

1.0 INTRODUCTION

Sierra Leone has been ranked the least in the United Nations Development Programme Human Development Index for more than half of the period for which the Report has been published since 1990. Although several schools of thought contest the country's rank the fact that the most recent Living Standards /Household Income and Expenditure Survey conducted on the eve (1989/1990) of the maiden publication of the UNDP Report in 1990 revealed that 81.6¹ percent of population were poor lends some credence to the reports position.

The state of affairs of most Sierra Leoneans since then has been characterized by

- ❑ Lack of income
- ❑ Lack of access to health, education and other services
- ❑ Powerlessness
- ❑ Isolation
- ❑ Vulnerability
- ❑ Social Exclusion

The above characteristics of majority of Sierra Leoneans are consistent with the broader definition and measurement from command over market-purchased goods (income) to other dimensions of living standards such as longevity, literacy and healthiness, and, most recently, to concerns with risk and vulnerability, and powerlessness and lack of voice. While there is a correlation between these different dimensions, this broadening changes significantly our thinking about strategies to reduce poverty. A broader definition expands the set of policies that are relevant to the reduction of poverty. But the broadening also emphasizes that poverty reducing strategies must recognize the interactions among the policies--the impact of appropriately designed combinations will be greater than the sum of the individual parts.

Sierra Leone as a state has embarked on series of policies aimed at improving the well being of more than 80 % of the population. These policies have ranged from Structural Adjustment Programmes propounded by the Bretton Woods Institutions (The World Bank and IMF), the Green Revolution and lately, Poverty Reduction Strategy Papers (PRSP) now used by many low-income countries in their efforts to eradicate extreme poverty.

The thrust of International Donor Institutions such as the DfID, the World bank and the IMF within the context of the PRSP at the turn of the 21st Century has now been to work with low income countries in order to improve the availability of sound and credible statistical data on which effective poverty monitoring and evaluation depend and strengthen feedback loops between data collectors and policy makers. Such a policy switch and focus will immensely help in monitoring progress toward the Millennium Development Goals.

2.0 DATA SOURCES FOR POVERTY MEASUREMENT IN SIERRA LEONE.

A prerequisite for successful poverty alleviation means providing answers to three distinct but related elements

- Identify who the poor are, where they are (distribution by demographic and socio-economic groups)
- A thorough analysis of why these people are poor
- Ascertain what policy mix can improve the lot of these poor and hapless members of society. Such policy intervention could be geared toward accelerating growth and enhancing the income generating capacities of the poor as well as putting in place the required infrastructure for the growth to be sustainable.

¹ Poverty profile for Sierra Leone (1989/1990), Department of National Development and Economic Planning, Freetown, Sierra Leone.

Objective and credible statistical information (along with other types of information) potentially plays an important role in answering these types of questions. If and when properly used, statistical information can also represent a more objective method of identifying and characterising the poor than other alternatives, especially in underdeveloped societies where the poor lack an effective and/or significant political voice.

Following the 1989/1990 survey, have been carried out by various institutions to provide objective information on the extent of poverty in Sierra Leone; the United Nations Development Programme (UNDP) and the African Development Bank (ADB) funded studies of poverty in 1994 and 1995 respectively. In addition, the Government of Sierra Leone in 1994, through the Social Action and Poverty Alleviation Programme (SAPA) conducted poverty –related seminars in some communities in the provinces. In all these, it was realized that the studies were limited in both scope and coverage.

The Government of Sierra Leone (GoSL) prepared an Interim Poverty Reduction Strategy Paper (I-PRSP) in 2001 as a foundation for the preparation and development of a full Poverty Reduction Strategy Paper for submission to the World Bank and IMF. The following sources provide information for the preparation of the full PRSP

- The Multi-Indicator Cluster Survey of November/December 2000. (MICS –II).
- Survey of Household Expenditure and Household Economic Activities (SHEHEA), 1989/1990.
- The Sierra Leone Integrated Household Survey, 2003/2004. (SLIHS 2003/2004)
- Participatory Poverty Appraisal and Focus Group Discussions conducted by the Poverty Alleviation Strategy Coordinating Office (PASCO) and the Economic Policy Research Unit (EPRU). The results of these qualitative data collection activities would be used in concert with the results from the household survey (SLIHS).

In addition to these data sources on poverty Statistics Sierra Leone was recently commissioned by the UNDP Sierra Leone to collect data on the MDG indicators. The results of that exercise revealed serious data paucity on most of the MDG indicators. A closer review of the situation indicated that whereas most of the key line ministries had established planning and /or statistical units with responsibility for collecting routine administrative data, not much emphasis had been placed on processing such data to the point of adding value to administrative and ad hoc surveys.

