OPHI MPI METHODOLOGICAL NOTE 52

The global Multidimensional Poverty Index (MPI) 2022 country results and methodological note

Sabina Alkire*, Usha Kanagaratnam* and Nicolai Suppa*

October 2022

* The Oxford Poverty and Human Development Initiative (OPHI), Oxford Department of International Development, University of Oxford. Contact details: ophi@qeh.ox.ac.uk Tel +44 1865 271915.

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

Attribution

The country (national) estimates are jointly produced by OPHI and HDRO using 111 survey datasets. The joint country results are published in Table 1 of the UNDP-OPHI Global Multidimensional Poverty Index 2022 report, *Unpacking Deprivation Bundles to reduce Multidimensional Poverty*. Standard errors of the country estimates, which are produced by Alkire, S., Kanagaratnam, U., and Suppa, N. (2022), are made available in OPHI's Data Table 1.

Suggested citation of this methodological note

Alkire, S., Kanagaratnam, U., and Suppa, N. (2022). 'The global Multidimensional Poverty Index (MPI) 2022 country results and methodological note', OPHI MPI Methodological Note 52, Oxford Poverty and Human Development Initiative (OPHI), University of Oxford.

Contents

1. Overview

This Methodological Note presents the methodology and technical decisions behind the **country** (national) results of the global Multidimensional Poverty Index (MPI) 2022. The 2022 MPI **country** results are based on the most recent data from 111 countries, covering 6.1 billion people.

This document is structured as follows. Section 2 presents the global MPI structure and indicator definitions. Section 3 provides an outline of the global MPI and its partial indices that we estimate and publish. Section 4 outlines the data management policies of the global MPI. Section 5 provides a summary of survey details. Section 6 summarises the country-specific technical decisions that were applied for each of the new or updated surveys. We conclude with brief closing reflections.

2. The global MPI structure[1]

The global MPI is a measure of acute poverty covering over 100 countries in the developing regions of the world. This measure is based on the dual-cutoff counting approach to poverty developed by Alkire and Foster ([2011](#)). The global MPI was developed in 2010 by Alkire and Santos ([2014](#), [2010](#)) in collaboration with the UNDP's Human Development Report Office (HDRO). Since its inception, the global MPI has used information from 10 indicators, which are grouped into three equally weighted dimensions: health, education, and living standards (Figure 1). These dimensions are the same as those used in the UNDP's Human Development Index.

In 2018, the first major revision of the global MPI was undertaken, in order to take into account improvements in survey microdata and better align to the 2030 development agenda insofar as possible (Alkire and Jahan, 2018). The revision consisted of adjustments in the definition of five out of the ten indicators, namely child mortality, nutrition, years of schooling, housing and assets. Alkire, Kanagaratnam, Nogales and Suppa ([2022a](#)) provide a comprehensive analyses of the consequences of the 2018 revision. The normative and empirical decisions that underlie the revision of the global MPI, and adjustments related to the child mortality, nutrition, years of schooling and housing indicators are discussed in Alkire and Kanagaratnam ([2021](#)). The revision of assets indicator is detailed in Vollmer and Alkire ([2022](#)).

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[1] The text in this section draws on methodological notes published for each update of the global MPI (see Alkire, Roche, Santos and others, 2011; Alkire, Conconi, Robles and others, 2015, and annual updates by the authors since 2018) and the book by Alkire, Foster, Seth and others (2015). It is useful to include similar text in each methodological note, in order to provide an overview of the global MPI structure, as well as MPI and its partial indices to first-time users of the global MPI data.

