



OPHI WORKING PAPER NO. 121

The New Global MPI 2018: Aligning with the Sustainable Development Goals

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September 2018

Abstract

Early in 2018, the United Nations Development Program's Human Development Report Office (HDRO) and the Oxford Poverty and Human Development Initiative (OPHI) agreed to adjust and unify their methodologies on poverty measurement and consider indicator improvements, in order to better monitor the Sustainable Development Goals (SDGs). This paper sets out the specifications of a joint global Multidimensional Poverty Index first published in 2018, which is an internationally comparable measure of acute poverty that captures the multiple deprivations poor people experience with respect to health, education and living standards. It builds on the original MPI launched in 2010, and an innovative MPI launched in 2014. The best features of both of these are subsumed in the joint global MPI 2018, which also reflects new data possibilities to better align the global MPI to the Sustainable Development Goals. Because the objective of revising the MPI to create a more credible and legitimate measure of multidimensional poverty that enables comparisons across countries using existing data was challenging to realize, the paper first sets out five key principles for a global poverty measure related to data coverage, communicability, comparability, disaggregation, and robustness. Drawing on expert interventions, a global consultation, empirical trials, and these principles, the paper then explains conceptually the motivation and nature of adjustments that were made to five of the ten included indicators. It also recognizes desirable changes that could not be made due to data constraints – for example including data on the environment, work, and security, or on intrahousehold inequalities. And it identifies key issues for future research related to household composition and the use of land and livestock variables.

Keywords: Global Multidimensional Poverty Index (MPI), UNDP, human development, capability poverty, SDGs, leave no one behind.

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This study has been prepared within the OPHI theme on multidimensional measurement.

JEL classification: D63, F01, H87, I10, I20, I30, I32, O1, O19, O21, Q01

Acknowledgements

This paper stands on the shoulders of many interactions since 2010. A first occasion to discuss MPI revisions was the workshop on Measuring Human Development organized jointly by the HDRO and the German Corporation for International Cooperation, which took place 14 June 2013 in Eschborn, Germany. The Second Conference on Measuring Human Progress was organized by the HDRO and took place 4–5 March 2013 in New York. Many other expert engagements and interchanges are warmly acknowledged in accompanying papers.

Funding information

We are grateful for the financial support from the Swedish International Development Co-operation Agency (Sida) and the UK Department for International Development (DFID).

Citation: Alkire, S. and Jahan, S. (2018). ‘The New Global MPI 2018: aligning with the Sustainable Development Goals’, OPHI Working Paper 121, University of Oxford.

This paper is also cross-posted as Alkire, S. and Jahan, S. (2018). ‘The New Global MPI 2018: aligning with the Sustainable Development Goals’, HDRO Occasional Paper, UNDP.

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Introduction

Poverty measures compare people in a society in order to assess the extent of unacceptable disadvantages that exist. Yet any poverty measure is itself imperfect. Imperfections stem primarily from two factors: data limitations and the diversity of human lives being assessed. Internationally comparable measures face a greater challenge on both counts: the pool of comparable data is narrower, and the diversity of lives and contexts being compared is greater. Thus, the construction of internationally comparable poverty measures is an intricate rather than an easy task.

This paper presents the revisions of the global Multidimensional Poverty Index (MPI) in 2018. This MPI measures acute multidimensional deprivations in over 100 countries, covering well over 90 percent of the population in lower- and middle-income countries and over 75 percent of the population of the earth. It was co-designed and launched in 2010 by the United Nations Development Programme (UNDP) Human Development Report Office (HDRO) and the Oxford Poverty and Human Development Initiative (OPHI) at University of Oxford, and it was first published in 2010 as part of the Twentieth Anniversary of the *Human Development Report* (HDR). The original MPI (henceforth MPI-O) aligned, insofar as was then possible, with indicators used to track the Millennium Development Goals (MDGs). It has been published in every *Human Development Report* (HDR) subsequently, with adjustments that have been documented in the methodological reports.¹ In 2014 an innovative MPI (henceforth MPI-I) was also developed and published in parallel, in order to explore how to improve the MPI (Kovacevic and Calderon 2014). The present revision draws upon and subsumes the best of both previous MPIs.

The advent of the Sustainable Development Goals (SDGs) in 2015, along with improvements in some survey questions to better reflect SDG indicators, provided an occasion to realign the global MPI and publish a more defined jointly revised global MPI in 2018 (UN 2015, Kovacevic 2015). The improvements in the global MPI coincide with the start of the Third Decade on Poverty Reduction (2018–2027). They build upon, insofar as data permit, the recommendations of the World Bank’s Atkinson Commission on Monitoring Global Poverty (World Bank 2017) that are concerned with non-monetary poverty measures. They reflect inputs from a consultative process encompassing academics, UN agencies, national statistics offices, and civil society organizations. The empirical global MPI results to be launched in September 2018 reflect new estimations from every single dataset, following a consistent computational strategy.