3.0 THE SIERRA LEONE INTEGRATED HOUSEHOLD SURVEY 2003/2004.

3.1 Survey Organization

Against the backdrop of an outdated and inadequate poverty data the Government of Sierra Leone in 2003 commissioned Statistics Sierra Leone to conduct an Integrated Household survey that should provide up to date information on poverty for the preparation of a full PRSP. Simultaneous nationwide data collection for SLIHS started on April 24 and ended on 26 April 2004 divided into twelve cycles, each lasting for a period not exceeding 30 days including travelling time for the field supervisors and enumerators. Quality control teams comprising the Survey Coordinator, Field Officers and Statisticians made regular visits to field staff throughout the survey period.

3.2 Survey Sample Design

The sampling frame used for the SLIHS was based on the 1985 population census. Although the frame used is outdated (given the demographic changes caused by the violent period of lawlessness in Sierra Leone) it was the same frame used for the UNICEF Multi Indicator Cluster Survey conducted by Statistics Sierra Leone in Nov/Dec 2000.

A total of 226 enumeration areas were systematically selected from the list of 2553 census enumeration areas (EAs). This selection was done from the ordered list (ordered by region, district and urban/rural). The sample was implicitly stratified in that a proportion of urban EAs were selected according to the proportion of estimated population assumed to be living in the urban areas. Although each of the urban EAs contained 20 households and the rural contained 15 households, the sample maintained the estimated population proportions of the population. The sample was therefore a self-weighted sample with no over sampling done in the urban areas. In this case, the strata were the same as a survey domain.

Once the EA was selected a listing of households was done in the selected EA. It was from this list that a random selection of households was taken: 15 in the case of rural households, and 20 for urban households. On the whole 3720 households containing 23022 persons were interviewed over the twelve cycles. The table below presents the sample share by strata;

<u>Strata</u>	<u>Sample Share</u>
Freetown	10.39%
Rural	64.47%
Other Urban	25.14%
<u>District</u>	
Bo	8.81%
Bonthe	5.57%
Moyamba	7.83%
Pujehun	4.23%
Kailahun	6.43%
Kenema	8.86%
Kono	9.62%
Bombali	7.62%
Kambia	5.82%
Koinadugu	7.26%
Port Loko	9.82%
Tonkolili	5.81%
Western Urban	10.39%
Western Rural	1.90%
National	100%

3.3 Data Processing And Analysis.

Four types of questionnaires were used each of which elicited information on different but related topics. The four modules were

- Modules A & B: collected household level information focussing on income and expenditure of the household.
- Module C: this was a community module.
- Module D: a price questionnaire administered in as many market outlets as possible within each selected EA.

A data entry system was in designed *IMPS*. In order to do consistency checks edit programmes were designed in *CONCOR*. Further edits and procedure systems for preparing the data and imputing aggregates were done in *Census and Survey Processing (CS Pro)*.

At the outset of the data processing and analysis the emphasis was on getting the consumption expenditure data structurally sound for the imputation of the poverty indicators within a reasonable period for a more current and credible poverty diagnostics for the PRSP process. This deadline was met by mid June. Beyond this target, there has been concerted effort by both staff of SSL and the team of International Consultant Analysts for a thorough cleaning of the full data sets so as to be to produce a new Poverty Profile of Sierra Leone and, a more detailed survey report.

3.3.1 Treatment Of Outliers And Missing Values.

Getting the data set structurally sound meant ensuring that all information in the household roster matched with all other sections in the different modules. In addition, all outlying and missing values were treated, bearing in mind the need to minimize the level of imputing values. So, a process of checking and correcting for extreme values was required before producing the aggregates. The method used in dealing with outliers was through an analysis of a correlated ratio of the median, which was used to base the limit of acceptability. In most cases the values were dynamically imputed. This method involved the use of resistant fences to establish limits of acceptability based on the inter-quartile ranges of the median values.² The CSPro software was used to automate the process. No treatment of outliers was done if the number of observations of any given product was less than or equal to 5.

In calculating the aggregate, information taken from the questionnaire must be extracted and appropriately annualized. Prior to this extraction, the data are subjected to rigorous control for quality and this includes an examination of outlying values that can substantially distort results. Any values that exceed reasonable limits are replaced with a value that is considered acceptable. The methodology used in treating the SLIHS was a rigorous examination of the median value. Limits were established using resistant fences.³ If a value exceeded an upper or lower limit, replacement of the value was done through the process of dynamic imputation (i.e. hot decking). Once the data were subjected to these controls, consumption values were extracted and appropriately annualized.

3.4 Data Analysis: Computation of Aggregates.

The expenditure aggregate forms the basis for computing a poverty line. Different methods can be used to set a poverty line and even when the assumptions behind the definition are explicit and understood all the different methodologies might provide slightly different information to the policy maker. Regardless of the poverty line selected, the computation of the household aggregate is required in order to rank the acquisitive power of a household and thus quantify the welfare of a household. *The household expenditure aggregate is defined as the categorical computation of expenditure of a household.* . The Standardized Aggregate Template provided by the Africa Data Group at the World Bank defined the primary headings for the aggregate viz: -

² See: Statistical Methods for Developing Ratio Edit Tolerances for Economic Data, Journal of Official Statistics, vol. 15, no. 14, 1999 (pgs. 517-535) by Jenny Thompson and Richard S. Sigman.