Figure 1. Composition of the Global MPI – Dimensions and Indicators
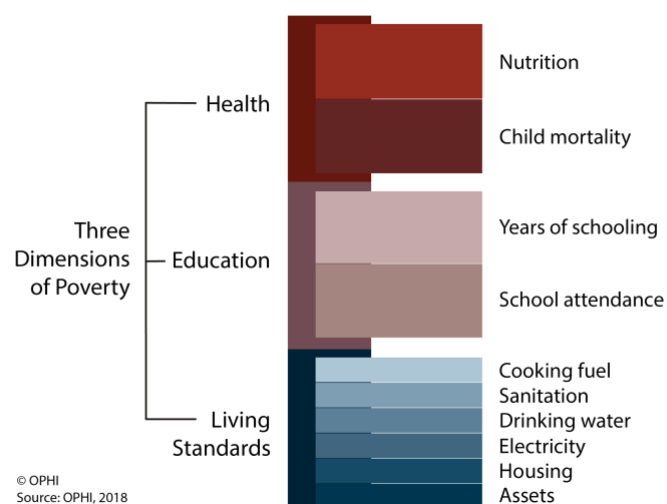
The global MPI begins by establishing a deprivation profile for each person, showing which of the 10 indicators they are deprived in. Each person is identified as deprived or non-deprived in each indicator based on a deprivation cutoff (Table 1). In the case of health and education, each household member may be identified as deprived or not deprived according to available information for other household members. For example, if any household member for whom data exist is undernourished, each person in that household is considered deprived in nutrition. Taking this approach – which was required by the data – does not reveal intrahousehold disparities[2], but is intuitive and assumes shared positive (or negative) effects of achieving (or not achieving) certain outcomes. Next, looking across indicators, each person's deprivation score is constructed by adding up the weights of the indicators in which they are deprived. The indicators use a nested weight structure: equal weights across dimensions and an equal weight for each indicator within a dimension.

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[2] Though disparities within households can be consistently explored in parallel. See Alkire, Ul Haq and Alim (2019).

Table 1. Global MPI – Dimensions, Indicators, Deprivation Cutoffs, and Weights

Dimensions of poverty	Indicator	Deprived if...	SDG area	Weight
Health	Nutrition	Any person under 70 years of age for whom there is nutritional information is **undernourished**.[1]	SDG 2	1/6
	Child mortality	A child **under 18** has **died** in the household in the five-year period preceding the survey.[2]	SDG 3	1/6
Education	Years of schooling	**No** eligible household member has completed **six years** of **schooling**.[3]	SDG 4	1/6
	School attendance	Any school-aged child is **not attending** school **up to** the age at which he/she would complete **class 8**.[4]	SDG 4	1/6
Living Standards	Cooking fuel	A household cooks using **solid fuel**, such as dung, agricultural crop, shrubs, wood, charcoal, or coal.[5]	SDG 7	1/18
	Sanitation	The household has **unimproved** or **no** sanitation **facility** or it is improved but **shared** with other households.[6]	SDG 6	1/18
	Drinking water	The household's source of **drinking water** is **not safe** or safe drinking water is a **30-minute** or **longer walk** from home, roundtrip.[7]	SDG 6	1/18
	Electricity	The household has **no electricity**.[8]	SDG 7	1/18
	Housing	The household has **inadequate** housing materials in **any** of the three components: **floor**, **roof**, or **walls**.[9]	SDG 11	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.	SDG 1	1/18

Notes: The global MPI is related to the following SDGs: No Poverty (SDG 1), Zero Hunger (SDG 2), Health and Well-being (SDG 3), Quality Education (SDG 4), Clean Water and Sanitation (SDG 6), Affordable and Clean Energy (SDG 7), and Sustainable Cities and Communities (SDG 11).

[1] 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 aged 20 to 70 years (229–840 months) are considered undernourished if their Body Mass Index (BMI) is below 18.5 m/kg².

[2] The child mortality indicator of the global MPI is based on birth history data provided by mothers aged 15 to 49. In most surveys, men have provided information on 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 are missing, and if the male in the household reported no child mortality, then we identify no child mortality in the household.

[3] 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.

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

[5] If the survey report uses other definitions of solid fuel, we follow the survey report.

[6] A household is considered non-deprived in 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 the survey report uses other definitions of improved sanitation, we follow the survey report

[7] A household is considered non-deprived in 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. It must also be within a 30-minute walk, round trip. If the survey report uses other definitions of improved drinking water, we follow the survey report.

[8] A small 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.

[9] 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.

