Multidimensional Poverty Index – Winter 2015/16: Brief Methodological Note and Results

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This analysis uses data from the USAID Demographic and Health Surveys (DHS), UNICEF Multiple Indicator Cluster Surveys (MICS), and the Pan Arab Family Health Survey (PAPFAM) collected by the League of Arab States and local Bureaux of Statistics.

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Contents

Introduction

1. 2015 MPI Updates
2. The MPI Methodology: Poverty, Vulnerability, and Severe Poverty
3. The Measurement of Destitution and of Inequality among the poor.
4. Considerations by country

Introduction

The Winter Multidimensional Poverty Index (MPI) 2015/16 updates (released December 2015, henceforth MPI 2015/16) use the same parameters (dimensions, indicators, cutoffs and weights) and the same functional form (Alkire and Foster Adjusted Headcount Ratio M₀) as in previous years. The main MPI updates are released in summer; Winter MPI Updates provide the opportunity to share new estimations for any databases that have been processed. This brief methodological note presents the Winter 2015/16 MPI updates, and releases the tables with the full results: national MPI, destitution and vulnerability results, rural, urban, subnational region, changes over time, and complete estimations, as well as complementary data, dimensional breakdowns, and confidence intervals. Destitution data are now available for 100 countries. It first explains the main updates in the 2015/16 MPI, following the guidelines for updates presented in the 2014 Methodological Note (Alkire, Conconi and Seth 2014b). It uses the MPI methodology that has been presented in detail in previous methodological notes (Alkire and Santos 2010; Alkire, Roche, Santos and Seth 2011; Alkire, Conconi and Roche 2013; Alkire, Conconi and Seth 2014b). Then it briefly describes the methodological assumptions considered for the estimation of each dataset. The results of such estimations are presented in the form of 7 main tables, 101 country briefings and the interactive Databank, all available on OPHI’s website (www.ophi.org.uk).

1. Winter 2015/16 MPI Updates

Updated MPIs from new data

The Winter 2015/16 MPI updates present new and updated estimations for 5 country datasets. Thirty eight datasets for 37 countries were updated in June 2015. Thirty three countries were updated in 2014; in 2013 there were updates for 16 countries and in 2011, for 25 countries. MPI estimations for 13 countries are carried out with data that predates 2006, 30 estimations are carried out with data collected between 2007 and 2010, and the number of analyses with data from 2011 onwards has increased to 58.

The countries in December 2015, together with the surveys used and years are as follows: **Updated countries**: Bangladesh (MICS 2012-13), Cambodia (DHS 2014), Ghana (DHS 2014), Malawi (MICS 2013-14), Yemen (DHS 2013). The survey data used to estimate the MPI is dated from 2004 to 2014. In 2014,

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1 From January 2015, the global MPI estimations are updated twice per year. This methodological note appends the considerations for the new country estimations.

2 Recent surveys for other countries/years were also considered but eventually dismissed from the calculations of the MPI 2015 because they do not satisfy the policies for updating, as explained in the 2013 Methodological Note (Viet Nam MICS 2013-14, Panama MICS 2013, Uganda MIS 2010, Burkina Faso MIS 2010).
the MPI reported estimations from 2003 to 2013 along with China WHS 2002. In 2013, MPI estimations were carried out using data from 2002-2011; in 2011 from 2000-2010; and in 2010 from 2000-2008.

Policies regarding population figures and complementary information
As stated in the 2014 Methodological Note, the surveys are dated according to the year in which the fieldwork took place, as detailed in the survey report. If the fieldwork took place during two calendar years, the data will be labelled with both years, e.g. 2010/11.

In this case, the population figures indicated as those of the year of the survey, as well as the complementary information, will correspond to the second calendar year, or the closest available year with information.

Population figures are reported for 2011 and 2012, using the 2012 Revision of World Population Prospects (UNDESA 2012). When, for illustrative purposes, regional aggregates are presented, 2011 population data are employed. Aggregate estimates in 2014 used 2010 population data, and in 2013 used 2009 population data. The population year used for aggregate estimates changes by one year annually in the summer updates.