³ See: Katherine Jenny Thompson, RATIO EDIT TOLERANCE DEVELOPMENT USING VARIATIONS OF EXPLORATORY DATA ANALYSIS (EDA) RESISTANT FENCES METHODS by Katherine Jenny Thompson, Economic Statistical Methods and Programming Division, United States Bureau of the Census.

- **Household composition**
Adjusts household members by age and sex to compute an equivalent adult.
- **Purchased food expenditures**
Provides the headings for all purchases of food-by-food groups.
- **Self-produced food consumption**
Provides the headings for all self-produced foods by food groups.
- **Education expenditures:** Tuition, Books, Uniforms, Extra curricular activities, Room and board, Transport, Informal fees and Other education expenses.
- **Health care expenditures:** Consultation fees, Medical expenditure, Medical procedures, Hospitalization, Transportation, Insurance and Other health related expenditure
- **Other frequent non-food expenditures:** Tobacco (alcohol was included under food to account for caloric values), Utilities, Clothing, Household maintenance, Transportation Communication, Recreation Non-farm self-produced (computed but not included in aggregate as it was felt these were already counted under their specific product), Rent (imputed or actual) and Other non-food expenditures
- **Total infrequent non-food expenditures:** Appliances, Use value of large items less than five years old, Ceremonial expenses (computed but not included in the aggregate), Transfer in whether cash or in-kind were excluded since double counting would occur as were transfers out since they do not add to household welfare.

3.4.1 Computation of Equivalent Adults

Part of the procedure for computing a food-energy intake poverty line requires the adjustment of the household members to equivalent adults. *An equivalent adult scale essentially assigns a proportion of “adulthood” to a household member depending on age and sex.*

The normal situation should have been to prepare a country-specific adult equivalent scale ⁵ but time constraints data paucity made it not feasible. As a compromise a sensitivity analysis was done between SLIHS food consumption aggregates and adult equivalent scales from Ghana and Rwanda where similar methodologies had been used. It was found that the scale used in Ghana (in 1998) correlated better with the Sierra Leone data than the Rwandan scale, and so it was chosen for use in Sierra Leone.

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

3.4.2 Selecting a Basket of Goods.

In order to compute the food poverty line, a basket of food products was selected. For the basket to be representative of the poorest, household food consumption was computed per adult equivalent and then ranked from lowest to highest. A basket of food items was selected from the bottom 20% as it felt this was representative of the consumption habits of the poor.

Food consumption basket of the poorest 20% of the population

Rice (Paddy Grain) Local	30.45%	Chicken	2.24%
Palm Oil	12.32%	Cookery	1.36%
Dried Fish	8.31%	Sugar	1.32%
Fresh Fish	4.24%	Bread and Buns	1.29%
Ground Nuts (roasted or raw)	3.40%	Fresh Pepper	1.18%
Salt	3.35%	Kola Nut	1.07%
Pepper (Dried)	3.24%	Broad beans	1.04%
Other vegetables	3.11%	Cassava (Other Forms)	0.98%
Cassava Roots	2.89%	Palm Wine	0.97%
Smoked Fish	2.58%	Cowpeas (Small)	0.69%

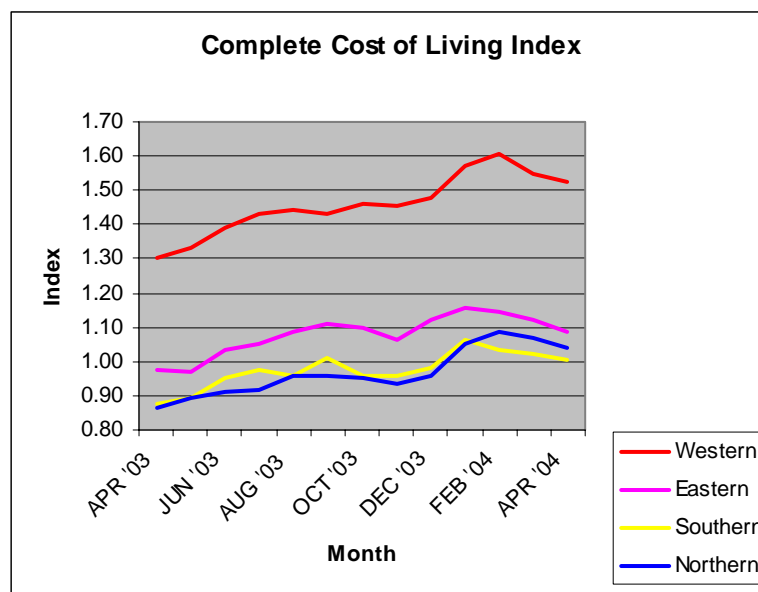
Non-Food consumption (welfare) of the bottom 20%.

