

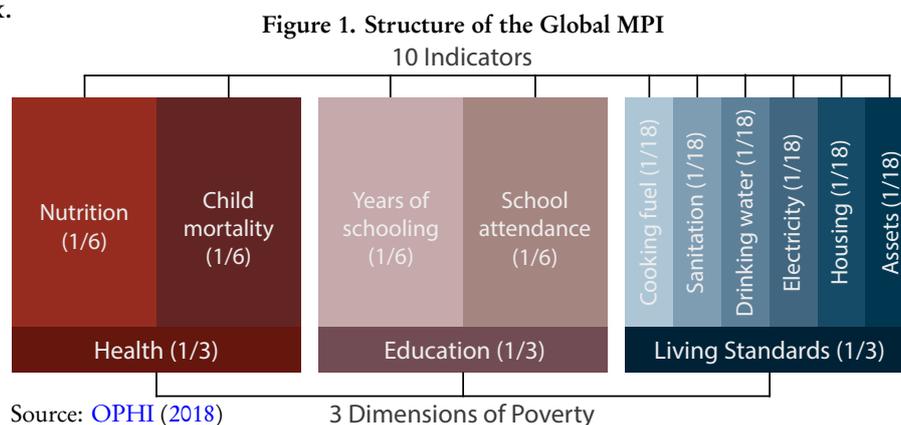
Oxford Poverty and Human Development Initiative (OPHI)  
 Oxford Department of International Development  
 Queen Elizabeth House, University of Oxford  
[www.ophi.org.uk](http://www.ophi.org.uk)



## Global MPI Country Briefing 2021: Sierra Leone (Sub-Saharan Africa)

### The Global MPI

The global Multidimensional Poverty Index (MPI) was created using the multidimensional measurement method of Alkire and Foster (AF).<sup>1</sup> The global MPI is an index of acute multidimensional poverty that covers over 100 countries. It is computed using data from the most recent Demographic and Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS), Pan Arab Project for Family Health (PAPFAM) and national surveys. The MPI has three dimensions and 10 indicators as illustrated in figure 1. Each dimension is equally weighted, and each indicator within a dimension is also equally weighted.<sup>2</sup> Any person who fails to meet the deprivation cutoff is identified as deprived in that indicator. So the core information the MPI uses is the profile of deprivations each person experiences. Each deprivation indicator is defined in table A.1 of the appendix.



In the global MPI, a person is identified as multidimensionally poor or MPI poor if they are deprived in at least one third of the weighted MPI indicators. In other words, a person is MPI poor if the person's weighted deprivation score is equal to or higher than the poverty cutoff of 33.33%. Following the AF methodology, the MPI is calculated by multiplying the **incidence** of poverty ( $H$ ) and the average **intensity** of poverty ( $A$ ). More specifically,  $H$  is the proportion of the population that is multidimensionally poor, while  $A$  is the average proportion of dimensions in which poor people are deprived. So,  $MPI = H \times A$ , reflecting both the share of people in poverty and the degree to which they are deprived.

**Table 1. Global MPI in Sierra Leone**

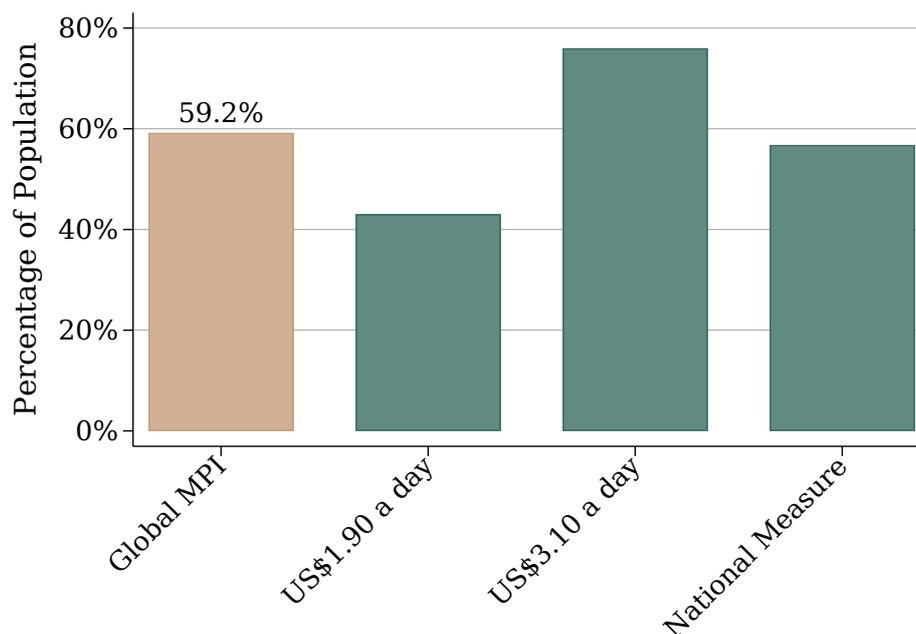
Area	<i>MPI</i>	<i>H</i>	<i>A</i>	Vulnerable	Severe Poverty	Population Share
National	0.293	59.2%	49.5%	21.3%	28.0%	100.0%
Urban	0.137	33.3%	41.3%	26.5%	7.4%	41.4%
Rural	0.403	77.5%	51.9%	17.6%	42.5%	58.6%

**Notes:** Source: DHS year 2019, own calculations.

<sup>1</sup>A formal explanation of the method is presented in Alkire and Foster (2011). An application of the method is presented in Alkire and Santos (2014).

<sup>2</sup>It should be noted that the AF method can be used with different indicators, weights and cutoffs to develop national MPIs that reflect the priorities of individual countries. National MPIs are more tailored to the context but cannot be compared.

