

## Multidimensional Poverty Index

Sabina Alkire and Maria Emma Santos, July 2010

### Key Findings

- Half of the world's MPI poor people live in South Asia; and just over a quarter in Africa.
- People living in MPI poverty may not be income poor. For example, only two-thirds of Niger's people are income poor, whereas 93% are poor by the MPI.
- Multidimensional poverty varies a lot within countries. In Kerala, India 16% of people are MPI poor; compared to 81% in the Indian state of Bihar.
- The composition of poverty varies. We found five 'types' of multidimensional poverty among the countries, each of which require different policy responses.
- Ethiopia reduced MPI poverty by improving nutrition and water, whereas Bangladesh improved it by sending children to school. Ghana improved several aspects of MPI poverty at once.
- Although limited by data, the MPI is robust. 95% of the rankings do not change if we look at people who are poor in as little as 20% or as many as 40% of deprivations.

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### Research Brief

*The Oxford Poverty and Human Development Initiative (OPHI) has developed a new international measure of poverty – the Multidimensional Poverty Index or MPI – for the 20th Anniversary edition of the United Nations Development Programme's flagship Human Development Report. The new innovative index goes beyond a traditional focus on income to reflect the multiple deprivations that a poor person faces with respect to education, health and living standard. This brief summarises the new method and key findings and shows how the MPI can be used.*

The MPI assesses the nature and intensity of poverty at the individual level, with poor people being those who are multiply deprived and the extent of their poverty being measured by the extent of their deprivations. The MPI creates a vivid picture of people living in poverty within and across countries, regions and the world. It is the first international measure of its kind, and offers an essential complement to income poverty measures because it measures deprivations directly. The MPI can be used as an analytical tool to identify the most vulnerable people, show aspects in which they are deprived and help to reveal the interconnections among deprivations. This can enable policy makers to target resources and design policies more effectively.

OPHI has just concluded a first ever estimate and analyses of global multidimensional poverty in 104 developing nations across the world using existing household survey data. Other dimensions such as work, safety, and empowerment could be incorporated into the MPI in the future as data become available.

This brief summarises key findings of the new index and shows how the measure can be used by governments, development agencies, and other institutions to help eradicate acute poverty.

### Income

What does it mean to live in poverty? This question has often been answered by lack of income, but the traditional narrow focus on income as the only measure of a person's wellbeing, or lack of it, is being increasingly challenged. Recent high profile initiatives, such as the Stiglitz-Sen-Fitoussi Commission, have called for broader measures that take account of other vitally important aspects of life.

The human development approach has long argued that although income is important, it needs to be complemented by more direct measures (Anand and Sen 1997). In 2010, the 20th anniversary year of the United Nations Development Programme's flagship *Human Development Report* (UNDP HDR), the HDR is introducing a new international measure of poverty – the Multidimensional Poverty Index or MPI – which directly measures the combination of deprivations that each household experiences. The new MPI supplants the Human Poverty Index or HPI used in previous *Human Development Reports*.

The MPI looks at poverty through a 'high-resolution' lens. By directly measuring the nature and magnitude of overlapping deprivations at the household level, the MPI provides

information that can help to inform better policies to reduce acute poverty. The MPI is the first international measure to reflect the intensity of poverty – the number of deprivations that each household faces at the same time.

From their inception, the UNDP HDRs have pioneered new ways to analyze human development and poverty, intended to have a direct impact on development strategy and methodology. By featuring this independently conceived new approach to poverty measurement in the 20th anniversary report, UNDP HDR hope to encourage its use by governments, development agencies, and other institutions dedicated to the eradication of acute poverty.

It can be decomposed by population group and broken down by dimension. The full results and detailed information on the index can be found in: *Alkire, S. and Santos, M.E. (2010). Acute Multidimensional Poverty: A New Index for Developing Countries. Oxford Poverty and Human Development Initiative Working Paper 38. Available at: <http://www.ophi.org.uk/publications/ophi-working-papers/>. Also see [www.ophi.org.uk](http://www.ophi.org.uk).*

**Multidimensional Poverty Index (MPI): Basic Overview**

The MPI is an index of acute multidimensional poverty. It reflects deprivations in education to health outcomes to assets and services for people across 104 countries. Although deeply constrained by data, the MPI reveals a different pattern of poverty than income poverty, as it illuminates deprivations directly. The MPI has three dimensions: health, education, and standard of living. These are measured using 10 indicators. Poor households are identified and an aggregate measure constructed using a methodology proposed by Alkire and Foster (2007, 2009) (See box on page 7). Each dimension is equally weighted; each indicator within a dimension is also equally-weighted.