Rent or shelter (imputed)	14.56%
Health	13.68%
Education	12.78%
Kerosene and other liquid fuel	6.58%
Goods for Personal Care e.g. Razor Blades Cosmetics Powder	5.75%
Tobacco	3.85%
Soap and Washing Powder	3.85%
Road Transport	2.95%
Cotton cloth	2.53%
Clothes: Trousers, shirts and blouses	2.08%
Firewood and Other Solid fuel	1.89%
Transistor Batteries / Films & Other Non-Durable Photo Items	1.43%
Bed sheets Bed Cover Blanket Curtains	1.43%
Tailoring Charges	1.38%
Men's Shoes	1.28%
Ladies Slippers	1.10%
Suit / Safari Suit	1.08%
Underwear (Incl. Vests and Underpants)	0.99%
Dress (ladies/girls)	0.97%

3.4.3 Computing a standard of living measure.

A Lespeyer cost of living measure was established for both food and non-food expenditure based on the relevant basket of the poorest 20%.

Due to regional and monthly price variations there was need of an adjustment of expenditures to reflect these changes. The Consumer Price Indices⁴ data currently produced for four regional towns including the capital city Freetown – Bo in the South, Kenema in the East, Makeni in North, and Freetown (the capital) in the Western Area were used to provide a regionally weighted national average. The month of May 2003, the start of the survey was selected as the reference data. Where required, all expenditures are therefore specified as a national average based on May 2003 prices.



The graph above shows the increase in prices over the course of the survey. It is based on a national basket of goods, both food and non-food representative of the poorest 20%. With unstable prices, and wages that may not be increasing proportionally, people living in urban areas may be sacrificing food consumption in order to pay for fixed cost items such as rent and transport to and from work. Such price instability and erosion of purchasing power translates into less food consumption in areas of high population concentration.

Another issue cited as possibly causing some distortion involves the technicality of the sample selection. Although the sample was stratified, it was done so implicitly. Explicitly stratified sample would have selected households from separate lists and treat the selection of each differently (appropriately weighting the sample in the final analysis).

There is currently no composite index for Sierra Leone although Statistics Sierra Leone is in the process of coming up with one. Until that time, the Freetown index is used as proxy for the country. Rather than use a single reference location such as Freetown, the prices were weighed by the proportion of the population sampled in the region. This provided a regionally weighted national average. The month selected was the beginning of the survey, or May 2003. Where required, all expenditures are therefore specified as a national average based in May prices

⁴ Statistics Sierra Leone currently only produces regional CPIs for Bo (in the South), Kenema (in the East), Makeni (in the North), and Freetown (in the West). Plans to expand the coverage of CPI to more urban and rural localities are underway.

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3.4.4 Calculating a poverty line

Once the appropriate basket of food items and deflator was defined, a poverty line was then computed. This poverty line values the basket at the reference prices. The selection of a minimum caloric level is required to compute the theoretical expenditure required to attain that minimum nutritional requirement. This level of expenditure represents a core and extreme poverty line. If a household is unable to provide this level of expenditure, it implies that even if all a household's expenditure were dedicated to food, the household would be unable to minimally feed itself.