3. The global MPI and its partial indices

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 deprivation score is equal to or higher than the poverty cutoff of 33.33 percent. After the poverty identification step, we aggregate across individuals to obtain the **incidence** of poverty or headcount ratio (H) which represents the percentage of poor people in the population. We then compute the **intensity** of poverty (A), representing the average percentage of weighted deprivations experienced by the *poor*. We then compute the adjusted poverty headcount ratio (M_0) or **MPI** by combining H and A in a multiplicative form (MPI = H x A).

Both the incidence and the intensity of these deprivations are highly relevant pieces of information for poverty measurement. The incidence of poverty is intuitive and understandable by anyone. People always want to know how many poor people there are in a society as a proportion of the whole population. Media tend to pick up on the incidence of poverty easily. Yet, the proportion of poor people as the headline figure is not enough (Alkire, Oldiges and Kanagaratnam, 2021).

Imagine two countries: in both, 30 percent of people are poor (incidence). Judged by this piece of information, these two countries are equally poor. However, imagine that in one of the two countries poor people are deprived – on average – in one-third of the dimensions, whereas in the other country, the poor are deprived – on average – in two-thirds. By combining the two pieces of information – the intensity of deprivations and the proportion of poor people – we know that these two countries are not equally poor, but rather that the second is poorer than the first because the intensity of poverty is higher among the poor. The MPI will show this difference.

A headcount ratio is also estimated using two other poverty cutoffs. The global MPI tables identifies individuals as **vulnerable** to poverty if they are close to the one-third threshold, that is, if they are deprived in 20 to 33.33 percent of weighted indicators. The tables also apply a higher poverty cutoff to identify those in **severe poverty**, meaning those deprived in 50 percent or more of the dimensions.

The AF methodology has a property that makes the global MPI even more useful—dimensional breakdown. This property makes it possible to consistently 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. The weighted sum of censored headcount ratios of all MPI indicators is equal to the MPI value.

The censored headcount ratio shows the extent of deprivations among the poor but does not reflect the weights or relative values 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.

In addition, we compute the **variance** measure. The variance measure allows us to identify inequality among the poor. The computation and publication of the variance measure follows the methodology discussed in Seth and Alkire (2017) and Alkire and Foster (2019).

Since 2020, as part of the global MPI output, we publish the proportion of **MPI poor who are destitute**. The destitution measure has precisely the same structure as the global MPI but applies extreme deprivation cutoffs for most indicators. The destitute are all already MPI poor but also experience a more extreme level of deprivation. This measure builds on the framework in Alkire, Conconi, and Seth (2014). The destitution cutoffs were revised in 2019 (see details in Alkire, Kanagaratnam and Suppa, 2020, p.9).

The results presented in our tables are based on sample surveys that use information from a fraction of the population to represent the whole population. Thus, it is important to compute a measure of confidence for each estimate from a sample survey. The computation of the **standard errors** is based on the linearized variance estimator (or first-order Taylor series approximation), correcting for single sampling unit stratum using the centered method in the 'svy' Stata command. We have also taken into account of the two-stage clustering and stratification of the sample.

The global MPI estimates are produced using the Stata package 'mpitb' developed by Suppa (2022).

4. Policies for the global MPI

In this section, we highlight key policies that relate to the use of new survey, the use of new information to improve existing indicators, the computation of the global poor population, the exclusion of non-usual household members, the treatment of household members about whom information in certain indicators is lacking, the treatment of datasets that lack any one of the 10 global MPI indicators, and the treatment of households with missing indicators.

4.1 New survey data

The global MPI is updated when new data become available from the following sources: Demographic and Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS), and national surveys. We also explore whether there are new national surveys in the public domain that have indicators comparable to those included in the global MPI. National surveys are considered in the absence of surveys produced by

DHS and MICS, or if DHS and MICS data sets are more than three years older than the national surveys. The latter is a criterion introduced in 2019, so as to maximise the possibility of using internationally comparable surveys such as DHS and MICS.