The MPI reveals the combination of deprivations that batter a household at the same time. A household is identified as multidimensionally poor if and only if it is deprived in some combination of indicators whose weighted sum exceeds 30% of all deprivations. The indicators and the criteria for someone to be considered deprived in each indicator are

**Inside the MPI**

1. **Education** (each indicator is weighted equally at 1/6 )
  - **Years of Schooling:** deprived if no household member has completed five years of schooling
  - **Child Enrolment:** deprived if any school-aged child is not attending school in years 1 to 8
2. **Health** (each indicator is weighted equally at 1/6)
  - **Child Mortality:** deprived if any child has died in the family
  - **Nutrition:** deprived if any adult or child for whom there is nutritional information is malnourished
3. **Standard of Living** (each indicator is weighted equally at 1/18)
  - **Electricity:** deprived if the household has no electricity
  - **Drinking water:** deprived if the household does not have access to clean drinking water or clean water is more than 30 minutes walk from home
  - **Sanitation:** deprived if they do not have an improved toilet or if their toilet is shared
  - **Flooring:** deprived if the household has dirt, sand or dung floor
  - **Cooking Fuel:** deprived if they cook with wood, charcoal or dung
  - **Assets:** deprived if the household does not own more than one of: radio, TV, telephone, bike, or motorbike, and do not own a car or tractor

presented in 'Inside the MPI' (above).

The indicators are based on participatory exercises with poor people, emerging international consensus and the availability of suitable data. Most are linked to Millennium Development Goals. The index mainly uses data from three household surveys: the Demographic and Health Survey, the Multiple Indicators Cluster Survey and the World Health Survey.

The MPI is the product of two numbers: the Headcount H or percentage of people who are poor, and the average intensity of deprivation A – which reflects the proportion of dimensions in which households are, on average, deprived. Alkire and Foster show that this measure is

very easy to calculate and interpret, is intuitive yet robust, and satisfies many desirable properties.

Better data are needed at the international level to be able to expand the measure to include other important dimensions, such as informal work, empowerment and safety from violence, in the future.

By directly measuring the different types of poverty in each household, the MPI goes beyond the HPI and other poverty measures to capture how different groups of people experience concurrent deprivations.



Take Tabitha, who is 44 years old and lives in Lunga Lunga slum just outside of Kenya's capital, Nairobi. Tabitha lives with her husband and their six children. Her husband has no permanent work so she is the main breadwinner for the family. She depends on casual jobs, including washing clothes for others in the neighbourhood, where she is paid Ksh 50 per wash (US \$1.65). When no one has clothes to be washed, Tabitha goes to the nearby rubbish dump and finds old clothes to sell to a local clothes recycling dealer who buys 1kg of clothing for Ksh 10 (US \$0.33). On a good day, Tabitha can manage to collect 1-5kg (total; US \$0.33-1.65) of clothes from the rubbish.

Despite having such a low income, Tabitha's four school-aged children attend the local school. She has high hopes for her children as neither Tabitha nor her husband had the opportunity to go to school. "My hopes for the future are that I can support my children to continue their education," she says. Tabitha worries that she will



Lunga Lunga, Nairobi, Kenya



Tabitha at work, looking for old clothes to sell not be able to pay the school fees for secondary level education though.

The family live in a rented house made of iron sheets and a cement floor. The house has no toilet, electricity or running water. The family uses one of the public toilets which cost Ksh 5 (US \$0.16) per visit and buys their drinking water from the community water point for Ksh 5 (US \$0.16) per jerrican. Because there is



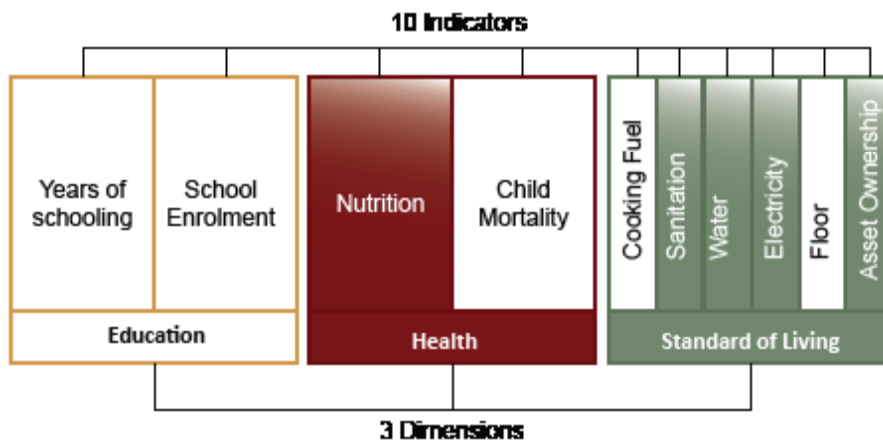
Washing clothes at home

no electricity, Tabitha works to daylight hours; she gets up early to prepare her breakfast for her family, if there is food available. Going without meals is a weekly occurrence for Tabitha's family, but because it happens often, she talks about it in a light-hearted way: "Going without meals; this is normal for us". For the evening meal Tabitha prepares

Ugali (made from boiled water and maize flour) on charcoal. Having no TV or radio for entertainment, the family spends their evenings sitting together as a family and talking about



De-threading old clothes



Tabitha's poverty profile (shaded boxes = poor; non-shaded boxes = non-poor)

their day.

The figure above shows Tabitha's poverty profile according to the MPI. The shaded boxes show the indicators in which her household is deprived. Tabitha is poor according to both the MPI and income poverty; the MPI tells us more about the nature of the poverty that she faces.

The MPI looks at the poverty of each person in this way. It builds from the person right up to international level to create a vivid picture of poverty. The index can then be broken down by dimension and group to clearly show how the composition of multidimensional poverty changes in incidence and intensity for different regions, countries, states, ethnic groups and more.