¹ The MPI stands on the shoulders of the preceding Human Poverty Index (Anand and Sen 1997; cf Sen 2000, 2016) and seeks to advance the same conceptual framework. For the methodological reports of the MPI, see Alkire and Santos (2014) and the Methodological Notes for 2011–Winter Updates 2017/2018, available at <https://ophi.org.uk/multidimensional-poverty-index/global-mpi-2017/multi-methodology/>. For UNDP’s 2014–2017 MPI methodology, see Kovacevic and Calderon (2014).

Despite the enormous effort involved in conceptually identifying indicator weaknesses and improvements, and then canvassing every single survey to identify potential new indicators with broad comparability and country coverage, and finally, empirically, implementing and analysing 23 possible trial MPI specifications, the agreed changes are much less far-reaching than anticipated. In particular, rather to our surprise, the global MPI still contains the same number of indicators (10) organized into three dimensions, with the same dimensional and weighting structure. This result was not fully anticipated because we, alongside others, would have wished to include dimensions of work, of safety from violence, or of empowerment in the global MPI; we, as well as others, would have also hoped for further improvements to indicators in component dimensions, for example, covering quality of education or other health outcomes or land and livestock. This paper documents what was possible and what was not (and why) as well as how to move forward.

Having scrutinized existing data extensively, this paper also pauses, in the context of some interest in a ‘data revolution’, to re-state definitively the need for serious and ongoing investment in surveys such as the Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS) and similar multi-topic national surveys, which provide regular high-quality data that can be disaggregated. A ‘data revolution’ that neglects to strengthen core data sources on vital, overlapping and interconnected aspects of poverty can only be described as incomplete.

1. Origins and History of the MPI

In 2010 the MPI was introduced into the HDRs. As the 2011 HDR explained, “The MPI measures serious deficits in health, education and living standards, looking at both the number of deprived people and the intensity of their deprivations” (p. 5). A lead story of the 2010 launch (that there are more poor people in the eight poorest states of India than in the 26 poorest countries of Sub-Saharan Africa) carried internationally. The original MPI, similar to Sumner et al., independently found that 72 percent of the MPI poor lived in middle-income countries. It drew attention, in the 2011 HDR, to the environmental pressures from poor water and sanitation. And by 2014, a study covering 2.5 billion people over time found many instances of statistically significant and strong reduction in MPI, the fastest of which were in Nepal and Rwanda.²

The data tables on MPI from HDRO carried the level, incidence (H) and intensity (A) of MPI; results of two alternative poverty cutoffs: Vulnerability (20 percent) and Severity (50 percent); and the contribution

² Detailed analyses are found in Alkire, Roche and Vaz (2017), and, for Sub-Saharan Africa, in Alkire, Jindra, Robles and Vaz (2017).

of each of the three dimensions to the MPI. The data tables on MPI published by OPHI included the above information plus all indicator-level detail using three poverty cutoffs, as well as disaggregation (rural-urban, subnational and age), strictly harmonized MPI data over time, all MPIs ever published and technical information (e.g. standard errors and sample sizes). Methodological reports itemized the treatment of each dataset.

The 2014 and 2015 HDRs both contained MPIs obtained by the original and innovative methodology. The MPI-I modified five indicators: nutrition, child mortality, years of schooling and assets; it also treated households without children and women of child-bearing age (15-49) differently. In particular, height-for-age (stunting) replaced weight-for-age (undernutrition) for children under five years of age, as stunting was becoming the favored indicator of child nutrition. A child death was included as a health deprivation only if it happened in the five years prior to the survey (when this information was included) or if the mother was under 35 years of age, if the date of death was not available. In education, a household was considered deprived if no one had completed six rather than five years of schooling. Six years reflected the standard definition of primary schooling and was used in international measures of functional literacy. The I-MPI used an expanded list of assets including access to arable land (rented or owned), livestock, animal cart or motor boat to better reflect rural as well as urban assets deprivation. Households for which indicators on health are not available (in many surveys because they were without children and women of child-bearing age (15-49) were dropped from the MPI-I estimation and the sampling weights of its members were added to sampling weights of members in other households with the same characteristics regarding sex, age, and place (urban/rural).

Both indices were published in parallel. Empirically, the results matched closely, but it was a useful exercise to explore different specifications. However publishing two MPIs created confusions in the development community. The present revision of the global MPI builds on and subsumes the best of both preceding MPIs, as well as the knowledge and understanding that emerged from the dialogue between them. It also sketches issues such as missing data and the data limitations when analyzing poverty among older persons, as well as articulates some research questions.