ITEM	SHARE	Price	Standard	Cals/100g	2200	2500	2700	3000
Rice (Paddy Grain) Local	30.45%	94	100g	353	256.37	291.33	314.63	349.59
Palm Oil	12.32%	151	100ml	875	103.75	117.90	127.33	141.48
Dried Fish	8.31%	425	100g	269	69.96	79.50	85.87	95.41
Fresh Fish	4.24%	331	100g	101	35.66	40.52	43.77	48.63
Ground Nuts (roasted, peeled)	3.40%	194	100g	549	28.64	32.55	35.15	39.06
Salt	3.35%	140	100g	0	28.20	32.04	34.60	38.45
Pepper (Dried)	3.24%	4,010	100g	346	27.30	31.03	33.51	37.23
Other vegetables	3.11%	27	100g	70	26.19	29.76	32.14	35.71
Cassava Roots	2.89%	47	100g	149	24.36	27.68	29.90	33.22
Smoked Fish	2.58%	305	100g	171	21.71	24.67	26.64	29.60
Chicken	2.24%	658	100g	72	18.89	21.47	23.19	25.76
Cookery	1.36%	168	100g	943	11.48	13.05	14.09	15.66
Sugar	1.32%	131	100g	380	11.10	12.61	13.62	15.13
Bread and Buns	1.29%	176	100g	261	10.87	12.35	13.34	14.83
Fresh Pepper	1.18%	2,528	100g	48	9.91	11.26	12.16	13.51
Kola Nut	1.07%	271	100g	148	8.98	10.20	11.02	12.24
Broad beans	1.04%	116	100g	344	8.72	9.91	10.71	11.90
Palm Wine	0.97%	53	100ml	42	8.18	9.30	10.04	11.16
Okra	0.64%	143	100g	36	5.40	6.14	6.63	7.36
Cassava Gari	0.63%	15	100g	351	5.30	6.02	6.50	7.22
Paw paw	0.51%	45	100g	32	4.29	4.87	5.26	5.85
Gardens eggs (small)	0.44%	85	100g	47	3.71	4.22	4.56	5.06
Fried Fish	0.43%	425	100g	516	3.62	4.12	4.45	4.94
Coffee	0.43%	80	100g	4	3.59	4.08	4.41	4.90
Mangoes	0.40%	31	100g	61	3.39	3.85	4.16	4.62
Bananas	0.39%	44	100g	88	3.27	3.72	4.01	4.46
Yams	0.38%	102	100g	112	3.24	3.68	3.98	4.42
Soft drinks	0.36%	172	100ml	30	3.07	3.49	3.77	4.19
Maize-Cob (fresh)	0.31%	166	100g	364	2.63	2.99	3.23	3.58
Oranges (Tropicana)	0.30%	49	100g	49	2.49	2.83	3.06	3.40
Sweet Potato	0.30%	248	100g	121	2.48	2.82	3.05	3.39
Milk Powder	0.29%	633	100g	79	2.42	2.75	2.97	3.30
Tea	0.28%	1,388	100g	4	2.33	2.65	2.86	3.18
Groundnut oil	0.24%	256	100ml	875	2.06	2.34	2.53	2.81
Biscuits	0.24%	790	100g	371	2.00	2.27	2.45	2.72
Pineapples	0.18%	76	100g	47	1.51	1.71	1.85	2.05
Shell Fish	0.15%	347	100g	102	1.29	1.47	1.58	1.76
Omole and local (oil)	0.15%	215	100ml	42	1.28	1.45	1.57	1.74
Onions	0.15%	207	100g	41	1.23	1.40	1.51	1.68
Tomatoes	0.15%	102	100g	21	1.23	1.40	1.51	1.68
Eggs	0.09%	15,174	100g	140	0.78	0.89	0.96	1.07
Other vegetable (oil)	0.09%	272	100ml	875	0.75	0.85	0.92	1.02
Gin/Sass man	0.09%	159	100ml	42	0.74	0.85	0.91	1.01
Fresh Cow meat (no bones)	0.08%	768	100g	237	0.67	0.76	0.82	0.91
Coconuts	0.07%	78	100g	388	0.61	0.69	0.75	0.83
Milk	0.07%	372	100g	79	0.60	0.68	0.74	0.82
Margarine	0.06%	1,119	100g	875	0.50	0.57	0.61	0.68
Canned Fish	0.06%	1,002	100g	143	0.48	0.55	0.59	0.65
Ice cream lollipop	0.05%	714	100g	380	0.39	0.45	0.48	0.54
Chocolate	0.04%	1,529	100g	351	0.34	0.39	0.42	0.47
Pork	0.01%	521	100g	418	0.10	0.11	0.12	0.14

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Cabbage/Lettuce	0.01%	239	100g	26	0.09	0.10	0.11	0.12
TOTAL BASKET	92.42%				778.16	884.27	955.01	1061.13
Weighted to 100%					842	957	1033	1148
Annual Expenditures					307,330	349,305	377,045	419,020

This level of expenditure represents a core and extreme poverty line. If a household is unable to provide this level of expenditure, it implies that even if all a household's expenditure were dedicated to food, the household would be unable to minimally feed itself

In order to attain the minimum requirement at the 2700 calorie level, approximately Le1033 would have to be spent per day per equivalent adult in May 2003 national prices. This expenditure level constitutes the core poverty line of Le 377,045 per year.

A shortcut method was used where an examination of the expenditures of households grouped around the poverty line (i.e. plus or minus 10%) and the average expenditure on basic needs calculated and added to this core. The average non-food expenditures per adult equivalent around the poverty line was Le 393,633 for a total of Le 770,678 per year or approximately Le 2111 per day (which is very close to the nominal US \$1 average exchange rate for the Leone over the course of the survey of Le 2145).

In order to assure that the food to non-food consumption values were reasonable the average shares attributable to each of these components across the quintiles were examined. It was realised that the share dedicated to non-food items increases the higher the quintile so much so that the percentage shares are opposite in the fifth quintile. This may well be a reflection of the higher rent payments in Freetown and some other urban areas like Bo (in the South) and Kenema (in the East).

Shares of food and non-food.