Figure 2. Headcount Ratios by Poverty Measures



**Notes:** Source for global MPI: DHS, year 2019, own calculations. Monetary poverty measures are the most recent estimates from World Bank (Azevedo, 2011). Monetary poverty measure refer to 2018 (\$1.90 a day), 2018 (\$3.10 a day), and 2018 (national measure).

A headcount ratio is also estimated for two other ranges of poverty cutoffs. A person is identified as **vulnerable** to poverty if they are deprived in 20–33.33% of the weighted indicators. Concurrently, a person is identified as living in **severe poverty** if they are deprived in 50–100% of the weighted indicators. A summary of the global MPI statistics are presented in table 1 for national, rural and urban areas.

A brief methodological note is published following each round of global MPI update. For this round please refer to Alkire, Kanagaratnam and Suppa (2021). The note explains the methodological adjustments that were made while revising and standardizing indicators for over 100 countries. As such, it is useful to refer to the methodological notes with this country brief for specialized information on how the country survey data was managed.<sup>3</sup>

### Poverty Headcount Ratios

Figure 2 compares the headcount ratios of the global MPI and monetary poverty measures. The height of the first bar of figure 2 shows the percentage of people who are MPI poor. The second and third bars represent the percentage of people who are poor according to the World Bank’s \$1.90 a day and \$3.10 a day poverty line. The final bar denotes the percentage of people who are poor according to the national income or consumption and expenditure poverty measures.

<sup>3</sup>Previous methodological notes, published for each round of update, are made available on the OPHI website:<http://ophi.org.uk/multidimensional-poverty-index/mpi-resources/>.

Figure 3. Headcount Ratios for Global MPI, Severe Poverty and \$1.90/day

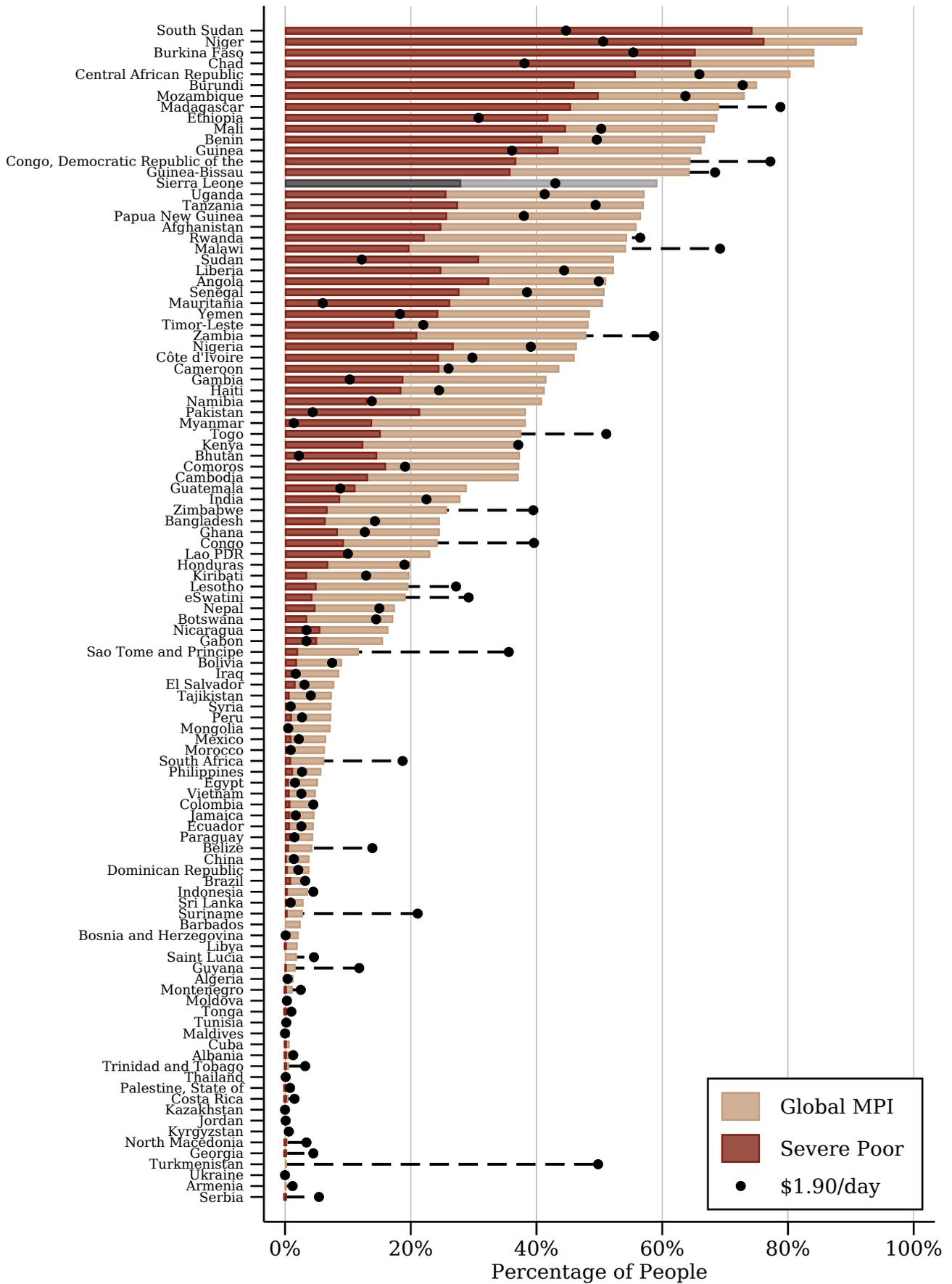
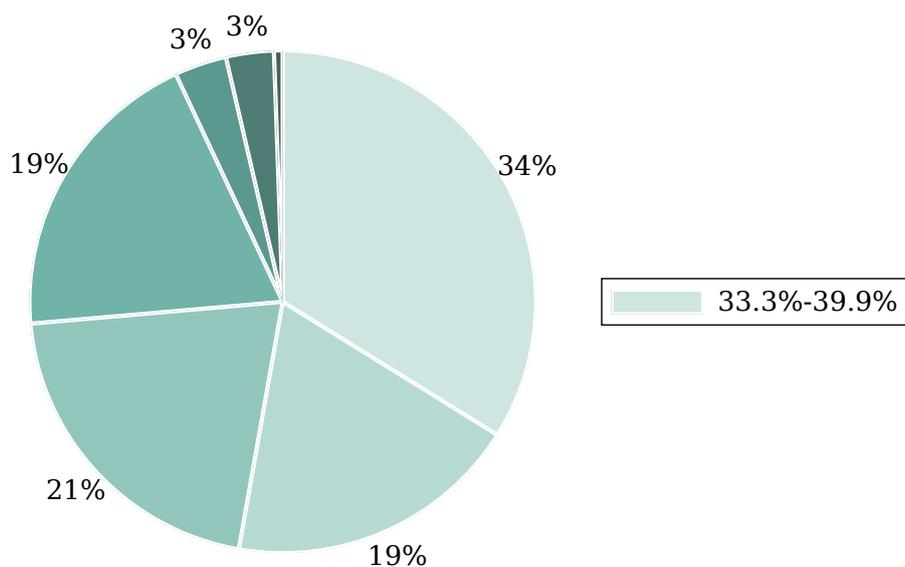