A word on nomenclature may be pertinent. When it was launched in 2010, the MPI was the first prominent implementation of the adjusted headcount ratio (Alkire and Foster 2011). Since 2010, many governments now use national MPIs as permanent official poverty statistics that complement monetary poverty statistics. Because the underlying Alkire-Foster methodology is flexible, and because national contexts and policy priorities differ, the dimensions and indicators used in national MPIs are tailored to each country. Naturally, this means that national MPIs are not comparable. So to clarify how these national MPIs (many of which are also supported by UNDP) related to the MPI published by UNDP and OPHI, the latter

came to be called a ‘global’ MPI. Strictly speaking, it is not ‘global’ in that it does not cover all countries in the world; it focuses on developing regions. However the motivation has always been to offer a direct measure of poverty that can be compared across countries insofar as data permit and for which any non-comparability is clearly documented.³ Just as the US\$1.90/day monetary poverty measure tracks global income poverty with a primary focus on low- and middle-income countries (even though now it is estimated well beyond these, for European countries for example), so the MPI was designed to reflect acute multidimensional poverty in these countries.⁴ The term ‘global’ therefore has the spirit of showing that it is a measure that covers most of the countries where a measure of poverty defined in this acute way is salient (as well as some countries where acute multidimensional poverty is vanishingly small).

2. Principles of indicator selection

The objective of creating a credible and legitimate measure of multidimensional poverty that added value to the new generation of national MPIs by enabling comparisons across countries, in a transparent way, while making the best use of existing data, was challenging to realize. It proved helpful to establish a set of core principles to guide the process of revising the indicators and specifications of the 2018 global MPI.⁵ In particular, the following principles governed the present revision:

1. **Coverage:** Indicators are to be present for at least 75 countries and 3.5 billion people.
2. The global MPI must be **compelling**. It must be intuitive and easy to understand.
3. The global MPI seeks **comparability** across countries by
 - A. Minimizing the inclusion of indicators with different meanings across countries.
 - B. Justifying and making clear existing non-comparabilities.
4. **Disaggregation** by subnational regions and ages is to be preserved insofar as possible.
5. MPI comparisons are to be **robust** to a range of weights and poverty cutoffs.

³ The Methodological Notes on OPHI’s website, which were published on the occasion of each global MPI update, document any country-specific treatment of data (see <https://ophi.org.uk/multidimensional-poverty-index/global-mpi-2017/mpi-methodology/>).

⁴ An MPI for Europe was implemented using EU-SILC data as part of the Net-SILC3 project (Alkire and Apablaza 2016), but it is not possible to replicate all of the health, education or living standards indicators of the global MPI using this dataset, hence at present the global MPI cannot be seamlessly extended to high-income countries, even if there were interest in doing so. In practice, it would seem more relevant for a legitimate process of open coordination to design an indicator of moderate poverty that might be used where it was deemed relevant.

⁵ Atkinson and Marlier (2010) very helpfully articulate principles that were adapted to this context.

Naturally, specifying principles does not settle all decisions. Principles conflict and there is no umpire. An example is that the child mortality indicator in the revised MPI is now restricted, where data permit, to deaths that occurred in the last five years prior to the survey. This makes the MPI arguably more compelling because it does not include a tragic death that occurred 15 years ago in a previous policy era. However, because the date of a child's death is not included in 14 countries' datasets and thus all child mortality is included for these 14 countries, this change reduces the comparability of the final measure, and comparability is also a priority. Yet this change fulfills the first criteria, in that data on the date of a child's death is present for more than 75 percent of countries and 3.5 billion people.

Another example is the exclusion of land and livestock variables. Their inclusion would clearly make the MPI more compelling, as it would better reflect the productive assets of many rural dwellers. However due to data limitations across countries and strong conceptual concerns it has proven impossible to establish a common deprivation standard other than counting a person as non-deprived if they owned 'any' land or 'any' livestock. For example, data on farm productions and inputs under various farming systems, such as the value of food production per hectare or the ratio of irrigated land, are missing in most DHS, MICS and national surveys, as are sale prices of farm animals (or the quantity of farm animals sold and/or consumed). Additionally, land fertility varies quite dramatically at the regional and global level (FAO 2018), which makes it impossible to set a globally comparative minimum land size cutoff. Even if a minimum land size cutoff was identified (and used in trial measures) or farm animals were counted in 'livestock units' (which is internationally the most widely used livestock conversion unit, see FAO 2011), one had to code missing values (which were extensive, reaching 69 percent of the sample in India in self-reported land size for example) as either deprived or non-deprived to avoid large drops in data that would have led to biased estimates. Missing data on livestock was also considerable in many countries, including Bangladesh, Colombia, India and the Philippines. This treatment required many assumptions and introduced yet another layer of incomparability, which affected results but was not transparent, being difficult to interpret or explain. So it was decided reluctantly that the inclusion of land and livestock must await improvements in data.