	% Of Total Allocated	
Quintiles	% Food	% Non food
1	63%	37%
2	63%	37%
3	61%	39%
4	57%	43%
5	36%	64%

3.4.5 Emerging Poverty Situation of Sierra Leone.

3.4.5.1 Poverty Indicators And Ratios

One salient characteristic of poverty in Sierra Leone is the higher incidence of food (nutritional) poverty in urban areas compared with overall poverty. Food poverty is understood as the expenditures of a household dedicated to food such that each member of the household (treated in terms of adult equivalence) receives the minimum caloric requirement, in this case, 2700 calories. The stratum with the highest food poverty unexpectedly indicates that urban areas outside of Freetown are not eating enough. The incidence of food poverty in "other urban" is 75% meaning that 3 out of 4 people in the urban zones outside of Freetown are not attaining the minimum caloric levels. Adding a component for basic needs to the consumption, the full poverty line indicates that poverty actually decreases in the urban strata and expectedly increases in the rural area (from 69% to 79%).

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Urban areas tend to be monetarized, that is, there is currency available. Imputed values assign a level of welfare to a household although the value is not actually monetary. This is the case for owner imputed rent and consumption of own produce. Sierra Leone has undergone a period of rapid inflation over the course of the survey. Urban areas are unable to cope with rising food prices by eating their own produce. Expenditures on food items will tend to be in cash. Likewise, renting homes is more prevalent in urban areas as is the need to use public transport. A table is provided in the annexes, which detail the share of monetarized expenditures per strata.

<i>Strata</i>	Sample Share	P ₀ Extreme ¹	P ₀ Food ²	P ₀ Full ³	P ₁ Depth	P ₂ Severity	C ₀ Con ⁴	P ₁ /P ₀ ⁵	Gini P _{1X} ⁶	P _{1X} /P _{1P} ⁷	Mon ⁸	
<i>Strata</i>												
Freetown	10.39%	0.02	0.38	0.15	0.04	0.04	2.2%	0.27	0.32	1.16	29.00	0.84
Rural	64.47%	0.33	0.69	0.79	0.34	0.19	72.8%	0.43	0.36	0.14	0.41	0.53
Other Urban	25.14%	0.20	0.75	0.70	0.26	0.14	25.1%	0.37	0.33	0.18	0.69	0.71
<i>District</i>												
Bo	8.81%	0.25	0.69	0.64	0.27	0.16	8.1%	0.42	0.22	0.42	1.56	0.70
Bonthe	5.57%	0.35	0.89	0.85	0.37	0.20	6.8%	0.44	0.31	0.08	0.22	0.68
Moyamba	7.83%	0.16	0.60	0.68	0.24	0.13	7.6%	0.35	0.31	0.16	0.67	0.56
Pujehun	4.23%	0.14	0.38	0.59	0.18	0.09	3.6%	0.31	0.28	0.23	1.28	0.42
Kailahun	6.43%	0.45	0.88	0.92	0.42	0.23	8.5%	0.46	0.25	0.03	0.07	0.51
Kenema	8.86%	0.38	0.88	0.88	0.38	0.21	11.1%	0.43	0.29	0.05	0.13	0.63
Kono	9.62%	0.22	0.64	0.66	0.25	0.15	9.1%	0.38	0.36	0.19	0.76	0.59
Bombali	7.62%	0.63	0.88	0.89	0.50	0.32	9.7%	0.56	0.35	0.06	0.12	0.55
Kambia	5.82%	0.09	0.56	0.69	0.21	0.09	5.7%	0.30	0.35	0.24	1.14	0.69
Koinadugu	7.26%	0.29	0.66	0.77	0.33	0.19	8.0%	0.43	0.29	0.07	0.21	0.42
Port Loko	9.82%	0.20	0.71	0.82	0.31	0.15	11.5%	0.38	0.30	0.11	0.35	0.65
Tonkolili	5.81%	0.32	0.63	0.84	0.35	0.20	7.0%	0.42	0.29	0.05	0.14	0.44
Western Urban	10.39%	0.02	0.38	0.15	0.04	0.04	2.2%	0.27	0.32	1.16	29.00	0.84
Western Rural	1.90%	0.15	0.70	0.45	0.16	0.09	1.2%	0.36	0.37	0.58	3.63	0.63
National	100%	0.26	0.68	0.70	0.29	0.16	100.0%	0.41	0.39	0.25	0.86	0.65

¹ The extreme poverty measure is a measure of the incidence of total deflated consumption falling below the poverty line of 377,045 Leones or **Total per equivalent adult expenditure/Food Poverty**.

² The "food" poverty line is provided as a measure of nutritional intake, or the proportion of food expenditure falling below the food poverty line. This was done to capture seasonality. **Per equivalent adult food expenditure/Food Poverty**

³ The full poverty line adds a measure of basic needs and measures total deflated consumption against the full poverty line of 770,678 Leones. **Total per equivalent adult expenditure/Full Poverty**.

⁴ This is a measure of the contribution to total poverty.