4.2 Indicator availability

Survey instruments such as DHS and MICS improve over time. Our policy while producing the country (national) estimates using most recent survey of a country, is to use as much of the information that is available for the 10 global MPI indicators and to incorporate improvements in the new surveys. For example, in recent MICS surveys, the electricity variable in the data included additional categories, going beyond the usual question on 'Does your household have electricity' that is limited to the 'yes' or 'no' categories. Households with access to electricity were further probed on whether they were 'interconnected to the grid' or 'off-grid with generator or isolated system. For the purpose of the global MPI, we identified households on the electricity grid and households that were powered by alternative sources of energy as non-deprived. Another example is when data on ownership of a computer or any hitherto missing asset in the past becomes available in recent surveys, these will be incorporated into the assets indicator.

In summary, MPI estimation for a given year will be the most accurate possible figure using the available data but may not be comparable across time. Indicator definitions must be harmonised for comparability over time. This we cover in detail in Methodological Note 54 (Alkire, Kanagaratnam and Suppa, 2022c).

4.3 Population-weighted global aggregates

Since 2010 we have used a fixed population year to produce the global aggregations. We have also provided the population data for the related survey year in the Data Tables for those who prefer this information. The headcount ratio for each country in the global MPI 2022 is multiplied by the total population for 2019, regardless of the year of the survey, in order to identify the number of MPI poor in any given country or across countries:

$$\text{Number of MPI poor} = H * \text{Total Population}$$

This approach has the important advantage of comparison: it is possible to aggregate across countries to develop regional rankings, analyse country groupings such as low-income countries, and aggregate across regions. For example, using this approach we can generate the figure that 19 percent of the inhabitants in the 111 countries are MPI poor. Suppose the year of the population count (2020) is after the year of the survey. In that case, this approach provides an incentive for governments to update their poverty data, because after updating the 'number of poor' will decline if poverty rates have gone down and if these are not overturned by strong population growth. The approach also has limitations. In using a headcount ratio

that is older than (or more recent than) the reference year of the survey, the assumption is being made that the level of poverty in the year of the survey and the year of population count are identical. We acknowledge that this is a strong assumption, but it is clear that changes in the global MPI over time do not justify alternative assumptions such as linear extrapolation.

The population count years used for aggregate estimates of the global MPI are updated by one year, annually. As in past years, the current data tables also include the population during the year of the survey, as well as population figures for both the reference year (2020) and the year before (2019). The source of population data is the *World Population Prospects* medium-fertility variant, which is published by the Population Division of the Department of Economic and Social Affairs of the United Nations (2022).

4.4 Excluding *non-usual* residents

The DHS datasets define **de jure** residence as **usual** or legal residence. The 'hv102' variable in DHS datasets distinguishes *de jure* (usual) from non-*de jure* (non-usual) household members. In the global MPI, we only use information from usual residents and exclude information from non-usual household members. We exclude the information from the non-usual members because this makes it comparable to MICS, which collect information only from usual household members. In addition, the achievement of an occasional visitor (for example, in years of schooling) could cause the household to be non-deprived (in education), which would be misleading.

4.5 Applicable and non-applicable populations

Three of the 10 global MPI indicators are not applicable to all households. Households that do not have the relevant population are classed as non-deprived in that indicator.

Nutrition has two sub-populations of interest, with different applicable populations. Young children's nutrition is not applicable to households with no children within the eligibility criteria (under 5 years old for most surveys) to be weighed and measured. We consider households that did not have any eligible children as non-deprived in child nutrition.

Adult Body Mass Index (BMI) is not applicable to households where there were no eligible females or males to be measured anthropometrically. In the global MPI, data on adult BMI is mostly taken from DHS surveys and national surveys. In DHS surveys, information on adult nutrition is usually collected from eligible women aged 15 to 49 years who are *de jure* (usual) members of the household. Women eligible for anthropometric measures are identified using the *eligibility* variable provided by DHS data providers. In some countries, such as Egypt, eligibility criteria exclude women who have never been married. In a number of DHS surveys, nutrition data is also collected from a subsample of adult men. In some other national surveys, nutrition data is collected from all age groups in the household (e.g. China, and Ecuador).

The global MPI uses all available data on nutrition, up to the age of 70 years (<=840 months in age) to construct the nutrition indicator, because bone density changes in higher age cohorts make BMI more complex to interpret.