In the case of such hard choices, trial measures employing different possible indicator definitions were implemented and analyzed fully in order that the normative assessment could be supplemented by information on how using each indicator empirically affected the number and ranking of countries. Alkire and Kanagaratnam 2018 present the extensive empirical assessments that were undertaken to inform the global MPI indicator revisions.

3. Relevant Advances

The revision of the global MPI drew on conceptual and measurement advances that have occurred since 2010. It also revisited earlier objectives, which could not be realized in the initial global MPI specifications due to data constraints, to see whether such constraints had been relaxed in the intervening years.

A. New dimensions

Drawing on participatory work, the human development framework, Amartya Sen's capability approach and other areas of international consensus, it is evident that multiple dimensions are relevant to poverty measures. In 2010 we wrote, "The potential dimensions that a measure of poverty might reflect are quite broad and include health, education, standard of living, empowerment, work, environment, safety from violence, social relationships, and culture among others" (Alkire and Santos 2014). These dimensions remain relevant. In practice, for example, countries are using many of these dimensions in their national MPIs (Zavaleta 2017). Empirical options more recently have benefited from advances in data-linking techniques, the growth of satellite and big data, improvements in survey questions and so on. Yet it was interesting to discover that despite these advances at the national level, in 2018, as in 2010, data constraints proved to be decisive. The key new areas that were vigorously pursued but then reluctantly dismissed due to missing data included environmental issues, work and employment, and security.

B. Leaving no one behind

The SDGs provided the opportunity to restate the value-added of the MPI. In particular, the SDG emphasis on 'leaving no one behind', which was originally proposed by the High-Level Panel of Eminent persons on the post-2015 Development Agenda, emphasizes the need to consider and track the trajectories of the poorest. The formal construction of the MPI itself accords with the SDG focus on 'leaving no one behind'. According to the axiom of dimensional monotonicity, if the same percentage of people are poor in two periods, but in one, one person becomes deprived in more indicators at the same time, MPI rises. Similarly, if any deprivation of any poor person is reduced, MPI goes down, even if that person remains poor. This makes the MPI useful to monitor the concept of 'leaving no one behind'. As the 2011 HDR put it, "Capturing reductions in both the incidence and intensity of poverty is one of the MPI's key strengths, creating useful incentives to reduce both the number of people in poverty and the number of deprivations that they jointly face. The index thus overcomes a well-known problem associated with traditional ('headcount only') poverty measures that can lead to a focus on moving people from just below to just above the poverty line, thus leaving the poorest behind" (p 50).

C. Households without children

There has been a longstanding concern for older adults, whose deprivations are not particularly well captured in the DHS and MICS datasets. In particular, the information on nutrition and on child mortality is only captured from women aged 15 to 49 and, in some surveys, from men up to the age of 59. But for persons 60 and above, the data available would only include completed years or levels of schooling plus household-level data on services and standards of living. Thus if a household only has persons aged 60 and above, it might be that its deprivation profile of necessity lacked health indicators and school attendance. There was therefore considerable concern that the global MPI could be underreporting deprivations of older populations, hence the MPI-I dropped those households and adjusted the sampling weights of members of other households with similar characteristics.

To assess the magnitude of the MPI's difficulty in capturing deprivations of older persons, a comparison was made with the age decompositions of the global \$1.90/day poverty measure, which were first performed in October 2016 by the World Bank with UNICEF (Newhouse et al. 2016). Of the population covered, the \$1.90 study found that 50 percent of poor people are children and 20 percent of children are monetary poor. Fully 44 percent of the population were adults aged 18 to 59 and 9.5 percent of them are \$1.90/day poor. Finally, 6 percent of the population are aged 60 and above, and 7.0 percent of them are poor. The \$1.90/day measure thus arguably shows that there are low monetary poverty rates among the higher age brackets, roughly one third the level of \$1.90/day poverty for the entire population.

To probe this issue empirically for the global MPI-O, we applied an age disaggregation using these same categories and the global MPI 2017, which had been age disaggregated by children in 2017. The age disaggregation revealed that among children under 18, 38 percent are poor, whereas 21 percent of adults aged 18 to 59 are poor and 20 percent of persons aged 60 and above are poor. This finding suggests that persons aged 60 and above are not dramatically less poor than adults aged 18 to 59. And in both cases, disparities across age groups are less than for monetary measures. So while undoubtedly data on aging populations should be improved, for that reason, the global MPI 2018 is based directly on information coming from all households with constant indicator weights, and no replacements are made.

