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How Multidimensional Poverty Went Down: Dynamics and Comparisons

Sabina Alkire and José Manuel Roche, March 2013

Key Findings

- Of 22 countries having data on MPI poverty over time, 18 reduced MPI significantly, and most reduced multidimensional poverty faster than income poverty.
- Nepal, Rwanda and Bangladesh had the largest absolute reductions in MPI poverty, followed by Ghana, Tanzania, Cambodia and Bolivia. Colombia also had strong reductions in relative terms.
- Bangladesh, Ghana, and Bolivia cut MPI poverty two to three times faster than income poverty. Nepal made stellar progress in both.
- Subnational patterns vary. Bangladesh and Rwanda reduced MPI significantly in every region, Nepal in 10 out of 13 regions, Cambodia in 12 out of 19 regions, and Nigeria in only one of its six regions.
- Each of the ten indicators mattered: each indicator went down significantly in many countries, and no two always moved together.
- The top-performing countries reduced both the headcount of MPI poverty and the intensity of poverty.
- Reductions in the intensity of MPI poverty were strongest in relatively poorer countries such as Ethiopia, Malawi and Senegal, showing the vital importance of using MPI, not just the percentage of poor people (H), in order to document and celebrate the progress in the poorest countries.
- If the current absolute pace of poverty reduction were to continue steadily, then half of the countries would eradicate MPI poverty within 20 years, another seven within 41 years, and the remaining four countries within 95 years.
- Our analysis finds that low income countries facing a myriad of development challenges can reduce MPI powerfully. Progress is possible – even with imperfect institutions.

Our aim: action

The aim of poverty measurement is simple: to aid, incentivize, and celebrate the reduction of disadvantages that blight people's lives. Comparing poverty across time unearths rousing stories about how and where poverty has been reduced. It shows what is possible. It also provides insights into bottlenecks in places where progress has been slower. And it opens the space for 'constructive competition' between regions or countries to reduce or eradicate acute deprivations.

Our subject: 22 diverse countries

This briefing shares an exciting set of insights into how multidimensional poverty changed in 22 countries and 189 subnational regions. The 22 countries come from every geographic region in the developing world. They

Methodological note: Absolute vs. relative comparisons

We discuss both absolute and relative changes in poverty. Why? Usually we focus on absolute changes – they are simple and easy to compare across countries. However, while a country with high poverty rates like Madagascar could reduce H by 10 percentage points, Colombia, with only 9.3% of people in poverty initially, could never do so. Poverty would be eradicated first! So we also look at relative reductions, especially to understand the changes in poverty for countries with lower absolute poverty levels.

contain nearly 2 billion people, which is almost 30% of the world's population.[1] They are Low, Lower Middle, and Upper Middle Income Countries with a GNI per capita from $340 in Malawi to $6110 in Colombia.[2] And poverty ranges from low to high: the proportion of MPI poor in the starting period ranged from 1% to 94% across these countries.

Our analysis: one change – many angles

What did we do? We created rigorously comparable MPI values – which are denoted MPI_T because some differ slightly from published MPI values.[3] Then, we analysed how MPI changed in each of these 22 countries. Looking around, we compared changes in the MPI and in $1.25/day poverty to see if both measures matter. We look inside countries to see whether changes were even or uneven across regions. We break the changes in MPI down to see which indicators drove progress. We observe how changes in incidence and intensity are blended in different proportions by countries to create specific recipes of poverty reduction. We also take note of nation-wide changes in MPI indicators to make sure that the non-poor were not neglected. And we see where population growth competes with poverty reduction. This briefing only contains the headlines of the detailed analysis that has been conducted: more details as well as data tables can be found on our website (www.ophi.org.uk).

Limitations

Like all cross-national studies of poverty, ours operates under constraints. Cross-national comparisons are constrained by data as the precise variable definitions differ across countries (though they are well harmonized for the same country across time), and the years of surveys differ.

The Bigger Picture: MPI Reductions in 18 Countries

Of the 22 countries, 18 had statistically significant reductions in multidimensional poverty.[4] The pace of progress varied a lot. So let's take a closer look.

MPI stars: Nepal, Rwanda, and Bangladesh had an outstanding absolute decrease in MPI. Nepal had the fastest progress. Nepal's MPI fell from 0.350 to 0.217 – about -0.027 per year – and the incidence (H) fell from 65% to 44% in a five-year period (2006-2011). That is, H fell by 4.1 percentage points each year. Rwanda and Bangladesh follow very closely, reducing MPI by -0.026 and -0.025 on average every year, respectively, and reducing H by 3.4 percentage points and 3.2 percentage points per year.

Africa's other successes: Tanzania and Ghana also did

Photo by Mihika Chatterjee

Glossary

Here's a quick and intuitive review of the terms we use to show how MPI changes:

MPI – a number between 0 and 1 that reflects the level of acute poverty. A bigger number shows higher poverty. The MPI is the answer to **H x A.**

H – the Headcount Ratio or percentage of people who are identified as multidimensionally poor; sometimes referred to as the 'rate' of poverty. It goes from 0% to 100% and more is worse.