Figure 3 shows the percentage of people who are MPI poor in the countries analyzed. The bar denoting this country is in grey, with other countries shown in color. The percentage of people who are MPI poor is shown in beige. The height at each dot denotes the percentage of people who are monetary poor according to the \$1.90 a day poverty line in each country. The monetary poverty statistics are taken from the year closest to the year of the survey used to calculate the MPI. The year of the survey is provided in the footnote of figure 2 and 3. In cases where a survey was conducted over two calendar years, the later period is taken as the reference year.

### Intensity of Multidimensional Poverty

Recall that the intensity of poverty ( $A$ ) is the average proportion of weighted indicators in which poor people are deprived. A person who is deprived in 90% of the weighted indicators has a greater intensity of deprivation than someone deprived in 40% of the weighted indicators. Figure 4 shows the percentage of MPI poor people who experience different intensities of deprivation. For example, the first slice of the pie chart shows deprivation intensities of greater than 33.33% but strictly less than 40%.

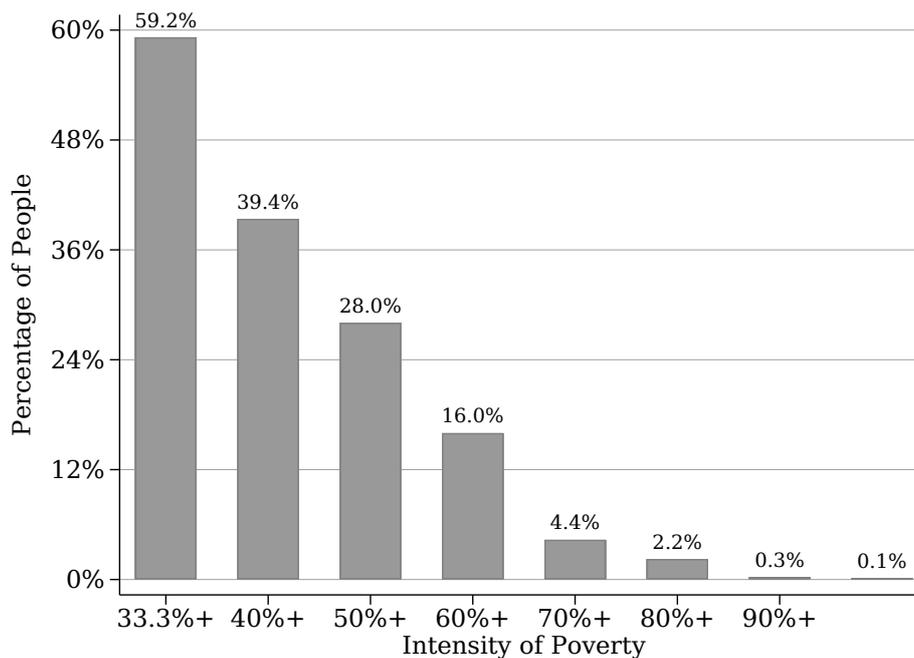
Figure 4. Intensity of Deprivation among MPI Poor



Notes: Source: DHS year 2019, own calculations. Depicted slices without label account for 1% or less.

In contrast, the bar graph in figure 5 reports the proportion of the population in a country that is poor in that percentage of indicators or more. For example, the number over the 40%+ bar represents the percentage of people who are deprived in 40% or more of weighted indicators. For example, people who are deprived in 50% or more of the indicators are the subset of MPI poor people who are identified as living in **severe** poverty.

Figure 5. Share of People by Minimum Deprivation Score



**Notes:** Source: DHS year 2019, own calculations. Category 33.3+% is equivalent to headcount ratio of global MPI, category 50+% corresponds to Severe Poverty of global MPI.