4. Global MPI 2018: Data and Structure

A. Data

In 2018, the global MPI relies on DHS for 51 countries, MICS for 43 countries, two combined DHS-MICS surveys, three PAPFAM surveys, plus national surveys for Brazil, China, Ecuador, Jamaica, Mexico and South Africa. The 2018 tables cover datasets that have been gathered from 2006 to 2016.⁶ Ninety-five of the datasets date are from 2010 to 2016, and 56 date from 2014 to 2016, making the global MPI data as up-to-date as is feasible. All of the publicly available DHS and MICS datasets in this period have been analyzed as of August 2018. The population covered by these tables represents 5.73 billion people, aggregated using 2016 population figures. It cannot be overstressed that the global MPI relies on high quality well documented data, much of which can be disaggregated, that is freely available in the public domain. The tremendous leadership role of the DHS and MICS teams in particular in data collection must be recognized as a pivotal public good, which is essential to rigorous poverty measurement, and without which the present work could not be accomplished.

B. Dimensions, indicators, weights and cutoffs

The global MPI 2018 uses the same functional form as in previous years (the adjusted headcount ratio) (Alkire and Foster 2011), which is the percentage of people who are multidimensionally poor adjusted by the average share of deprivations among the poor (intensity). Five of the 10 indicators are modified from the original MPI: nutrition, child mortality, years of schooling, housing and asset ownership. As summarized in table 1, the MPI uses information from 10 indicators that are categorized in three dimensions: health, education and living standards, and which identify each person as deprived depending upon the joint achievements of household members.

The global MPI uses the cross-dimensional poverty cutoff of one-third, identifying each person as poor if their weighted deprivations sum to one-third or more. Two other poverty cutoffs are also used: severe poverty (the percentage of people deprived in at least half of the weighted indicators) and vulnerability (the proportion of people deprived in 20 to 33 percent of weighted indicators). These are all unchanged from previous years.

The subsequent sections explain each of the indicators. In the case of the five indicators that changed, the changes are explained and justified.

⁶ Two datasets (Burundi and Nigeria) contain data from 2016 to 17.

Table 1: The dimensions, indicators, deprivation cutoffs, and weights of the new global MPI

Dimensions of poverty	Indicator	Deprived if...	Weight
Health	Nutrition	Any adult under 70 years of age or any child for whom there is nutritional information is undernourished.*	1/6
	Child mortality	Any child has died in the family in the five-year period preceding the survey. ⁷	1/6
Education	Years of schooling	No household member aged 10 years or older has completed <u>six</u> years of schooling.	1/6
	School attendance	Any school-aged child ⁺ is not attending school up to the age at which he/she would complete class 8.	1/6
Living standards	Cooking fuel	The household cooks with dung, wood, charcoal or coal.	1/18
	Sanitation	The household's sanitation facility is not improved (according to SDG guidelines) or it is improved but shared with other households.**	1/18
	Drinking water	The household does not have access to improved drinking water (according to SDG guidelines) or safe drinking water is at least a 30-minute walk from home, round trip.***	1/18
	Electricity	The household has no electricity.	1/18
	Housing	At least one of the three housing materials for roof, walls and floor are inadequate: the floor is of natural materials and/or the roof and/or walls are of natural or rudimentary materials.****	1/18
	Assets	The household does not own more than one of these assets: radio, TV, telephone, computer, animal cart, bicycle, motorbike or refrigerator, and does not own a car or truck.	1/18

Notes

⁺ Data source for age children start school: United Nations Educational, Scientific and Cultural Organization, Institute for Statistics database, table 1. Education systems [UIS, <http://stats.uis.unesco.org/unesco/TableViewer/tableView.aspx?ReportId=163>].

* Adults 20 to 70 years are considered malnourished if their Body Mass Index (BMI) is below 18.5 m/kg². Those 5 to 20 years of age are identified as malnourished if their [age-specific BMI cutoffs](#) are below minus two standard deviations. Children under 5 years are considered malnourished if their z-score for either height-for-age (stunting) or weight-for-age (underweight) is below minus two standard deviations from the median of the reference population. In the majority of the countries, BMI-for-age covered people aged 15 to 19 years, as anthropometric data was only available for this age group; if other data were available, BMI-for-age was applied for all individuals above 5 years and under 20 years.

** 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.

*** 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 minutes' walk (round trip). If survey report uses other definitions of 'safe' drinking water, we follow the survey report.

**** Deprived if floor is made of mud/clay/earth, sand or dung; or if dwelling has no roof or walls or if either the roof or walls are constructed using natural materials such as cane, palm/trunks, sod/mud, dirt, grass/reeds, thatch, bamboo, sticks or rudimentary materials such as carton, plastic/ polythene sheeting, bamboo with mud/stone with mud, loosely packed stones, uncovered adobe, raw/reused wood, plywood, cardboard, unburnt brick or canvas/tent.

⁷ All reported deaths are used if the date of child's death is not known.

We begin with the two health indicators, which were the two most difficult indicators to revise.