**The MPI and the MDGs**

The Millennium Development Goals (MDGs) are the most broadly supported, comprehensive and specific development goals the world has ever agreed upon.

Adoption of the MDGs has increased comparable international data related to the goals and targets, provided feedback on development outcomes and created incentives to address core deprivations. Unlike the MPI, however, the international MDG reports invariably present progress on each indicator singly. No composite MDG index has been developed, and few studies have reflected the interconnections between indicators.

There are two reasons that no composite MDG index has been developed. First, the data often come from different surveys. Second, even when the data are in the same survey, the 'denominator' or base population of MDG indicators differ. In some cases it includes all people

(malnutrition, income, drinking water, sanitation); in some cases children (primary school, immunization), or youth 15-24 (literacy), or childbearing women (maternal mortality), or urban slum dwellers (housing) or households' access to secure tenure and so on. Some environmental indicators do not refer to human populations at all. Given this diversity of indicators, it is difficult to construct an index that meaningfully brings all deprivations into the same frame.

The MPI begins to fill this gap. The MPI shows which households have key MDG deprivations at the same time. Eight of the MPI's ten indicators relate to MDG targets. Hence the MPI can be used to identify the most vulnerable people and identify different patterns of deprivations – clusters of deprivations that are common among different countries or groups. The MPI can be used to understand the interconnections among deprivations, help target aid more effectively to the most vulnerable, identify poverty traps and consequently strengthen the impact of interventions required to meet the MDGs.

Recent research has shown that a greater understanding of these interconnections is key to policy success. In June 2010, the UNDP released an assessment of *What it would take to reach the Millennium Development Goals* using detailed studies in 50 countries. The first key message is that the MDGs are interconnected so we need to address MDG deprivations together. "Acceleration in one goal often speeds up progress in others... Given these synergistic and multiplier effects, all goals need to be ... achieved simultaneously."

Finally, a note on reporting

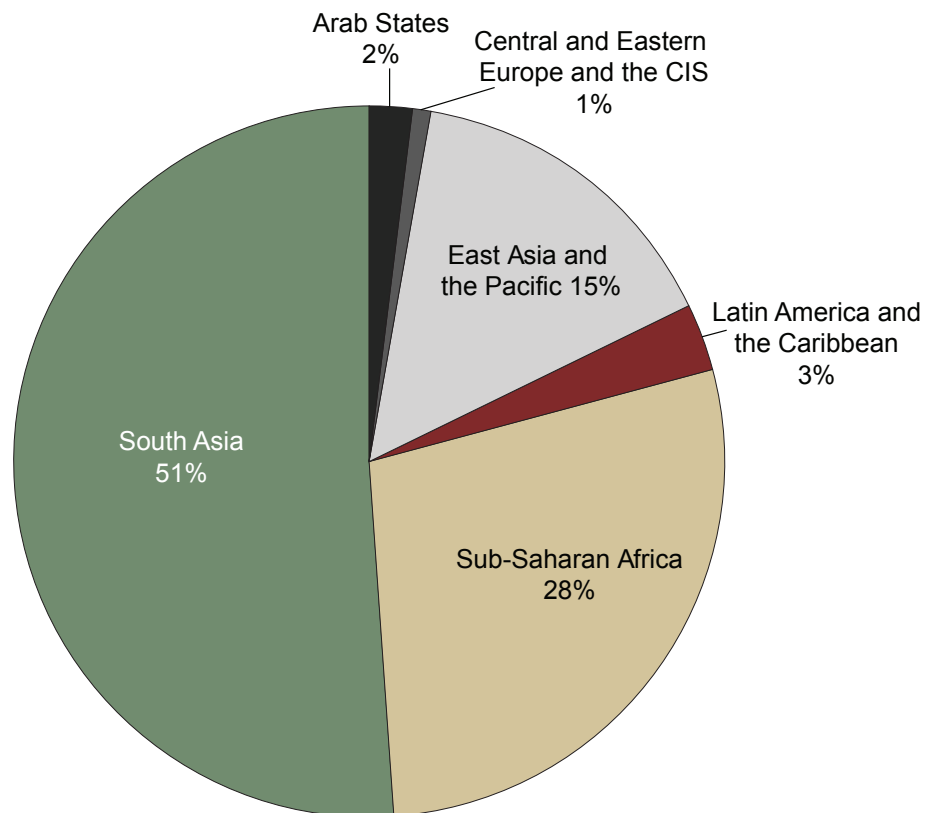
conventions. Many MDG reports focus on the percentage of countries that are 'on target' to meet the MDGs, which under-emphasizes poor people in large countries. Our analysis using the MPI emphasizes the number of poor people whose lives are diminished by multiple deprivations.

**Initial Findings Using the MPI**

OPHI analysed data from 104 countries with a combined population of 5.2 billion (78 per cent of the world total) using the MPI (Alkire and Santos 2010). The results should be considered the first analysis of multidimensional poverty rather than a comprehensive ranking. The 2010 MPI was created to reflect poverty in less developed countries. Key findings of the analyses are summarised below.

**About 1.7 billion people in the countries covered – a third of their entire population – live in multidimensional poverty, according to the MPI.** This exceeds the number of people in those countries estimated to live on US \$1.25 a day or less (1.3 billion), the World Bank's measure of 'extreme' income poverty. It is less than the total number of people living on less than US \$2 a day.