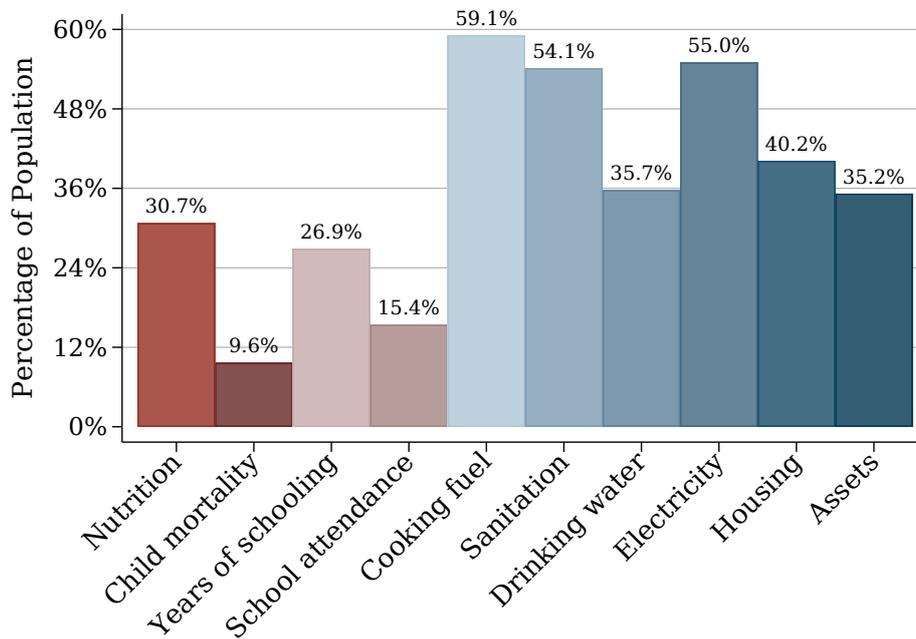
## Analyzing the Composition of Multidimensional Poverty

**Dimensional Breakdown.** The AF methodology has a property that makes the global MPI even more useful—dimensional breakdown. This property makes it possible to compute the percentage of the population who are multidimensionally poor and simultaneously deprived in each indicator. This is known as the **censored headcount ratio** of an indicator. Figure 6 shows the censored headcount ratio of each indicator at the national level. Poverty information, however, becomes even more valuable when it is disaggregated by urban and rural areas. Figure 7 illustrates the breakdown by indicators by country, and urban and rural areas. This analysis shows the contribution of different indicators to poverty in different areas, which can reveal structural differences in urban and rural poverty. This in turn could mean different policy responses in different areas, making the MPI useful for monitoring the effects of policy shifts and program changes.

**Percentage Contribution.** The censored headcount ratio shows the extent of deprivations among the poor but does not reflect the relative value of the indicators. Two indicators may have the same censored headcount ratios but different contributions to overall poverty, because the contribution depends both on the censored headcount ratio and on the weight assigned to each indicator. As such, a complementary analysis to the censored headcount ratio is the **percentage contribution** of each indicator to overall multidimensional poverty.

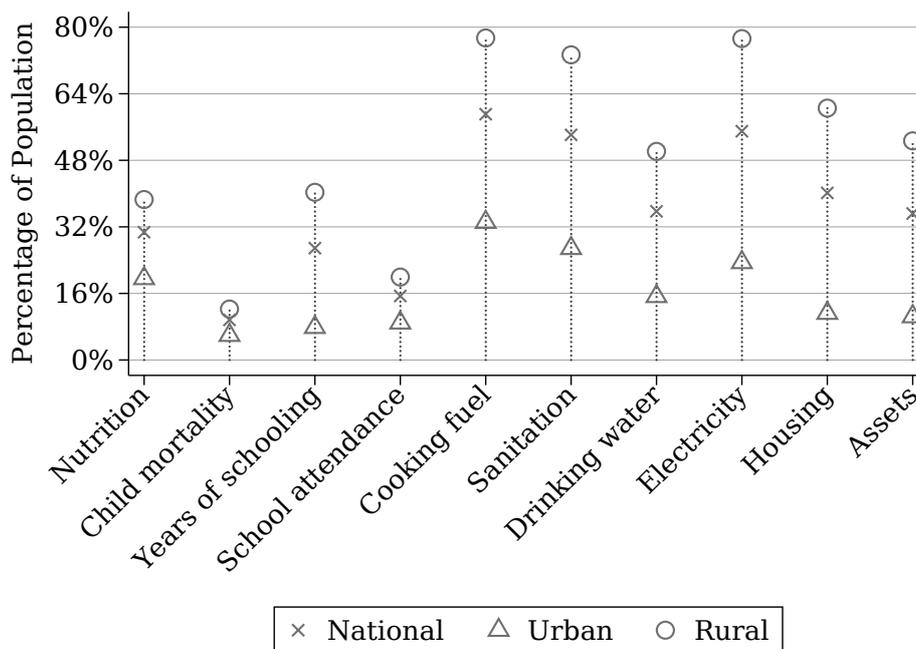
Figure 8 contains two bar graphs that compare the percentage contribution of each indicator to national, rural and urban poverty. In the bar graph on the left-hand side, colors inside each bar denote the percentage contribution of each indicator to the overall MPI, and all bars add up to 100%. In the bar graph on the right, the height of each bar shows the contribution of each indicator to MPI. This enables an immediate visual comparison of the composition of poverty across areas.