C. Nutrition

In the nutrition variable, all of the anthropometric data that is available for household members is used. In the MICS questionnaires, this ordinarily covers only children under five years of age. In DHS, this usually covers children 0 to 5 years plus women 15 to 49 years. Male malnutrition data is present in some DHS and national surveys, either for the full sample or more commonly for a subsample of men aged 15 to 59. Certain surveys depart from this: in particular, China CFHS 2014 and Egypt DHS 2014 have data for all ages.

In the global MPI 2018, adults above 20 years of age are considered undernourished if their BMI is below 18.5 m/kg². For individuals aged 15 to 19 [age- and gender-specific BMI cutoffs](#) from the World Health Organization are now applied. This change was universally supported by the global consultation and aligns the MPI with best practices. The change lowers the level of malnutrition among people aged 15 to 19, because lower BMI standards are used.

Children aged 0 to 5 are considered malnourished 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. This is in contrast with the MPI-O, which used underweight, and the MPI-I, which used stunting for children. While many children experience both, the match between the two indicators is not perfect. As the global consultation showed, the expert community prefers stunting as an indicator of child malnutrition. Country statistical offices tend to prefer underweight because stunting is, after the first 1000 days, more stock indicator, showing changes more slowly.⁸ In some contexts the height-for-age standards were also questioned, but these are clearly supported in the SDGs.

D. Child mortality

In the global MPI 2018, a household is deprived if it is known that the household suffered the loss of a child within the last five years. This indicator change (to consider deaths *only* from the last five years) impacted the global MPI estimations, bringing them lower than their earlier levels. The current indicator is a lower-bound estimation of child mortality, both because of data quality issues and because it does not reflect the death of any child in that household whose mother was not interviewed or whose mother was not alive, or not living in that household. Yet it has the advantage of better reflecting recent mortality conditions and capturing policy successes in reducing them.

⁸ Prendergast and Humphrey (2014) unusually find some evidence of recovery from stunting for older children using the Young Lives dataset; most studies e.g. Leroy et al (2014) suggest that recovery is very rare and indeed that the linear growth deficit continues to accumulate beyond the first 1000 days. See also Development Initiatives 2017.

The MPI-O considered child mortality in any period, primarily because only a few MICS surveys at that time included the date of the child death, and we prioritized comparability. The MPI-I switched to consider child mortality in the last five years if the date of death was known. The global MPI 2018 follows this procedure with only a minor difference.⁹ If the date of death was not known, the MPI-I included child deaths reported by women under the age of 35 but coded all child deaths reported by women 35 years and older as non-deprivations. This treatment was not used in the global MPI 2018 because, after consulting the micro data of DHS countries, the assumption of nearly all mortality in the last five years accruing to women under 35 was not validated. For example, in India, according to the 2015/16 DHS survey, 28 percent of child deaths in the last five years were reported by women aged 35 and above. So instead, for those 14 countries where the date of a child's death is not listed, all deaths were considered for the global MPI 2018.¹⁰

E. Years of schooling

In the global MPI 2018, a person is deprived in years of schooling if no household member aged 10 years or older has completed six years of schooling. This indicator changes the number of years of schooling from five to six years and in doing so follows the MPI-I.

The cutoff of five years of schooling was chosen in 2010 because of the following considerations: First, the choice of five years followed UNESCO's global estimations, which, when aggregating across primary schools of differing lengths, consider primary school children as aged 6 to 11, implying five years of schooling. Second, a number of countries had compulsory schooling that was less than six years at that time or was less than six years when persons who are now adults were attending school, so for these countries the global MPI required all adults to have *more than* primary schooling.

In 2018 we changed the indicator cutoff to six years mainly because primary-level schooling has a duration of six years in more countries than five years, and we wish to reflect this convention in setting a higher international standard. This change was supported by the global consultation and by inputs from UNICEF.

This being said, we recognize well (and are grateful to World Bank colleagues among others for stressing this) that years of schooling are an exceedingly poor proxy for learning (World Bank 2018). The limited

⁹ In some surveys, child mortality was collected from men, but the male questionnaire does not include the date of death so was not considered in the MPI-I. But information from women was missing in up to 10 percent of households. Thus for the 2018 MPI, if the household is missing women's data on child mortality, but if the male questionnaire reports no child mortality, then that household is retained, and coded as non-deprived. If the women's birth history is missing, and the male questionnaire reports a child death, then the household is coded as missing because we do not know the date of death.

¹⁰ These 14 countries are Bhutan, Brazil, Central African Republic, Ecuador, Djibouti, Kazakhstan, Montenegro, Morocco, Syrian Arab Republic, Serbia, Thailand, Trinidad and Tobago, Uzbekistan and Vanuatu.

usefulness of using the number of years of schooling to reflect learning outcomes is now well documented, and we look forward to the day in which we can ground this indicator in learning achievements rather than inputs in terms of years in school. For now, data limitations preclude such an adjustment.