**The MPI also captures distinct and broader aspects of poverty.** The percentage of people living in poverty according to the MPI is higher than the percentage living on less than US \$2 a day in 43 countries and lower than those living on less than US \$1.25 a day in 25 countries. In some countries, the difference between MPI poverty and income poverty is particularly marked. For example, in Ethiopia 90 per cent of people are MPI poor compared to 39 per cent extreme income poor, and in Pakistan 51 per cent are MPI poor compared to 23 per cent extreme income poor. Conversely, in Tanzania 89 per cent are extreme income poor compared to 65 per cent MPI poor. The MPI captures deprivations directly – in health and educational outcomes and key services such as water, sanitation and electricity. In some countries, these resources are provided free or at low cost; in others, it is very hard even for working people with an income to obtain them.



**Figure 1: Regional Distribution of People Living in MPI Poverty**

**Half of the world's poor as measured by the MPI live in South Asia (51 per cent or 844 million people) and over one quarter in Africa (28 per cent or 458 million) (Figure 1).**

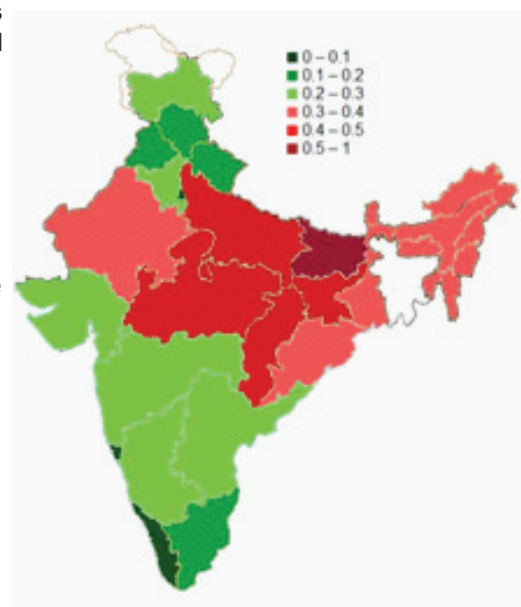
**The incidence of MPI poverty is greatest in Sub-Saharan Africa and South Asia. In Sub-Saharan Africa 64.5 per cent of people are MPI poor; in South Asia, 55 per cent.**

**The intensity of poverty – the average number of deprivations experienced by each household – is also greatest in Sub-Saharan Africa and South Asia.** The poorest country as measured by the MPI, Niger, also has the greatest intensity of poverty (where 93 per cent of people live in poverty and are deprived across 69 per cent of the indicators on average).

**There are more MPI poor people in eight Indian states than in the 26 poorest African countries combined** 421 million people in the Indian States of Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh, and

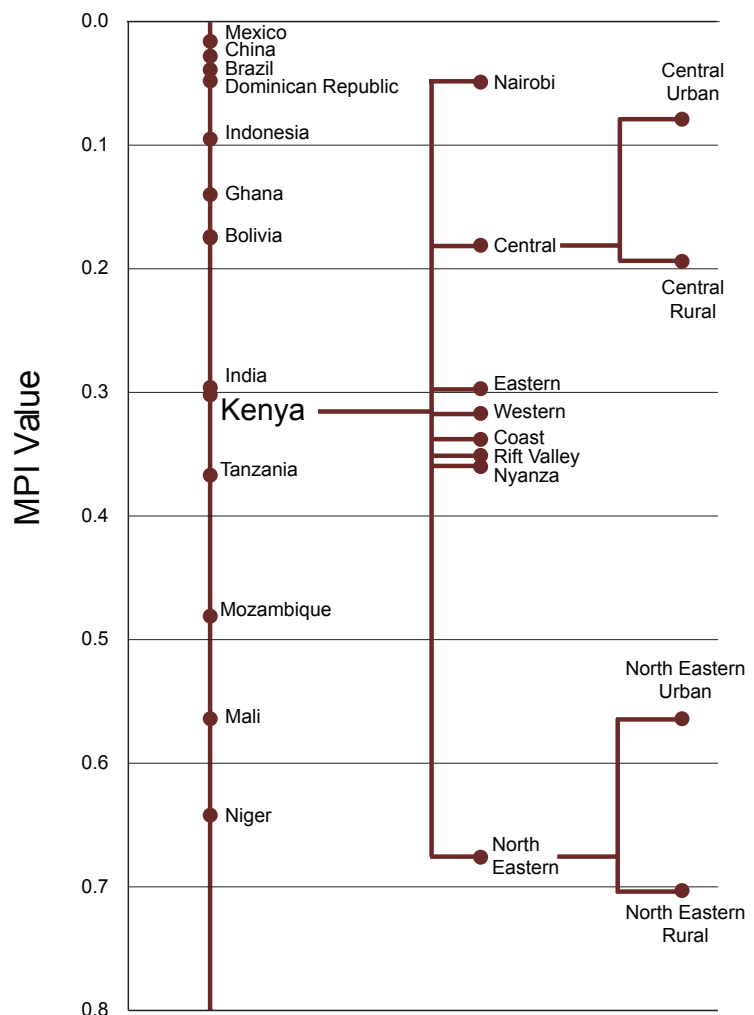
West Bengal live in multidimensional poverty; the 26 poorest African countries are home to 410 million MPI poor people. India has experienced strong economic growth in recent years, yet the MPI reveals that extensive acute multidimensional poverty persists.