Figure 6. Censored Headcount Ratios



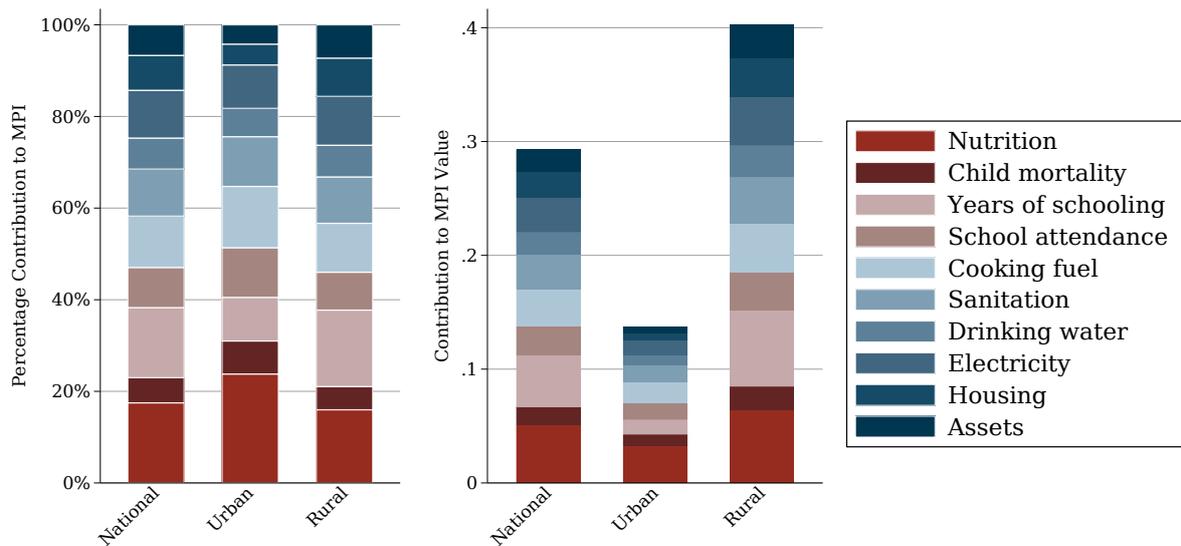
Notes: Source: DHS year 2019, own calculations.

Figure 7. Censored Deprivations by Area



Notes: Source: DHS year 2019, own calculations.

Figure 8. Indicator Contribution to Overall Poverty by Area



Notes: Source: DHS year 2019, own calculations.

### Subnational Analyses

In addition to providing data on multidimensional poverty at the national and urban-rural level (as shown in table 1), the MPI can also be computed by subnational regions to show disparities in poverty within countries. Subnational disaggregations are published when the survey used for the global MPI is representative at the subnational level.

Table 2 shows a summary of the global MPI statistics by subnational region. The last column of the table also presents the population share of each region. The population share was obtained by applying the sampling weight in the respective survey dataset to the final sample used for the computation of the reported poverty statistics in this country profile. The population-weighted regional figures on *MPI*, *H* and *A* add up to the national figures.

Figure 9 shows how the MPI varies across regions. Dark red indicates a higher MPI and therefore greater poverty, while dark green indicates a lower MPI and therefore lower poverty.

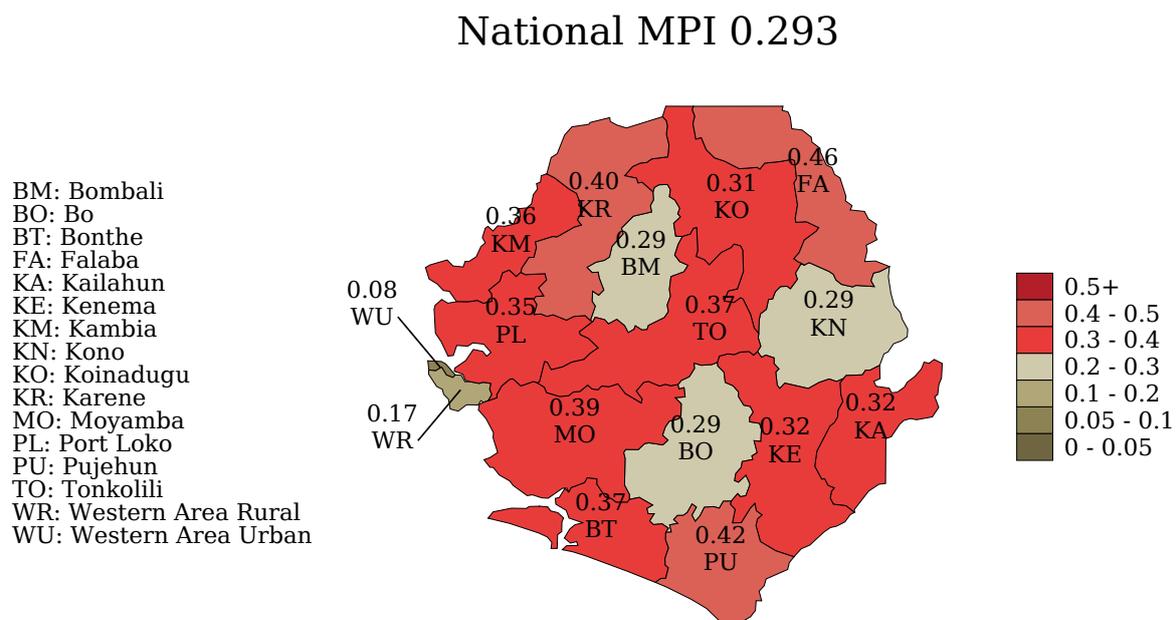
Figure 10 shows the contribution of each indicator to overall MPI at the subnational level. The regions are sorted by increasing values of the global MPI with the poorest region on the right.