2. The MPI Methodology: Poverty, Vulnerability, and Severe Poverty
The MPI is a measure of acute global poverty developed by the Oxford Poverty and Human Development Initiative (OPHI) with the United Nations Development Programme’s Human Development Report (Alkire and Santos 2010, 2014; UNDP 2010 and previous methodological notes). The index belongs to the family of measures developed by Alkire and Foster (2007, 2011; Alkire, Foster, Seth, Santos, Roche and Ballon (2015). In particular, it is an application of the adjusted headcount ratio, $M_0$. This methodology requires determining the unit of analysis (i.e. household), identifying the set of indicators in which they are deprived at the same time and summarizing their poverty profile in a weighted deprivation score. They are identified as multidimensionally poor if their deprivation score exceeds a cross-dimensional poverty cutoff. The proportion of poor people and their average deprivation score (i.e. the ‘intensity’ of poverty or percentage of simultaneous deprivations they experience) become part of the final poverty measure. A more formal explanation of the methodology is presented in Alkire and Santos (2014) and in Alkire and Foster (2011).
### Table 1: The dimensions, indicators, deprivation cutoffs and weights of the MPI

<table>
<thead>
<tr>
<th>Dimensions of poverty</th>
<th>Indicator</th>
<th>Deprived if…</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Education</strong></td>
<td>Years of Schooling</td>
<td>No household member aged 10 years or older has completed five years of schooling.</td>
<td>1/6</td>
</tr>
<tr>
<td></td>
<td>Child School Attendance</td>
<td>Any school-aged child+ is not attending school up to the age at which he/she would complete class 8.</td>
<td>1/6</td>
</tr>
<tr>
<td><strong>Health</strong></td>
<td>Child Mortality</td>
<td>Any child has died in the family in the five-year period preceding the survey.</td>
<td>1/6</td>
</tr>
<tr>
<td></td>
<td>Nutrition</td>
<td>Any adult under 70 years of age, or any child for whom there is nutritional information is undernourished in terms of weight for age*.</td>
<td>1/6</td>
</tr>
<tr>
<td><strong>Living Standard</strong></td>
<td>Electricity</td>
<td>The household has no electricity.</td>
<td>1/18</td>
</tr>
<tr>
<td></td>
<td>Improved Sanitation</td>
<td>The household’s sanitation facility is not improved (according to MDG guidelines), or it is improved but shared with other households**.</td>
<td>1/18</td>
</tr>
<tr>
<td></td>
<td>Improved Drinking Water</td>
<td>The household does not have access to improved drinking water (according to MDG guidelines) or safe drinking water is at least a 30-minute walk from home, roundtrip***.</td>
<td>1/18</td>
</tr>
<tr>
<td></td>
<td>Flooring</td>
<td>The household has a dirt, sand, dung or ‘other’ (unspecified) type of floor.</td>
<td>1/18</td>
</tr>
<tr>
<td></td>
<td>Cooking Fuel</td>
<td>The household cooks with dung, wood or charcoal.</td>
<td>1/18</td>
</tr>
<tr>
<td></td>
<td>Assets ownership</td>
<td>The household does not own more than one radio, TV, telephone, bike, motorbike or refrigerator and does not own a car or truck.</td>
<td>1/18</td>
</tr>
</tbody>
</table>

**Note:**


*Adults are considered malnourished if their BMI is below 18.5 m/kg². Children are considered malnourished if their z-score of weight-for-age is below minus two standard deviations from the median of the reference population.

**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.

***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 a distance of 30 minutes' walk (roundtrip).

**Source:** Alkire and Santos (2010). For details on the rationale behind each indicator, please see Alkire and Santos (2010, 2013).

The 2015/16 global MPI assesses multidimensional poverty for people in 101 countries for which data from 2004 onwards are available. As summarized in Table 1, the MPI uses information from 10 indicators which are organised into three dimensions: health, education and living standards, following the same dimensions and weights as the Human Development Index (HDI). Each person is identified as deprived or non-deprived in each indicator based on a deprivation cutoff (more details in Alkire and Santos 2010). Health and Education indicators reflect achievements of all household members. Then, each person’s deprivation score is constructed based on a weighted average of the deprivations they experience using a

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3 MPI estimations prior to 2004 are available on table 7 of the MPI online resources.