The age of 10 years is adopted mainly to establish that, if the only educated person in the household is a child, that child is likely to have the capability to harness their education to help the household by reading or otherwise using their knowledge for the public good. While indeed some children complete six years of schooling before the appointed age, either because they started early or because they skipped a year, the lower bound of 10 years also acts as a double-check in some surveys to ensure that any residual data errors are recognized and addressed.

F. School attendance

By the global MPI, a person is deprived if any child in the household is not attending school up to the age at which they should complete class eight. This indicator has not changed from the original indicator, and is in line with the mechanism by which UNESCO uses ages to calculate out-of-school children.¹¹ However a great deal of thought was put into the cutoff of eight years for the schooling indicator, as the context has changed and basic education is now widely considered to be nine rather than eight years.

SDG 4 focuses on education, and SDG Target 4.1 calls for universal primary and secondary completion whereas Target 4.2 calls for universal pre-primary education. So one clear aim for a revised global MPI was to include school attendance from pre-primary to lower secondary for all countries. This might have entailed extending this indicator from eight to nine years. For example, the 2015 Incheon Declaration and Framework for Action states “we will ensure the provision of 12 years of free, publicly funded, equitable quality primary and secondary education, of which at least nine years are compulsory.”¹²

The reason we retained eight years is that in practice, there are ten countries, home to 1.9 billion people, for which the combination of primary and lower secondary school (International Standard Classification of Education [ISCED] 1 and 2) is eight years long.¹³ If we were to apply the nine-year cutoff, we would systematically identify as deprived children that, according to national standards, have completed primary

¹¹ See: <http://uis.unesco.org>.

¹² The footnote to that statement reads: “The first nine years of formal education, i.e. the cumulative duration of ISCED 1 and 2: ISCED 1 is the primary level, typically lasting six years (with variation across countries between four and seven years), and ISCED 2 is lower secondary, typically lasting three years (again, with variation)” (UIS 2012).

¹³ <http://data.uis.unesco.org/?ReportId=163> In Bangladesh, Plurinational State of Bolivia, Democratic Republic of the Congo, India, Kenya, Nepal, Pakistan, Serbia, Somalia and South Sudan the combined years of primary and lower secondary schooling totals eight years.

and lower secondary school. To avoid this, we retain the cutoff of eight years of schooling for children until 75 percent of the population of covered countries has nine years of schooling as the duration through lower secondary school.

G. Housing

The MPI-O identified a household as deprived if their flooring material was dirt, sand or natural. This was because in 2010, roof and wall information was not available for a sufficient number of households. In contrast, at present 92 country surveys covering some 4 billion population have the combined information on the construction material used for wall, roof and floor. The revised global MPI proposes to consider all three components of the dwelling, hence improving the flooring indicator to an adequate housing materials indicator.

The materials used for construction of housing units (roof, walls and floors) are a significant input into the quality of life. Householders living in poor-quality or slum-like housing facilities are more likely to experience poorer health, and less favorable education and employment outcomes. As such, the combination of wall, roof and floor into a single indicator allows for a comprehensive monitoring of the physical condition of dwellings.

No global standards in terms of materials of adequate housing have been promulgated in the SDGs or by UN-Habitat or other institutions. The global MPI 2018 follows this standard: A household is identified as deprived in wall materials if the household has no wall or if the wall is made of natural, rudimentary or other unidentified materials.¹⁴ A household is identified as deprived in roofing if the household has no roof or if the roof is made of natural, rudimentary or other unidentified materials.¹⁵ The deprivation for flooring (indicating a natural floor) remains the same as applied in the MPI-O.¹⁶ The global MPI 2018 considers a household to be deprived in housing if any of the roof, floor or walls use low-quality material.

H. Assets

The global MPI 2018 identifies a person as deprived in assets if their household does not own more than one of these items: radio, telephone, television, refrigerator, computer, bicycle, motorcycle or animal cart. And, if they own a car or truck they are not deprived in assets.

¹⁴ Deprived materials are no walls, cane/palm/trunks, mud/dirt, grass/reeds/thatch, bamboo/sticks/mud, carton/plastic, bamboo with mud, stone with mud, uncovered adobe/bamboo/wood, plywood, cardboard, unburnt brick, canvas/tent, or raw/reused wood.

¹⁵ Deprived roof materials are no roof, thatch/palm leaf, mud, sod/mud and grass mixture, plastic/polythene sheeting, rustic mat, palm/bamboo, raw wood planks/timber, unburnt bricks, loosely packed stone, or cardboard.

¹⁶ Deprived floor materials are mud/clay/earth, sand, or dung.