Table 2. Global MPI in Sierra Leone by Subnational Region

Region	MPI	H	A	Vulnerable	Severe Poverty	Population Share
Bo	0.289	58.9%	49.1%	18.8%	25.8%	8.8%
Bombali	0.290	59.3%	49.0%	23.7%	22.6%	7.2%
Bonthe	0.375	71.5%	52.4%	12.5%	39.1%	3.4%
Falaba	0.462	84.6%	54.6%	9.4%	49.0%	2.5%
Kailahun	0.319	68.0%	46.8%	23.4%	29.0%	5.3%
Kambia	0.355	69.8%	50.8%	19.3%	34.6%	5.0%
Karene	0.404	77.9%	51.9%	16.7%	46.5%	2.9%
Kenema	0.317	63.4%	49.9%	19.2%	31.2%	10.5%
Koinadugu	0.309	60.8%	50.8%	20.7%	31.1%	2.7%
Kono	0.285	60.4%	47.3%	28.0%	26.2%	6.7%
Moyamba	0.388	73.9%	52.6%	17.4%	42.1%	4.9%
Port Loko	0.350	67.8%	51.5%	18.2%	36.7%	7.4%
Pujehun	0.423	80.6%	52.4%	11.0%	46.8%	3.5%
Tonkolili	0.371	73.2%	50.6%	21.2%	39.0%	8.4%
Western Area Rural	0.174	41.1%	42.3%	27.2%	11.2%	7.8%
Western Area Urban	0.079	20.2%	39.2%	27.9%	3.5%	12.9%

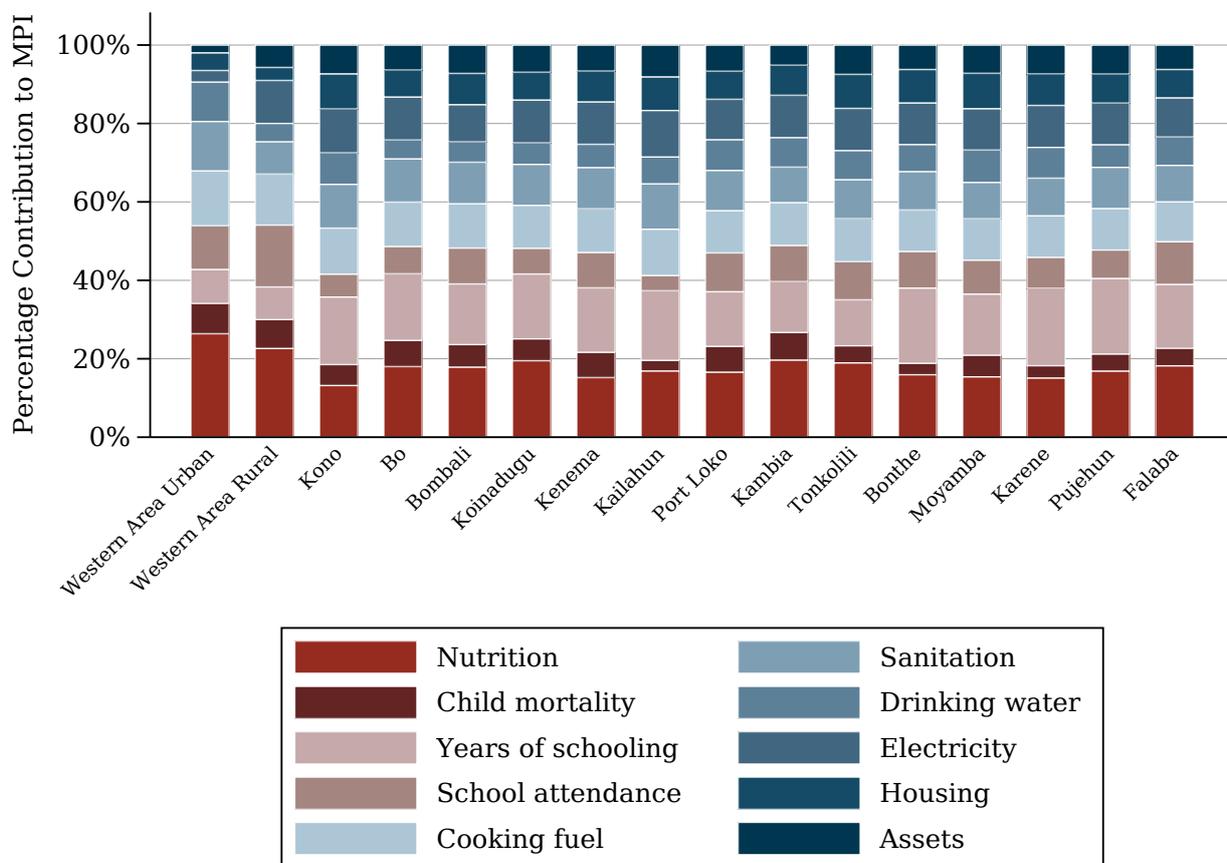
Notes: Source: DHS year 2019, own calculations.

Figure 9. Mapping MPI Value by Subnational Region



Notes: Source: DHS year 2019, own calculations. Underlying shp-file from [The Demographic and Health Surveys Program \(2019\)](#).

Figure 10. Indicator Contribution to Global MPI of Subnational Regions



Notes: Source: DHS year 2019, own calculations.

## Changes over Time

This section describes trends in multidimensional poverty for Sierra Leone between 2013 and 2019 using a harmonised version of the global Multidimensional Poverty Index (MPI). Harmonisation produces comparable MPI(T) estimations within a country, over time.

Goal 1 of the Sustainable Development Goals proposes an end to poverty in all its forms everywhere, and Target 1.2 sets an aim for countries to reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions by 2030. Tracking this target requires over-time comparisons, like those we present here. For further information on how countries and datasets were selected, and for country-specific methodological considerations, please see [Alkire, Kanagaratnam and Suppa \(2021\)](#).