4 For a more detailed description of the indicator definitions, see Alkire and Santos (2010) and Alkire Roche Santos and Seth (2011).
nested weight structure: equal weight across dimension and equal weight for each indicator within dimensions. Finally, a poverty cutoff of 33.33% identifies as multidimensionally poor those people whose deprivation score meets or exceeds this threshold.

The MPI reflects both the incidence or headcount ratio \( (H) \) of poverty – the proportion of the population that is multidimensionally poor – and the average intensity \( (A) \) of their poverty – the average proportion of indicators in which poor people are deprived. The MPI is calculated by multiplying the incidence of poverty by the average intensity across the poor \((H \times A)\). A person is identified as poor if he or she is deprived in at least one third of the weighted indicators. Those identified as ‘Vulnerable to Poverty’ are deprived in 20% – 33.33% of weighted indicators and those identified as in ‘Severe Poverty’ are deprived in 50% or more of the dimensions.

3. The Measurement of Destitution and of Inequality among the poor.

In 2014, to illustrate the ability of the MPI to consider the ‘depth’ of deprivations rigorously although data may be ordinal, we estimate a linked poverty measure which we call destitution. The destitution measure has precisely the same dimensions, indicators, weights, and poverty cutoff as the MPI. Only one set of parameters changes: the deprivation cutoffs. The cutoffs for 8 of the 10 indicators reflect more extreme deprivations. As a result, the destitution measure identifies a strict subset of the MPI poor who are also deprived in at least one-third of the indicators according to the destitution cutoffs.

That is, those identified as ‘destitute’ are deprived in at least one third or more of the same weighted indicators with more extreme deprivation cutoffs (as described in Table 2). Data on destitution is available for 100 of the 101 countries analysed in the 2015/16 MPI. For details, see Alkire, Conconi & Seth (2014b).

<table>
<thead>
<tr>
<th>Dimensions of poverty (same as for standard MPI)</th>
<th>Indicator (same as for standard MPI)</th>
<th>Deprived if…</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Education</strong></td>
<td>Years of Schooling</td>
<td>No household member has completed at least one year of schooling.</td>
</tr>
<tr>
<td></td>
<td>Child School Attendance</td>
<td>No children are attending school up to the age at which they should finish class 6.</td>
</tr>
<tr>
<td><strong>Health</strong></td>
<td>Child Mortality</td>
<td>2 or more children have died in the household.</td>
</tr>
<tr>
<td></td>
<td>Nutrition</td>
<td>There is severe undernourishment of any adult under 70 years of age (BMI&lt;17kg/m(^2)) or any child is ((-3) standard deviations from the median).</td>
</tr>
<tr>
<td><strong>Living Standard</strong></td>
<td>Electricity</td>
<td>The household has no electricity (no change).</td>
</tr>
<tr>
<td></td>
<td>Improved Sanitation</td>
<td>There is no sanitation facility (open defecation).</td>
</tr>
<tr>
<td></td>
<td>Improved Drinking Water</td>
<td>The household does not have access to safe drinking water, or safe water is more than a 45-minute walk (round trip).</td>
</tr>
<tr>
<td></td>
<td>Flooring</td>
<td>The household has a dirt, sand, or dung floor (no change).</td>
</tr>
<tr>
<td></td>
<td>Cooking Fuel</td>
<td>The household cooks with dung or wood (coal/lignite/charcoal are now non-deprived).</td>
</tr>
<tr>
<td></td>
<td>Assets ownership</td>
<td>The household has no assets (radio, mobile phone, refrigerator, etc.) and no car.</td>
</tr>
</tbody>
</table>
Since 2014 we have also measured the level of inequality in deprivation scores among the poor, both at the national level and within subnational regions, by using a separate, decomposable inequality measure. We also use the measure to assess disparity across subnational MPIs. Seth and Alkire (2014) proposed an additively decomposable inequality measure which is a positive multiple of “variance” and which can be broken down into a within-group and a between-group component. For measuring inequality among the poor at the national or subnational level, the inequality measure $I^q$ uses the vector of deprivation scores of the $q$ poor people $c_i(k)$.

