*1.8*	28.0	*1.6*	16.6	*1.4*	2.6	*0.5*	1.5	*0.4*	0.2	*0.2*	100.0
Secondary School													
Rural	6.5	*0.5*	9.3	*0.6*	11.5	*0.6*	15.4	*0.8*	29.6	*0.9*	27.8	*0.8*	100.0
Freetown	22.8	*1.7*	33.7	*1.8*	26.9	*1.6*	8.9	*1.1*	6.7	*0.9*	1.1	*0.4*	100.0
Other urban	30.1	*1.8*	27.8	*1.6*	20.7	*1.4*	12.0	*1.1*	5.6	*0.7*	3.9	*0.7*	100.0
Hospital													
Rural	4.9	*0.4*	5.1	*0.4*	7.2	*0.5*	11.1	*0.6*	28.0	*0.9*	43.7	*0.9*	100.0
Freetown	13.3	*1.5*	32.5	*1.8*	29.0	*1.7*	14.8	*1.3*	8.6	*1.0*	1.8	*0.5*	100.0
Other urban	10.4	*0.9*	24.6	*1.5*	25.7	*1.7*	17.0	*1.4*	13.2	*1.1*	9.1	*1.0*	100.0
Health Clinic													
Rural	17.7	*0.7*	13.6	*0.7*	16.6	*0.7*	16.6	*0.7*	21.8	*0.8*	13.8	*0.6*	100.0
Freetown	24.6	*1.8*	36.2	*1.8*	30.5	*1.7*	6.4	*0.8*	1.8	*0.5*	0.4	*0.3*	100.0
Other urban	28.2	*1.7*	31.6	*1.7*	25.6	*1.6*	10.5	*1.0*	3.9	*0.6*	0.1	*0.1*	100.0

Figure A2 : Per Adult Equivalent Growth Incidence Curves (2003-2011)



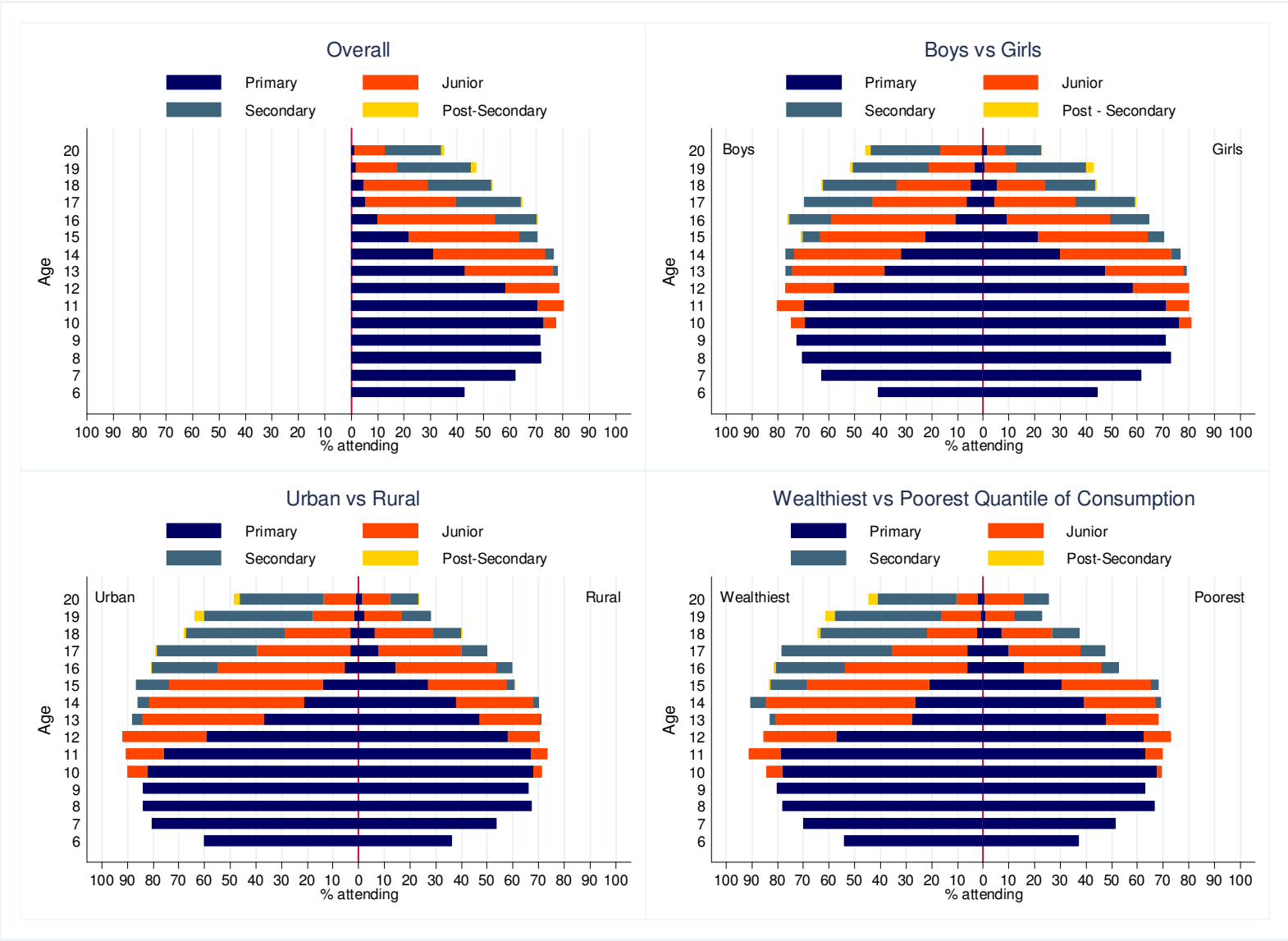
Source: Calculations based on SLIHS (2003 and 2011)

Figure A3 : School Attendance by Age, 2003



Source: Calculations based on SLIHS (2003)

Figure A4 : School Attendance by Age, 2011



Source: Calculations based on SLIHS (2011)