Table 3. Global MPI: harmonised over time

Year	Survey	MPI		H		A	
		Level	Abs. Chg. (annualised)	Level	Abs. Chg. (annualised)	Level	Abs. Chg. (annualised)
2013	DHS	0.409		74.05%		55.25%	
2017	MICS	0.300	-0.027***	58.33%	-3.93%***	51.46%	-0.95%***
2019	DHS	0.272	-0.014***	55.22%	-1.56%**	49.33%	-1.06%***

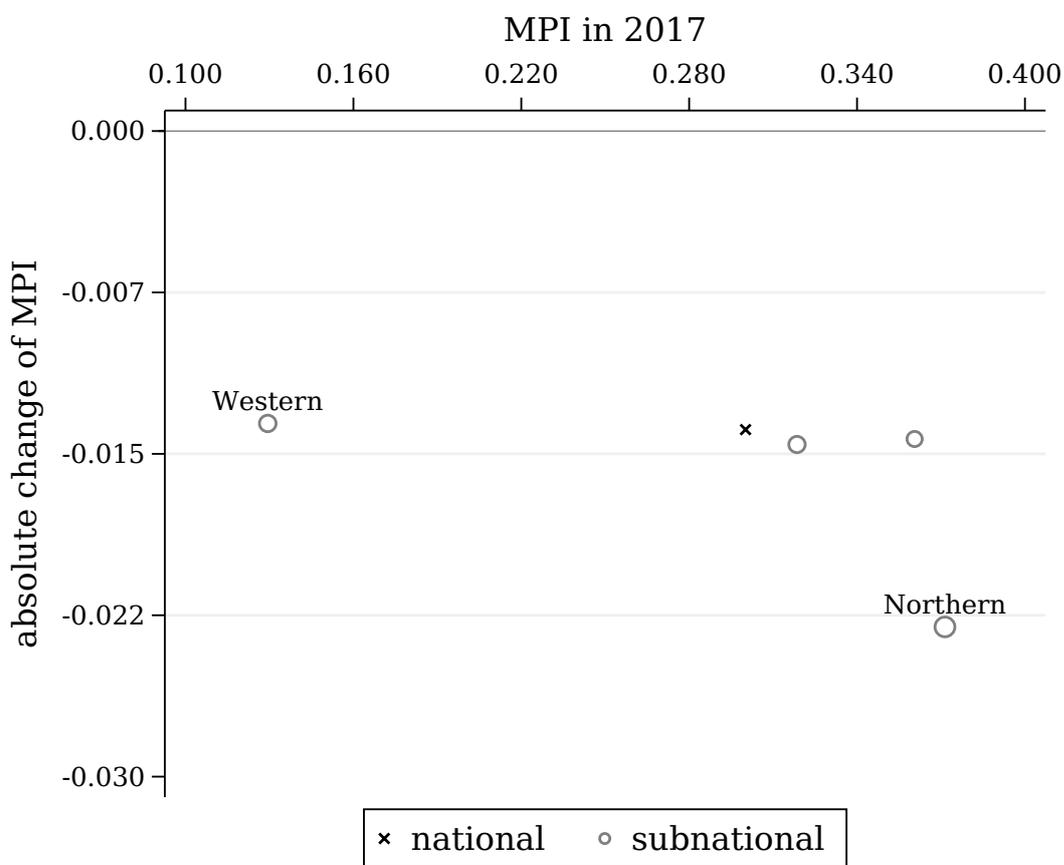
Notes: Change is calculated with respect to previous period; indicated levels of significance are \*\*\* for 1%, \*\* for 5%, and \* for 10%.

**National Trends.** Table 3 the levels and changes in MPI(T) values, incidence and intensity of poverty between 2017 and 2019 for Sierra Leone. This gives an indication of the speed of poverty reduction in the country. The absolute reduction in poverty is calculated by subtracting one measure of poverty from another and the annualised absolute change is this change divided by the number of years between surveys.

**Disaggregating the MPI.** National level results can often mask inequalities in poverty across geographical areas of a country. Recognising the importance of such inequalities, the 2030 Sustainable Development Agenda pledged to ensure ‘no one will be left behind’ in the process of poverty reduction. Therefore in addition to changes at the national level, trends in the harmonised global MPI(T) can shine a light on the inequalities in poverty reduction by presenting disaggregated results at the subnational level. This enables an assessment of whether poverty reduction in a country is pro-poor – with the poorest regions having the fastest reduction, therefore reducing inequality among the poor. Contrastingly, if poverty reduces faster among the less poor regions, those with the highest level of poverty fall further behind, hindering efforts to narrow the gap in poverty levels across the population

Figure 11 presents the difference in the absolute reduction of MPI(T) among the subnational regions in Sierra Leone. The horizontal axis presents the level of MPI(T) in 2017 for each region, while the vertical axis shows the rate of absolute reduction for the given region over time. The size of the bubbles refer to the share of poor people in 2017. Some countries present a pro-poor pattern at the subnational level, with the poorest regions reducing multidimensional poverty the fastest – thus not being left behind. This pattern is displayed if there is a diagonal trend, with the poorest region towards the bottom right of the graph and the least poor region towards the top left.

Figure 11. Changes in MPI by subnational region



Notes: Absolute changes are expressed in units of MPI and annualised. Source: For 2017 MICS, for 2019 DHS, own calculations.