$$I^q = \frac{\beta}{q} \sum_{i=1}^{q} [c_i(k) - A]^2.$$ 

The difference between each poor person’s deprivation score and average intensity is squared, and the squared distances summed and multiplied by a constant $\beta$ to create the measure of inequality. The deprivation scores of the poor range between $1/3$ and $1$, and so we set $\beta = 1/9$. This is the maximum possible value the inequality measure can take given the range of deprivation scores and thus ensures that the inequality measure is bounded between zero and one. In the 2015/16 MPI estimations, inequality among the poor at the national level varies from 0.006 to 0.300, and inequality among the poor at the subnational level varies from 0 to 0.351.

A lower level of inequality among the poor or a reduction in the level of inequality among the poor, however, may not mean that poverty has uniformly gone down in all regions or population subgroups. For further details of the measure and how it is applied, see Seth and Alkire (2014).

4. Considerations by country

This section comments on methodological issues in the 5 country datasets updated in December 2015.

**Bangladesh** (MICS 2012-13): Nutritional information was collected for every child under 5, children with the presence of oedema were considered as being underweight for MPI and destitution purposes. Child mortality information is provided by ever-married women aged 15 to 49. Page 49 of the MICS report does not consider ‘no food cooked’ and ‘other’ responses to types of fuel to be solid fuel, and this MPI estimation follows that categorization for cooking fuel. Table WS.5 on page 60 establishes that ‘no facility/bush/field’ is neither improved nor unimproved toilet, but the MPI considers no facility/bush/field as deprived. Table WS1 on page 54 states ‘missing’ source of water as unimproved but it has been considered as missing information for the MPI. The same table states that ‘spring and other’ sources of non-drinking water are non-improved when drinking water is bottled, and so likewise it is considered as deprived for the purpose of MPI. Survey estimates are disaggregated by rural and urban areas and 64 zilas or districts. This MPI was first published in December 2015.

**Cambodia** (DHS 2014): The DHS report establishes that 2/3 of the households were eligible to gather children’s and 15-49-year-old women’s anthropometric measures, which also follows the haemoglobin subsample (p. 7-8). Following guidelines from the Methodological Note 2013 (Alkire, Conconi and Roche 2013), the MPI estimation is based on this subsample. Child mortality information was provided by all eligible women and 1/3 of the men aged 15-49. Table 6.2 on p. 19 considers sources of water in both wet and dry seasons, and establishes that 70% of households use the same source of water in both seasons. This MPI calculation considers the sources of water during dry season only. The same table also considers ‘other’ sources as non-improved, and so does this MPI estimation. The report does not consider ‘no food cooked at home’ as solid fuel (p. 22), and so does this MPI calculation. The DHS report considers toilets that ‘flush to somewhere else’ and ‘flush don’t know where’ as non-improved toilet (p. 20), and so does this estimation of
MPI; missing information of toilet is considered as non-improved toilet in the report, but missing information is considered as missing for the purpose of MPI. Floating house was considered as having improved flooring. Survey estimates are disaggregated by rural and urban areas and 19 domains (subnational areas). This MPI was first published in December 2015.

**Ghana** (DHS 2014): Anthropometric measures were gathered among 50% of eligible women aged 15 to 49 years old, their children aged zero to five, and men aged 15-59 (p. 5). Following guidelines from the Methodological Note 2013 (Alkire, Conconi and Roche 2013), the MPI estimation is based on this subsample. Moreover, the report considers ‘no food cooked in household’ as improved fuel (p. 15) and this estimation of MPI considers the latter category as improved. This MPI calculation considers ‘flush somewhere else’ and ‘flush do not know where’ as non-improved toilet following the report (p. 14) and ‘other’ type of toilets are also considered as non-improved. Table 2.1, footnote 1 on p. 13 mentions that 2014 Ghana DHS did not collect information on the secondary source of water, and the quality of bottled/sachet water is not known, but they consider this source of water as improved to ensure consistency with 2008 GDHS. ‘Other’ sources of water are considered as non-improved in this MPI calculation. Section 2.8.2 on p. 28 establishes the primary school age at 6 to 11 years old. Survey estimates are disaggregated by rural and urban areas and 10 administrative regions. This MPI was first published in December 2015.