If a household is deprived in children's nutrition, BMI measure or both, then the household is deprived in nutrition. We consider households that have no eligible members to assess children's nutrition or BMI measure to be non-deprived.

Child mortality is based on birth history data provided by mothers aged 15 to 49. The birth history data ordinarily has the date of birth and death of each child. This tells us how old the child was when they died and how long before the survey year the death occurred. We consider households having no eligible women available to be interviewed as non-deprived in child mortality. In most DHS and MICS surveys, a sub-sample of eligible men have provided information on child mortality as well, but this lacks the date of birth and death of the child. Hence, the global MPI indicator is constructed solely from females. However, if the data from females are missing, and if the male in the household reported no child mortality, then we identify no child mortality in the household. In a few country surveys (e.g.: Argentina), detailed birth history data was not collected, such as the date of birth and date of death of the child. In such cases, we have constructed the child mortality indicator using any child death reported by eligible women and men, as we cannot distinguish deaths that occurred in the past five years nor the age of the child who died. In these countries, households that did not have eligible women and men for individual interviews are identified as non-deprived.

School attendance is not applicable to households without children of school-age. We identify households that did not have children of school-age as non-deprived (we consider an eight-year span starting at the age at which a child should begin school in each country). The data sources for the age at which children start compulsory primary school are the MICS and DHS country survey reports, followed by confirmation using the [UIS Global Database](#).

4.6 Treatment of dataset with missing indicators

If a survey dataset is missing any of the 10 indicators that make up the global MPI, then that indicator cannot be used in the computation of the poverty measure and is omitted. Indicator weights of other indicators in that dimension are re-adjusted accordingly, such that each dimension continues to be given a weight of one-third. For example, suppose one living standards indicator is missing. In that case, while originally each of the living standards indicators received a relative weight of 1/18 (5.56 percent), the remaining indicators will receive a relative weight of 1/15 (6.66 percent). If one health or education indicator is missing, the other indicator will receive the full indicator weight of one-third. If all indicators in any dimension are missing, the dataset does not qualify to be included in the global MPI.

4.7 Dropping households who are missing any indicator

Once each indicator has been constructed, we only use households that have complete information in all the constructed indicators for the poverty estimates. Households that lack data on any indicator are dropped from the final analytical sample. The percentage of the sample that is dropped is reported in OPHI's Data Table 1 (see sheet 1.7 'Sample Size & Non-Response'). The sample size after the treatment of missing data must be reasonably high. This is because a lower sample size may affect accurate comparability across subnational estimations. The policies for MPI estimation by subnational regions is discussed in Methodological Note 53 (Alkire, Kanagaratnam and Suppa, 2022b).

5. Survey details of global MPI 2022

The 2022 global MPI estimations are based on survey data from 111 countries. By contrast, the global MPI 2021 covered 109 countries, while the global MPI 2020, 2019 and 2018 covered 107, 101, and 105 countries respectively. The number of countries covered in each round varies for two reasons: (1) whether new/updated surveys are available; and (2) whether countries from previous rounds are dropped from the recent round because the surveys for these countries are considered outdated.

5.1 New and updated country surveys

This 2022 round covers three new countries (Argentina, Samao and Tuvalu) and 12 more recent survey datasets (Table 2). Notably, in this round we updated the survey for India.[3] Collectively, the 15 new and updated surveys represent some 1.8 billion or close to one-third of the population living in the developing regions of the world. Excluding India, the 14 new and updated surveys represent some 382 million or 6 percent of the developing region population.

Seven of these new or updated surveys were released by MICS, while four were released by DHS in a period of 13 months, that is, from 15 May 2021 to 01 June 2022. In addition, we updated Peru, Ecuador and Mexico using national surveys that are available in the public domain. We also updated Jamaica using the latest available survey from the Planning Institute of Jamaica (PIOJ). The cleaning and standardisation of the new and updated surveys follows the 2019 global MPI indicator specifications, in addition to the minor innovations introduced in 2020 for the years of schooling, drinking water, and sanitation indicators (see Alkire, Kanagaratnam and Suppa 2019, 2020 for details on the specifications).