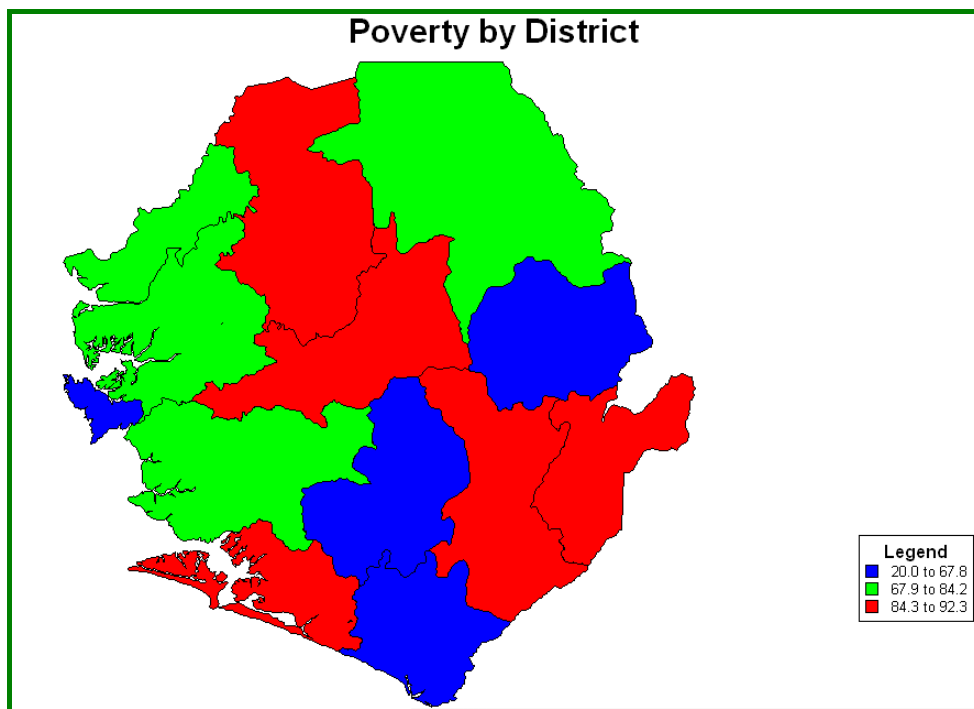
⁵ This is the income gap ratio.

⁶ This is a measure of the level of average consumption above the poverty line.

⁷ This provides an index of self-sufficiency

⁸ This provides a ratio of the monetarized expenditures

The survey data was used to evaluate the poverty situation at the district level. The map below graphically presents the incidence of poverty at the district level. Those districts in red have the highest incidence of poverty and those in blue, the lowest.



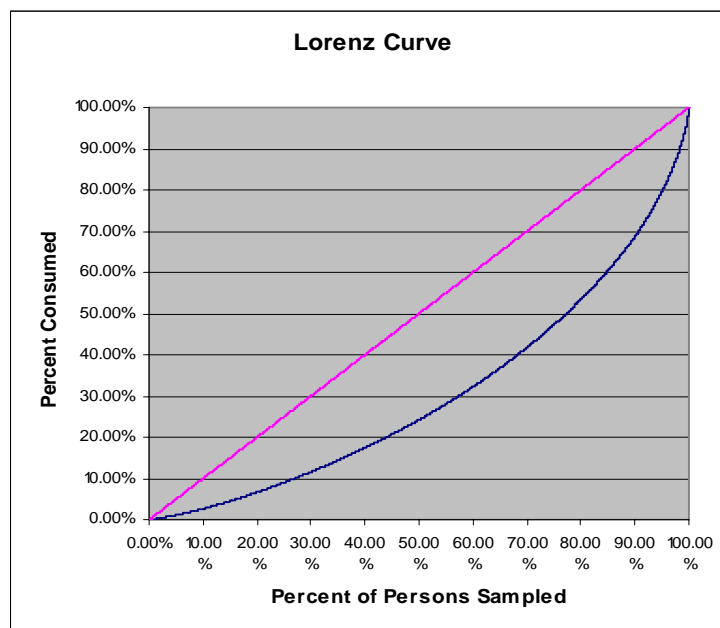
It is noteworthy that the district level

- Kailahun: appears to be one of the worst off districts with 92% of the population living under the full poverty line. Likewise, the poverty appears to be relatively deep and the level of monetary expenditure low.
- Bombali: Bombali is an area where the incidence of extreme poverty is the highest at 63%. This figure appears to be disproportionately high.
- Western Rural: The Western Rural area shows interesting characteristics due to its proximity to the capital. Furthermore, an evaluation of the EAs surveyed in the area may show that there is an encroachment of the urban zone. These areas, although classified as rural may in fact require reclassification.
- Pujehun: Higher proportions of imputed consumption than other areas. Lower average household sizes and the sample may be too rural (lower than other areas at 21.1% urban). Imputed rent is higher, this could be due to a bias in the enumerators and own produce is high.
- Western Urban: Shows that there is a low level of extreme hunger although 38% are going to bed hungry and 15% fall below the basic needs. When Western Rural is factored in it increases to 20%. Furthermore, from the excess consumption ratio, it is the only place in the country that appears to have a large consumption base and is likewise highly monetarized.
- Bo shows a pattern similar to urban area poverty and is one of the more monetarized districts. This is probably due to Bo town and its effect at the district level.