**Malawi** (MICS 2013-14): Anthropometric information was collected for all children under 5. Child mortality information was collected from all women 15-49 years old and 1/3 of men in the same age group. Definitions of non-improved toilet and source of drinking water followed the report. Page 166 of the report establishes 6 as the age to start primary education. ‘No food cooked in household’ is considered as an improved source of cooking fuel according to the report and this approach was followed in this estimation. Survey estimates are disaggregated by rural and urban areas and 27 districts. This MPI was first published in 2015.

**Yemen** (DHS 2013): Table 5.4 on p. 45 establishes that information on child mortality was not gathered from never-married women who are assumed to have 0 events of child mortality. This calculation of MPI assumes the same premise. The definition of deprivation in source of drinking water coincides with the non-improved categories reported in table 2.1, where the category of ‘container’ is included among the non-improved ‘other’ water sources and in page 9 of the report. Section 2.8 of the report establishes that the fundamental level of education lasts for 9 years. We use UNESCO reported starting school age which is 6 years old. Anthropometric information was gathered among all eligible women and their children. The report warns that the proportion of children with complete anthropometric data was only 87% and that the interpretation of results for Hadramout, Shabwah, and Sadah may be biased due to missing values. However, given the fact that the nutrition indicator is aggregated at household level and is formed by both child and adult malnutrition, the missing information on child nutrition in the household may be complemented by other household members’ nutrition information: if we have data and observe a deprivation in one household member, then the data are not missing. In this case, the nutrition indicator was considered of good quality as taking all household members together it has only 1.32% of missing values at national level and less than 10% of missing values at any given region. MPI estimates are disaggregated by rural and urban areas and by 21 governorates. This MPI was first published in December 2015.
Cited References


OPHI's Global MPI Data Bank  
www.ophi.org.uk/multidimensional-poverty-index/

OPHI's Global MPI Databank contains a wealth of resources on multidimensional poverty in more than 100 developing countries, enabling users to see how poverty is experienced in different parts of the world, zoom in on sub-national regions, or explore the character of poverty by different indicators. Follow the links below to find out more.

- **MPI Country Briefings**: Short, country-specific summaries on the results of the MPI analyses. A number of the briefings include data at the sub-national level.

- **MPI Interactive Databank**: An interactive databank that enables you to navigate the world according to the MPI as a whole or by individual dimensions and indicators of MPI poverty. You can zoom in on individual countries, and choose whether you want to see how multidimensional poverty has changed over time.


- **MPI Data Tables - Main MPI Results**: A table which presents the basic MPI results and sorts 101 countries from low to high.

- **MPI Data Tables – MPI at the Sub-national Level**: This table reports the MPI, its two components - the Headcount Ratio and the Intensity of Deprivation among the poor - and other indicators of multidimensional poverty for nearly 990 regions of 78 countries.

- **MPI Data Tables – rural-urban areas**: This table gives a breakdown of MPI results by rural and urban areas for 101 countries.

- **MPI Methodology**: OPHI’s MPI methodological notes explain how the global MPI is calculated and shares the updates that have taken place since it was first reported in 2010.

- **MPI Resources**: MPI publications collected in one place, including working papers and exchanges, and training material for producing a global or national MPI.

- **MPI Background**: A brief history of the MPI, including how it came to be developed for publication in UNDP’s Human Development Report, and how it is being used now.

- **MPI Case Studies**: Stories of people who are poor according to the MPI in their country: their hopes, strengths and challenges.

- **Making your own MPI**: Adaptations of the global MPI for other purposes, such as national poverty measurement, targeting, child poverty measurement and empowerment.

- **Online training portal**: Resources on multidimensional measurement techniques, including video and audio files, lecture slides, exercises and reading lists.

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