**Map of MPI Poverty in India (higher MPI value in dark red)**



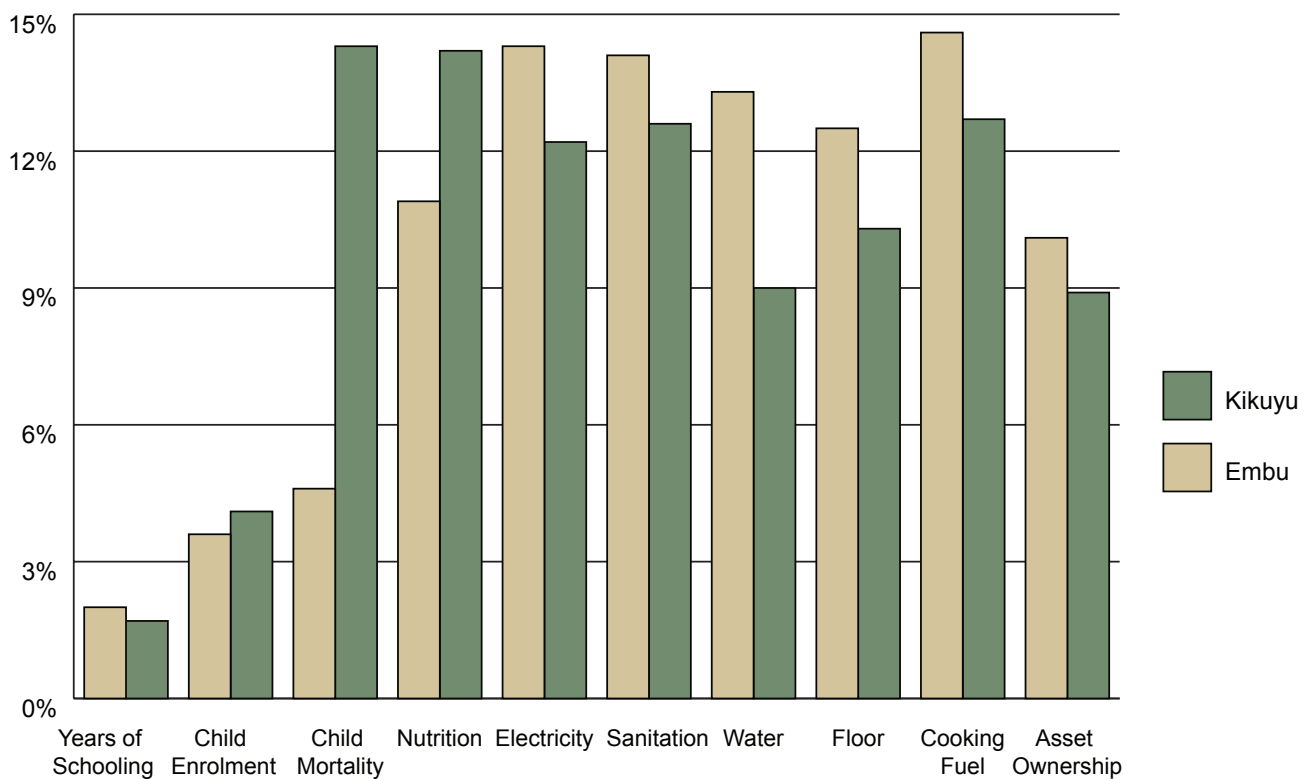
**The MPI reveals great variation in poverty within countries.** The capital city of Kenya, Nairobi, has the same MPI value as the Dominican Republic, which ranks in the middle of the countries analysed, whereas rural areas of northeastern Kenya have a worse MPI value than Niger, the poorest of all countries analysed (Figure 2).