- Kono shows mid level poverty but has the highest Gini coefficient implying that there is a high level of inequality.
- Port Loko shows the highest contribution to poverty at 11.5%

3.4.5.2 Inequality Measures

As a demonstration of the extent of inequality a Lorenz curve portrayed was plotted based on the distribution of total household consumption. The curve plots consumption of people ranked for lowest to highest against the percentage of consumption they represent. The closer the curve lies to the 45-degree line, the greater equality of distribution.



The graph above shows that top 20% of the population of Sierra Leone are responsible for about 47% of consumption, whereas the bottom 20% are responsible for about 6.65% of consumption. A common numerical indicator used to convey the Lorenz Curve is called the Gini Coefficient. The Gini Coefficient essentially calculates the area under the idealized curve and subtracts the area under the actual curve. The closer the actual curve is to the idealized curve, the closer the Gini coefficient approaches unity. The more pronounced the inequality the less the Gini coefficient with a theoretical minimum of 0. In the case of Sierra Leone the Gini coefficient relative to this Lorenz Curve is 0.39.

3.5 Some Data Processing And Analysis Problems Identified.

- During the planning phases of the survey, it was decided to *recode the enumeration areas into sequential system ids*. This created several problems. Because automated control systems were not sufficiently established prior to data entry, the changes in enumeration ids (i.e. field Ids and system Ids) created some confusion in tracking.
- **Rent:** There were some unreported rents as well as misreported (i.e. owner-estimated rents reported as actual rents etc. A quality index was derived from adding the primary characteristics of the house (i.e. wall, floor and ceiling). This index was used as the primary parameter or dimension of the hot deck. The median was examined using a normalized (logarithmic distribution) and the inter-quartile range examined. An attempt was made to build a hedonic housing model using regression techniques based on the same index but the model overestimated the rent and was not useful in predicting a value. Due to the random and arbitrary nature of assigning rent, it was determined that dynamic imputation based on the quality index would not preserve the integrity of the system used.
- **Own produce: two problems were noted**
 - *Value of non-standard units* - The median unit value for a product was examined. A tolerance of 4 times the ratio was established. The median value of that unit was imputed if the limit was exceeded.
 - *Annual consumption was high due to a poorly reported amount*, a keying error or problem with some enumerators cumulating the amount of product consumed per visit. The ratio used was consumption per equivalent adults by region and product. The lower limit was established at 0 or missing if the product was declared as consumed during the period of the interview. The upper limit was established as 1.5 times (inner fence) the inter-quartile. The distribution was left non-normalized.
- **Non-food items - Extreme values in reported amounts of consumption.**

Once the consumption quintiles were established the median value per product based on quintile was examined and the inter quartile ranges were established using the inner fence rule. The values examined were logarithmically transformed to lessen the effects of outlying values. This was done for two primary reasons. Since the values imputed were based on quintile medians, it was found that too many values were being imputed within the quintile without a power transformation. The curve was normalized, increasing the upper limit tolerance. Likewise, low values needed to be identified although they were only imputed if 0 or missing.

- **Food Purchases - Extreme values in reported amounts of food purchases.**

Median values by region and product were examined using the inner fence rules. There was no power transformation of the items since it was felt that the extensive nature of the reporting problem required an inclusion of more values. Likewise, the only low values imputed were blank or missing

4.0 Concluding Remarks

Millennium Declaration in 2000 identified poverty reduction as a critical focus of macroeconomic policy, placing particular emphasis on *reducing by half the number of people living in extreme poverty by the year 2015*. This goal poses critical challenges to all statisticians and economists especially those in countries emerging from conflict situations. By and large, it is now crystal clear that development programmes in our countries have become more and more linked to poverty reduction strategies, and, within such frameworks reliable statistics on poverty in developing countries are vital.

In order to enhance the capability of Statisticians/Economists and policy makers to respond to these challenges awareness raising and advocacy on poverty measurement and analysis among wider numbers of statisticians and economists is essential. The focus should be on those dimensions of poverty most relevant to the work of statisticians, and economist and notably on income/consumption poverty (but, consumption poverty can be emphasized because of the reliability of its data from household surveys compared to income data).

In the specific case of Statistics Sierra Leone, much of the data processing and analysis have been done with massive involvement of international consultants. Invariably this brings to bear a heavy cost on both the beneficiary country and the donors. Whereas such involvement of expatriate personnel is also a welcome idea, provisions for knowledge transfer to key national staff need not be over-emphasized. This should ensure that poverty measurement and analysis is sustainable on regular basis just as it will put the national statistical offices and other institutions on a better stead in monitoring progress toward the achievement of the MDGs.

Than you.

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