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[3] The survey is nationally known as the National Family Health Survey 5 (NFHS-5) and internationally as India Demographic Health Survey (DHS). Some 2.8 million householders living in 636 households was enumerated through this survey. The survey and survey sample was designed and fielded by NITI Aayong. Technical assistance was also provided by ICF that implements The Demographic and Health Surveys (DHS) Program.

Table 2. List of new and updated surveys used in the global MPI 2022

Country	Survey	Year
Argentina	MICS	2019-2020
Dominican Republic	MICS	2019
Ecuador	ENSANUT	2018
Gambia	DHS	2019-2020
Honduras	MICS	2019
India	DHS	2019-2021
Samoa	MICS	2019-2020
Jamaica	JSLC	2018
Peru	ENDES	2019
Mauritania	DHS	2019-2021
Mexico	ENSANUT	2020
Tuvalu	MICS	2019-2020
Rwanda	DHS	2019-2020
Malawi	MICS	2019-2020
Viet Nam	MICS	2020-2021

5.2 Survey coverage in 2022

The survey coverage for the 111 countries included in the global MPI 2022 is between 2010 and 2019-2021. A total of eighty-three countries—home to 81 percent of multidimensionally poor people—have data fielded in the last five years, that is, in 2015-2016 or later.

The primary data sources for the global MPI are the DHS (45 countries) and MICS (54 countries) surveys that are open access. For two countries, the source of the data is the Pan Arab Project for Family Health (PAPFAM) surveys. In the countries for which none of these internationally comparable surveys were available, national surveys that contained information on the MPI indicators were used if high-quality surveys with the same indicators were available, and if they were in the public domain or if countries requested to be included in the global MPI. For example, in the global MPI 2022, we have used national data for 10 countries, namely Bolivia, Botswana, Brazil, China, Ecuador, Jamaica, Mexico, Peru, Seychelles, and Sri Lanka.

5.3 Countries excluded from previous rounds

OPHI's Data Table 8 includes all of the surveys that have been included in all rounds of the global MPI. However Data Tables 1 to 5 and Data Table 7 report data from a 13-year moving time window, including the year of publication.

In the 2022 round, we excluded any country whose dataset was fielded in 2009, so is considered out of date. Thus we excluded the 2009 survey for Syria from the global MPI estimation. In the 2021 round, we would have excluded any country whose most recent survey was fielded in 2008, but there was no such country. In the 2020 round, we excluded Vanuatu as the survey was fielded in 2007. Four countries were excluded in the 2019 round, namely, Azerbaijan, Djibouti, Somalia, and Uzbekistan, as their surveys were fielded in 2006.

6. Country-specific considerations

This section details the country-specific standardised decisions concerning indicator availability and data treatment for each of the 15 new or updated countries included in the global MPI 2022.

Argentina (MICS 2019-2020): There is no data on birth history in the last five years, so the child mortality indicator considers individuals to be deprived if any child died in the household. The survey lacks information on ownership of radio and animal cart, hence, the assets indicator does not include these items. The survey report is jointly produced by UNICEF and SIEMPRO (2021).

Dominican Republic (MICS 2019): Across most included surveys, household ownership of vehicle is limited to car and truck. However, this survey includes additional information on ownership of jeep. We took this into account in the assets indicator. The survey report is produced by the National Statistics Office (ONE) and UNICEF (2021).

Ecuador (ENSANUT 2018): This is a national survey that is open access. All household members in the sample were eligible for anthropometric measurement (Valdivieso, Albán, and Nabernegg, 2019). Height and weight measurement was successfully collected from some 91 percent of the unweighted sample. However, following the principles of the global MPI, we use all available data on nutrition, up to the age of 70 years (840 months in age) to construct the nutrition indicator. The survey has no direct question on whether household has electricity or not. As the best alternative, the electricity indicator for this survey was drawn from the variable 'main source of lighting'. The response categories are: (1) public electricity; (2) private power plant; (3) candle/lamp/gas; (4) none. We identified households as not deprived in electricity if their lights are powered by public electricity or private power plant; while households that relied on candles or other sources to power the lights at home are identified as deprived in electricity. The

survey does not include information on whether the household owns a radio, a bicycle, a motorbike, or an animal cart, so the assets indicator does not include these items.