## Appendices

Table A.1. Global MPI

Dimension of Poverty	Indicator	Deprived if living in a household where...	SDG area	Weight
Health	Nutrition	Any person under 70 years of age for whom there is nutritional information is <b>undernourished</b> . <sup>1</sup>	SDG 2	$\frac{1}{6}$
	Child mortality	A child <b>under 18</b> has <b>died</b> in the household in the five-year period preceding the survey. <sup>2</sup>	SDG 3	$\frac{1}{6}$
Education	Years of schooling	<b>No</b> eligible household member has completed <b>six years</b> of <b>schooling</b> . <sup>3</sup>	SDG 4	$\frac{1}{6}$
	School attendance	Any school-aged child <sup>3</sup> is <b>not attending</b> school <b>up to</b> the age at which he/she would complete <b>class 8</b> . <sup>4</sup>	SDG 4	$\frac{1}{6}$
Living Standards	Cooking fuel	A household cooks using <b>solid fuel</b> , such as dung, agricultural crop, shrubs, wood, charcoal or coal. <sup>5</sup>	SDG 7	$\frac{1}{18}$
	Sanitation	The household has <b>unimproved</b> or <b>no sanitation facility</b> or it is improved but <b>shared</b> with other households. <sup>6</sup>	SDG 6	$\frac{1}{18}$
	Drinking water	The household's source of <b>drinking water</b> is <b>not safe</b> or safe drinking water is a <b>30-minute walk</b> or <b>longer walk</b> from home, roundtrip. <sup>7</sup>	SDG 6	$\frac{1}{18}$
	Electricity	The household has <b>no electricity</b> . <sup>8</sup>	SDG 7	$\frac{1}{18}$
	Housing	The household has <b>inadequate</b> housing materials in <b>any</b> of the three components: <b>floor, roof, or walls</b> . <sup>9</sup>	SDG 11	$\frac{1}{18}$
	Assets	The household does <b>not own more than one</b> of these <b>assets</b> : radio, TV, telephone, computer, animal cart, bicycle, motorbike, or refrigerator, and does not own a car or truck.	SDG 1	$\frac{1}{18}$

**Notes:** For more details see [Alkire, Kanagaratnam and Suppa \(2021\)](#); the global MPI is related to the following SDGs: No Poverty (SDG 1), Zero Hunger (SDG 2), Health & Well-being (SDG 3), Quality Education (SDG 4), Clean Water & Sanitation (SDG 6), Affordable & Clean Energy (SDG 7), Sustainable Cities & Communities (SDG 11).

<sup>1</sup> Children under 5 years (60 months and younger) are considered undernourished if their z-score of either height-for-age (stunting) or weight-for-age (underweight) is below minus two standard deviations from the median of the reference population. Children 5–19 years (61–228 months) are identified as deprived if their age-specific BMI cutoff is below minus two standard deviations. Adults older than 19 to 70 years (229–840 months) are considered undernourished if their Body Mass Index (BMI) is below 18.5 kg/m<sup>2</sup>.

<sup>2</sup> The child mortality indicator of the global MPI is based on birth history data provided by mothers aged 15–49. In most surveys, men have provided information on occurrence of child mortality as well but this lacks the date of birth and death of the child. Hence, the indicator is constructed solely from mothers. However, if the data from the mother is missing, and if the male in the household reported no child mortality, then we identify no occurrence of child mortality in the household.

<sup>3</sup> If all individuals in the household are in an age group where they should have formally completed 6 or more years of schooling, but none have this achievement, then the household is deprived. However, if any individuals aged 10 years and older reported 6 years or more of schooling, the household is not deprived.

<sup>4</sup> Data source for the age children start compulsory primary school: DHS or MICS survey reports; or <http://data.uis.unesco.org/>

<sup>5</sup> If survey report uses other definitions of solid fuel, we follow the survey report.

<sup>6</sup> A household is considered to have access to improved sanitation if it has some type of flush toilet or latrine, or ventilated improved pit or composting toilet, provided that they are not shared. If survey report uses other definitions of adequate sanitation, we follow the survey report.

<sup>7</sup> A household has access to clean drinking water if the water source is any of the following types: piped water, public tap, borehole or pump, protected well, protected spring or rainwater, and it is within 30-minute walk, round trip. If survey report uses other definitions of safe drinking water, we follow the country survey report.

<sup>8</sup> A number of countries do not collect data on electricity because of 100% coverage. In such cases, we identify all households in the country as non-deprived in electricity.

<sup>9</sup> Deprived if floor is made of natural materials or if dwelling has no roof or walls or if either the roof or walls are constructed using natural or rudimentary materials. The definition of natural and rudimentary materials follows the classification used in country-specific DHS or MICS questionnaires.

## References

- Alkire, S. and Foster, J.E. (2011). ‘Counting and multidimensional poverty measurement’, **Journal of Public Economics**, vol. 95(7-8), pp. 476–487, doi:[10.1016/j.jpubeco.2010.11.006](https://doi.org/10.1016/j.jpubeco.2010.11.006).
- Alkire, S., Kanagaratnam, U. and Suppa, N. (2021). ‘Global multidimensional poverty index 2021’, OPHI MPI Methodological Notes 51, Oxford Poverty and Human Development Initiative, University of Oxford.
- Alkire, S. and Santos, M.E. (2014). ‘Measuring acute poverty in the developing world: Robustness and scope of the multidimensional poverty index’, **World Development**, vol. 59, pp. 251–274, ISSN 0305-750X, doi:[10.1016/j.worlddev.2014.01.026](https://doi.org/10.1016/j.worlddev.2014.01.026).
- Azevedo, J.P. (2011). ‘WBOPENDATA: Stata module to access world bank databases’, Statistical Software Components S457234, Boston College Department of Economics. <http://ideas.repec.org/c/boc/bocode/s457234.html>, data downloaded on 1 October 2021.
- OPHI (2018). ‘Global multidimensional poverty index 2018: The most detailed picture to date of the world’s poorest people’, University of Oxford, UK.
- The Demographic and Health Surveys Program (2019). ‘Spatial data repository’, Retrieved from <https://spatialdata.dhsprogram.com>.

All figures presented in this brief are obtained from the MPI Data Tables. These and other related statistics are freely available under <https://ophi.org.uk/multidimensional-poverty-index/mpi-resources>. This country briefing was last updated in October 2021.

Please cite this document as:

Oxford Poverty and Human Development Initiative (October 2021). “Sierra Leone Country Briefing”, Multidimensional Poverty Index Data Bank. Oxford Poverty and Human Development Initiative, University of Oxford.

Available at: [www.ophi.org.uk/multidimensional-poverty-index/mpi-country-briefings/](http://www.ophi.org.uk/multidimensional-poverty-index/mpi-country-briefings/).