The asset indicator required by far the most technical work of any of the indicators to validate and defend (see Vollmer and Alkire 2018). This was because we were expecting to be able to use land and livestock as components of the asset index, and were eager to do so given the central importance these assets have to rural households. We also expected to re-group items in different categories, such as items of information, mobility and livelihood (as found in the MPI-I), or into consumer durables and productive assets. As already outlined in the “principles of indicator selection” in section III, the decision was eventually taken to exclude land and livestock variables due to data constraints and conceptual concerns. Despite the appeal of grouping assets into categories, we found only weak statistical support to categorize assets into information, mobility or livelihood, or to distinguish items based on their utility (e.g. to distinguish between durables and productive assets) or tangibility (e.g. tangible and intangible assets). Furthermore, the conceptual appeal was quite limited due to having a restricted set of assets.

Eventually, based on statistical tests, normative reasoning and extensive trial measures of possible asset indices presented in Vollmer and Alkire (2018), the revised assets indicator maintained the structure of the MPI-O, and added computer and animal cart as additional items. Computer and animal cart are both items for which data are widely available (82 and 77 countries respectively, covering almost 5 billion people).

Computer was found to be a salient item during the statistical analysis, which utilized tetrachoric exploratory factor analysis, multiple correspondence analysis, classical test theory and item response theory to identify a set of items that are suitable, valid and reliable to proxy assets deprivation globally for both urban and rural populations. Animal cart had some statistical support, does not require electricity and also responds to concerns that the MPI-O asset index had an urban bias (Dotter and Klasen 2014, pp. 19–20).

I. Sanitation, water, cooking fuel and electricity

These remaining four indicators are unchanged from the MPI-O specifications. Sanitation and Water follow the SDG indicator definitions, which themselves are consistent extensions of the MDG indicator definitions. Solid cooking fuel categories have not changed, and Electricity is defined by whether the person has access. The value-added of each indicator, and their limitations, have already been specified elsewhere (UNDP 2010; Alkire and Santos 2014, Kovacevic and Calderon 2014).

5. Concluding Remarks

This paper has presented the global MPI 2018, in which five of the indicators of the MPI-O have been revised to better align with the SDGs. It has acknowledged existing data gaps that a human development-focused poverty measure might wish to cover. And it has observed that, despite these constraints, the global MPI remains a powerful and insightful tool for illuminating poverty in all its forms and dimensions, and providing information that is critical to redressing it.

The paper also noted in passing unsolved issues and some of the many interesting questions for research¹⁷ that are particularly relevant in the context of a global MPI. First and foremost, throughout, we raised issues of data availability and the associated research agenda of identifying what would be the most powerful, internationally comparable and feasible questions for household surveys. This pertains as much to improvements in many of the current indicators and dimensions (e.g. land and livestock, household health and educational achievements) as to endeavors to add new indicators relating to work or the environment or security. Its importance cannot be overstated. There are also issues of data availability across the life cycle, including cohorts above reproductive age. A key question is whether multi-topic surveys could include these populations or whether separate surveys and poverty measures are required. Where data gaps persist, there will naturally be a hope to fill them immediately using multiple imputation methods, so research studies that use full data sets and assess the accuracy of alternative multiple imputation methods to predict joint deprivations at the level of each household would be useful.

Another fundamental research area pertains to the relationship between individuals and households. In monetary poverty measures, the equivalence scale which calibrates how much income, for example, a toddler needs not to be poor, is far from an easy topic to settle. The global MPI and many national MPIs take the household as the unit of identification, but households vary in size and composition, and their size and composition vary over time. Thus to the extent that the poverty status of a household is influenced by its composition, the level of poverty could change if household structures change, *ceteris parabis*. Furthermore, comparisons across subnational regions and countries may be influenced in part by household size and composition. These issues require research. Relatedly, many have called for individual-level poverty measures, but data do not suffice either for a child MPI or a gendered MPI in over 100 developing countries. Furthermore, finding a small strong set of indicators to compare work or reproductive health across genders and ages is challenging yet worth attempting. So research is required to propose, pilot and self-critically assess what might be ideal indicators for global, individual and age-appropriate child or adult multidimensional poverty measures.

¹⁷ Alkire (2018) sketches a more general research agenda for multidimensional poverty measurement and analysis.

The most important area to highlight is policy. Both research and public action are required in order to articulate how the global MPI might be part of a concrete set of inputs that improve the ability of policies using limited resources to move the needle on poverty in all its forms and dimensions. The SDGs are ambitious; the global MPI might offer a center of gravity or reference point for multiple actors seeking to identify and redress the situation of those being left behind in multiple SDGs, using integrated policies. Research into how the MPI might add value, as well as critical analysis of better and worse ways actors are using the global MPI information platform to shape policy, could be catalytic. George Bernard Shaw in his 1921 play *Back to Methuselah* wrote, “Some people see things that they are, and say ‘why’? We dream of things that never were and ask ‘why not’?” The aim is for the global MPI 2018, with all its constraints and imperfections, to draw attention to important “things that are not there” for over a billion people and urge us to ask, “why not?”

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