Gambia (DHS 2019-2020): Anthropometric data was collected from children 0 to 59 months in age and women aged 15 to 49 years living in the 50 percent of households sampled for the male interview. The survey report by GBoS and ICF (2021) presents the nutritional status of children (p.187-8) and the nutritional status of women (p.198) by the eight administrative regions in Gambia. This suggests that anthropometric estimates based on the subsample of households are representative at the subnational level. As such, the global MPI estimation for Gambia is based on this 50 percent subsample.

Honduras (MICS 2019): No country specific decisions was applied for this survey. The survey report is jointly produced by the National Institute of Statistics and the Secretary of Health of Honduras (2021).

India (DHS 2019-2021): Anthropometric data collection was applied to all children under 5 years and to all women 15-49 years. In addition, anthropometric data collection was also applied to men 15-54 years living in a subsample of households selected in the state module (IIPS and ICF, 2021, p.4). We use anthropometric data from all eligible members to construct the nutrition indicator. The survey report is jointly produced by the International Institute for Population Sciences (IIPS) and ICF (2021).

Jamaica (JSLC 2018): The JSLC data is not available on an open access platform. The microdata was provided by the Planning Institute of Jamaica (PIOJ) through an agreement between OPHI and PIOJ for computing and publishing the global MPI aggregates; and research related to the global MPI. The microdata and survey report is a joint publication of the Planning Institute of Jamaica (PIOJ) and the Statistical Institute of Jamaica (STATIN). Anthropometric measurements were collected from all children aged under 5 years (PIOJ and STATIN, 2021). This dataset lacks information on child mortality. We re-weight the nutrition indicator to obtain equal weight among the three dimensions. The electricity indicator for this survey was drawn from the variable 'main source of lighting for this dwelling'. The response categories are: (1) electricity from the grid; (2) electricity from solar; (3) electricity from wind; (4) kerosene; (5) other; and (6) none. We identified households as not deprived in electricity if their lights are powered by public electricity from the grid, solar or wind; while households that relied on kerosene or other sources to power the lights at home are identified as deprived in electricity. The survey report indicates that pit latrine is improved sanitation because this particular toilet facility guarantees the hygienic separation of human excreta from human contact (PIOJ and STATIN, 2021, p.5.7). This MPI estimation follows the categorisation by the survey report. The survey report identifies drinking water delivered by public water trucks (NWC) as from an improved source; while water delivered by private trucks are from an unimproved source because of the difficulty in determining the safety of the drinking water from the multiple private companies (PIOJ and STATIN, 2021, p.5.6). This MPI estimation follows the

categorisation by the survey report. In this dataset, distance to water is provided in kilometres/meters/miles/yards/chains. We have converted these distances to meters. Every 1000 metres represents 30 minutes' round trip to the water source. This survey did not collect information on floor and roof materials. Therefore, we do not include these components as part of the housing indicator. Following the survey report, we identified walls made of concrete block & steel as improved. The report states that this type of wall has durability for withstanding the elements of weather and for providing occupants with a greater level of security (PIOJ and STATIN, 2021, p.5.1). All other wall materials including wood, stone, brick, concrete nog, wattle/adobe and others are identified as non-improved. The survey does not include information on whether the household owns an animal cart, so the assets indicator does not include this item.

Malawi (MICS 2019-2020): No country specific decisions was applied for this survey. The survey report is produced by the National Statistical Office (2021).

Mauritania (DHS 2019-2021): Height and weight measurements were collected from women aged 15 to 49 living in the 50 percent of households sampled for the male interview (ONS, MS, and ICF, 2021, p.3). In addition, all children under 5 have anthropometric measurements, regardless whether the household was selected for the male interview or not. As such, our MPI estimation work is based on 100 percent of the households sampled. Koranic education was identified as informal education in the survey report. Hence those with this level of qualification were considered deprived in years of schooling. The survey report identifies rain water as an unimproved source of drinking water (ONS, MS, and ICF, 2021, p.22). This MPI estimation follows that categorisation.