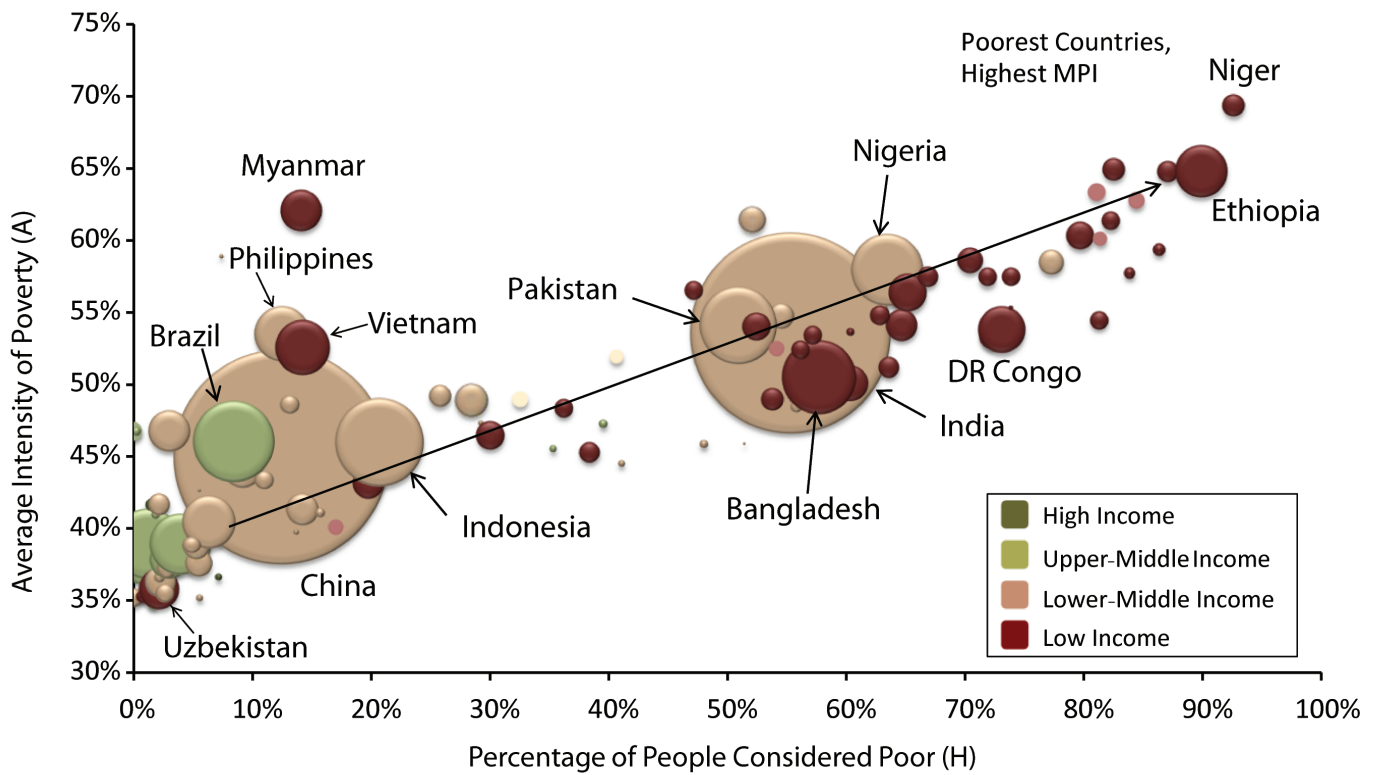
**The composition of poverty differs among regions and ethnic groups.** For example, different ethnic groups in Kenya with similar rates of poverty experience different deprivations. Deprivation in child mortality and malnutrition (both health indicators) contribute most to the poverty of the Kikuyu (39 per cent of whom are MPI poor), whereas deprivations in living standard, such as access to electricity, adequate sanitation and cooking fuel, contribute most to the poverty of the Embu (37 per cent of whom are MPI poor) (Figure 3). Decomposition of poverty in India and Bolivia also reveals interesting differences among groups.



**Figure 2: MPI Poverty Varies Widely Across Regions of Kenya (above)**

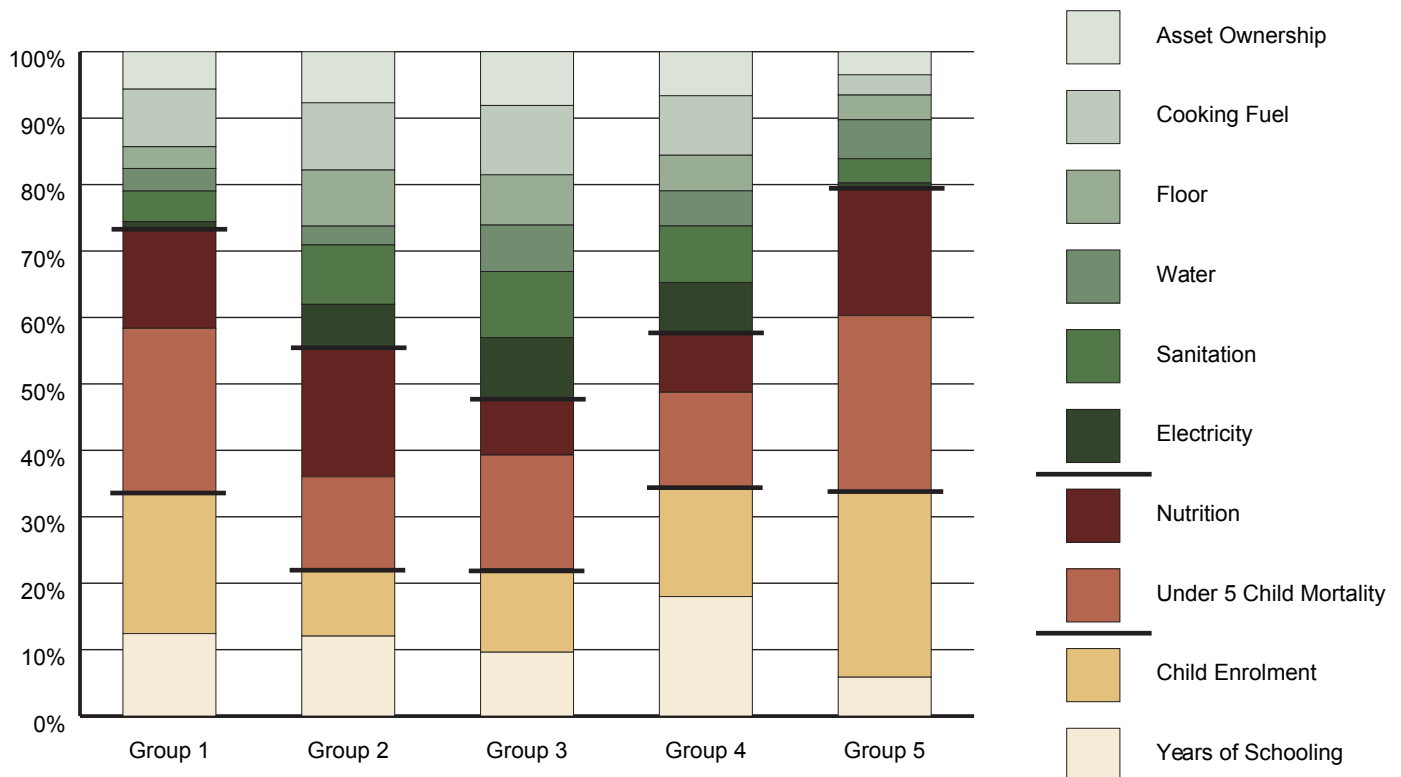
**Figure 3: Comparison of the Percentage of People Who are Poor and Deprived in Each Indicator in two Ethnic Groups in Kenya (below)**





**Figure 4: Bubble Chart Showing Relationship Between the Percentage of MPI Poor People, Average Intensity of MPI Poverty and Income (above).** Low income countries are spread across the chart, from Uzbekistan to Niger. Countries with greatest MPI poverty (highest incidence and greatest intensity) are located in the top right of the chart.

**Figure 5: The MPI Reveals Five Distinct Types of Deprivation Across Countries: Percentage Contribution of Each Dimension to the Overall MPI Poverty in Each Group (below)**



**Multidimensional poverty varies widely among low GDP per capita countries.** The percentage of people in low income countries who are MPI poor ranges from 2 percent in Uzbekistan to 93 percent in Niger. Figure 4 shows the percentage of people living in poverty in each of the 104 countries analysed, against the average intensity of their poverty. The size of each bubble represents each country's population size. Countries with a low GDP income (dark red) are spread across the whole chart. The chart also tells the sad tale that in countries with the highest incidence of poverty, such as Niger and Ethiopia, poverty is most intense.

**Analysis of patterns of deprivation across countries reveals five types of multidimensional poverty** (Figure 5). The structure of deprivation varies. And these variations need to inform policy. For example, some countries such as Syria, Iraq and Azerbaijan (Group 5 in Figure 5), are more deprived in health and education than they are in living standard. Countries such as India and Bangladesh experience higher deprivation in nutrition than in child mortality (Group 2 in Figure 5). Most African countries fall into Group 4. By identifying patterns of deprivation, the MPI can help us to understand the interconnections among deprivations, identify poverty traps and strengthen the impact of policies to reduce poverty in specific aspects, such as the MDGs.

**Multidimensional poverty can change rapidly over time.** Trends in the MPI over time show different pathways to MPI poverty reduction. Bangladesh reduced its MPI considerably from 2004, when 69 per cent of people were multidimensionally poor, to 2007, when multidimensional poverty fell to 59 per cent. Bangladesh improved by sending children to school. In contrast, Ethiopia reduced poverty by improving nutrition and

water, whereas Ghana improved several indicators at once.

#### The MPI as a Tool for Policy Makers

Not only is the MPI a more multi-faceted and more accurate tool for measuring poverty, it can also be used as a tool for eradicating poverty. How can it improve our current toolbox? To empower poor people to move out of poverty it is important to look holistically at key components of poverty – nutrition, years of schooling, adequate sanitation, clean water, etc. – as all part of one dynamic. Until now, many of these aspects have been measured in isolation, such as the MDGs. The MPI integrates them into a single measure that can be broken down by geographic area and population group and analysed to explore how deprivations interconnect.

The 2010 Millennium Goals Report stressed that the MDGs will be fully achieved only by focusing increased attention to those most vulnerable and by introducing policies and interventions that eliminate the persistent or even increasing inequalities between the rich and the poor, between those living in rural or remote areas or in slums versus better-off urban populations, and those disadvantaged by geographic location, sex, age, disability or ethnicity. Used as an analytical tool, the MPI can help policy makers to identify the poorest households and groups and the different deprivations that they face. This can help them to target aid more effectively to those specific communities.

The MPI goes beyond previous international measures of poverty to:

- Identify the poorest people and aspects in which they are deprived. Such information is vital to allocate resources where they are likely to be most effective.
- Identify which deprivations constitute poverty and which deprivations are most common among different groups, so that policies can be designed to address their particular needs.

- Reflect the results of effective policy interventions quickly. The MPI can be quicker to reflect the effects of changes in policies than income alone, where the indicators include direct and dynamic outcomes.
- Integrate many different aspects of poverty related to the MDGs into a single measure, reflecting interconnections among deprivations and helping to identify poverty traps.

### The Alkire Foster Method

#### An Innovative Technique for Multidimensional Measurement

OPHI created the Multidimensional Poverty Index using a technique developed by Sabina Alkire, OPHI Director, and James Foster, OPHI Research Associate and Professor of Economics and International Affairs at George Washington University. The Alkire Foster method measures outcomes at the individual level (person or household) against multiple criteria (dimensions and indicators).