Mexico (ENSANUT 2020): This is a national survey that is open access. This data set lacks information on child mortality. We re-weight the nutrition indicator nutrition to obtain equal weights among the three dimensions. According to the survey report, all households in the survey sample were eligible for anthropometric measurement, but the selection of people inside the households for anthropometric measurement consisted of two stages. In the first stage, the inhabitants were stratified into six age groups and at least one person was selected from each group. Whenever possible, an adult, an adolescent, a school child, and a preschool child were selected from each dwelling with equal probability (Shamah-Levy, Romero-Martinez, Barrientos-Gutierrez and others, 2021, p.919). The aim of the anthropometric stratification procedure was to ensure that in all households sampled, at least one member was eligible for anthropometric measurement. The outcome is that in some 73 percent of the households sampled, at least one eligible individual was successfully measured; while in the remaining households' there was non-response. As a result, the final weighted nutrition indicator showed that 25 percent of individuals lived in households with a missing nutrition indicator. The high missing observations for nutrition indicator plus

some missing observations across the living standard indicators meant that we were only able to retain 74 percent of the weighted analytical sample. This is because the global MPI only retains observations that are complete across the nine indicators in this country data set. This data set lacks information on the time it takes to collect drinking water. The survey does not include information on whether the household owns a bicycle or an animal cart, so the assets indicator does not include these items.

Peru (ENDES 2019): This is a national survey that is open access. Height and weight measurements were collected from all children under 5 and for all women aged 12 to 49 years living in the households sampled. Information on child mortality was collected for all women aged 12 to 49 who slept the night before in the household. This survey defines the eligibility of women in the fertile age group from 12 to 49 years instead of the usual 15 to 49 years. We have used information provided by all eligible women. Households using bottled water for drinking are classified as using an improved or unimproved source according to their water source for non-drinking activities.

Rwanda (DHS 2019-2020): Anthropometric data collection was applied to two subsamples. Height and weight data was collected from children under 5 and women aged 15-49 living in the half of the households sampled for the male questionnaire. In addition, height and weight measurements were collected as part of the micronutrient module from children under 5 and women aged 15-49 living in 25 percent of the household not selected for the male survey (NISR, MOH, and ICF, 2021, p.2). We use anthropometric information from those living in households sampled for the male questionnaire to construct the nutrition indicator. This is because, the sampling weight of this subsample (50 percent of the sample) is representative up to the province level. Households without an eligible person for nutrition, that is the household lacks children under 5 and women 15-49 years, are coded non-deprived in nutrition.

Samoa (MICS 2019-2020): This country survey is the first ever included in the global MPI. In this survey, we identified ownership of freezer, besides refrigerator, as part of the assets indicator. The survey report is produced by the Samoa Bureau of Statistics (2021).

Tuvalu (MICS 2019-2020): This country survey is the first ever included in the global MPI. The schooling variables had a specific category – FAA Special School. The Fusi Alofa Association (FAA) Tuvalu was created in 2010. FAA Tuvalu was established to promote the rights of persons with disabilities and to give children with disabilities greater opportunities in Tuvalu. Since FAA Special School provides basic education, we consider this as informal education, hence those with this level of qualification was considered to be deprived in years of schooling. In this survey, we identified ownership of freezer, besides refrigerator, as part of the assets indicator. The survey report is produced by the Central Statistics Division (2021).

Viet Nam (MICS 2020-2021): Anthropometric data was not part of the 2020-2021 data collection. We re-weight the child mortality indicator to obtain equal weights among the three dimensions. The survey report is produced by the General Statistics Office and UNICEF (2021).

Concluding remarks

In sum, the global MPI 2022 covers 111 countries, of which three new countries (Argentina, Samao and Tuvalu), and 12 countries have updated surveys. India is among the country with updated survey. Collectively these 15 new or updated countries represent close to one-third of the population living in the developing regions of the world. The computation of global MPI is only possible with individual level data from multitopic household surveys such as DHS and MICS. These surveys collectively remain the major microdata source used to produce the global MPI results (99 countries). The remaining surveys used in our work are national surveys (10 countries) and PAPFAM (2 countries).

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