The method is flexible and can be used with different dimensions, indicators, weights and cutoffs to create measures specific to different societies and situations. For example, the method can be applied to measure poverty or wellbeing, target services or conditional cash transfers and for monitoring and evaluation of programmes.

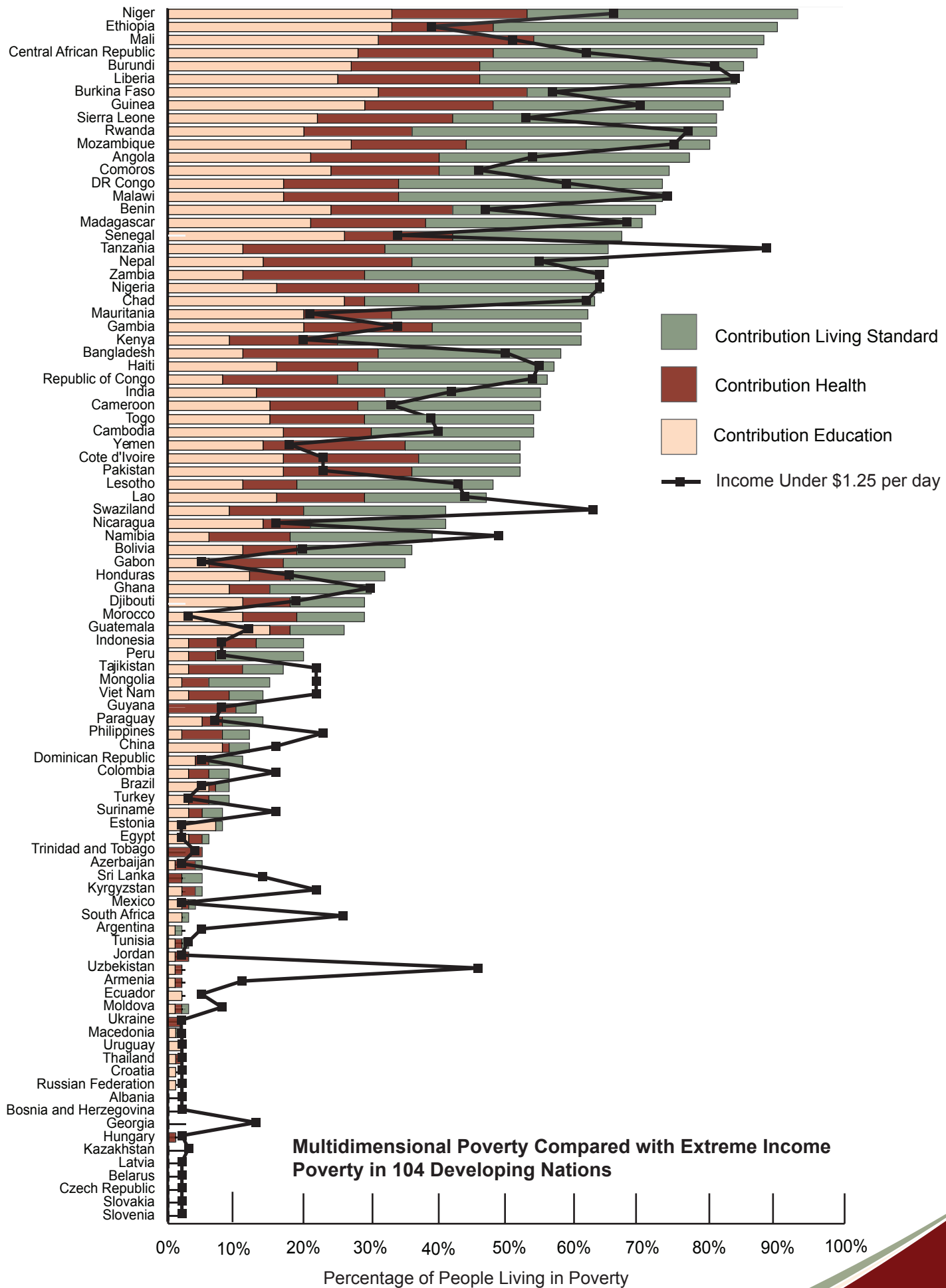
The method can show the incidence, intensity and depth of poverty, as well as inequality among the poor, depending on the type of data available to create the measure.

The MPI value is calculated using this method. Mexico used a form of the Alkire Foster method to create their new national poverty measure and Bhutan used it to calculate their 'Gross National Happiness Index'.

For more information, see: [www.ophi.org.uk/policy](http://www.ophi.org.uk/policy).

#### REFERENCES:

- Anand, S. and Sen, A. 1997. Concepts of Human Development and Poverty: A Multidimensional Perspective. Human Development Papers. New York: UNDP.
- Alkire, S. and Foster, J. 2007 and 2009. Counting and Multidimensional Poverty Measurement. OPHI Working Paper 7 and 32.
- Alkire, S. and Santos, M.E. 2010. Acute Multidimensional Poverty: A New Index for Developing Countries. OPHI Working Paper 38.
- United Nations Development Programme. 2010. The Millennium Development Goals Report 2010.
- United Nations Development Programme. 2010. What Will It Take to Achieve the Millennium Development Goals? An International Assessment.



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