A – the Intensity or average percentage of deprivations that poor people experience together, measured from 33% to 100% in the case of MPI. More is worse.

Absolute change: The reduction is calculated by subtracting one measure from another. For example, a 5 percentage point reduction of H could mean that H decreased from 75% to 70% or from 10% to 5%. It's just the difference.

Relative change: This is the absolute reduction divided by the original poverty level, and shows what percentage of the original poverty is gone. For example, in the 10%-5% example, we have a 50% relative reduction in poverty [(10%-5%)/10%]

Annualized: To show the changes **per year**, the total change is divided by the number of years between the surveys. This makes it easier to compare countries if surveys are a different number of years apart.

Changes in MPI & H: Countries Ranked by MPI_T

Country and Period	MPI_T Values		Annualized Change in MPI_T		Stat. Sig.	MPI Headcount Ratio (H)		Annualized change in H		Stat. Sig.
	Year 1	*Year 2*	*Absolute*	*Relative*		*Year 1*	*Year 2*	*Absolute*	*Relative*	
Armenia 2005-2010	.003	.001	.000	-12.9%	**	.8	.3	-.1	-12.7%	**
Jordan 2007-2009	.011	.011	.000	-3.6%		3.2	3.0	-.1	-2.4%	
Colombia 2005-2010	**.040**	**.023**	**-.003**	**-8.4%**	***	**9.3**	**5.7**	**-.7**	**-7.8%**	***
Guyana 2005-2009	.053	.041	-.003	-5.4%	**	13.4	10.6	-.7	-5.2%	**
Peru 2005-2008	.085	.066	-.006	-7.3%	*	19.5	15.7	-1.3	-6.4%	*
Bolivia 2003-2008	**.175**	**.089**	**-.017**	**-9.8%**	***	**36.3**	**20.5**	**-3.2**	**-8.7%**	***
Zimbabwe 2006-2010/11	.180	.145	-.008	-4.2%	***	39.7	33.6	-1.4	-3.4%	***
Lesotho 2004-2009	.239	.182	-.012	-4.8%	***	51.2	40.7	-2.1	-4.1%	***
Kenya 2003-2008/9	.296	.244	-.009	-3.2%	***	60.1	51.2	-1.6	-2.7%	***
Cambodia 2005-2010	.298	.212	-.017	-5.8%	***	59.1	45.9	-2.6	-4.5%	***
India 1998/9-2005/6	.300	.251	-.007	-2.4%	***	56.8	48.5	-1.2	-2.1%	***
Ghana 2003-2008	**.309**	**.202**	**-.021**	**-6.9%**	***	**58.7**	**41.9**	**-3.4**	**-5.7%**	***
Nepal 2006-2011	**.350**	**.217**	**-.027**	**-7.6%**	***	**64.7**	**44.2**	**-4.1**	**-6.3%**	***
Bangladesh 2004-2007	**.365**	**.289**	**-.025**	**-7.0%**	***	**67.2**	**57.5**	**-3.2**	**-4.8%**	***
Tanzania 2008-2010	**.367**	**.326**	**-.021**	**-5.7%**	***	**65.2**	**59.9**	**-2.7**	**-4.1%**	***
Nigeria 2003-2008	.368	.313	-.011	-3.0%	***	63.5	54.7	-1.8	-2.8%	***
Malawi 2004-2010	.381	.334	-.008	-2.0%	***	72.1	66.7	-.9	-1.3%	***
Madagascar 2004-2008/9	.383	.400	.004	1.0%		68.6	71.8	.7	1.0%	
Uganda 2006-2011	.417	.343	-.015	-3.5%	***	77.7	66.8	-2.2	-2.8%	***
Senegal 2005-2010/11	.440	.423	-.003	-0.7%		71.3	70.8	-.1	-0.1%	
Rwanda 2005-2010	**.460**	**.330**	**-.026**	**-5.6%**	***	**82.9**	**66.1**	**-3.4**	**-4.0%**	***
Ethiopia 2005-2011	.605	.523	-.014	-2.2%	***	89.7	84.1	-.9	-1.1%	***
Ethiopia 2000-2005	.677	.605	-.014	-2.1%	***	93.6	89.7	-.8	-0.8%	***

Note: *** statistically significant at α=0.01, ** statistically significant at α=0.05, * statistically significant at α=0.10

very well, with an annualized MPI reduction of -0.021. Tanzania reduced H by 2.7 percentage points per year, and Ghana by 3.4 percentage points.

Strong performers: Cambodia and Bolivia showed the next fastest reduction of MPI, reducing poverty rates by 2.7 and 3.2 percentage points respectively, and MPI by 0.017 per year.

Biggest relative reductions: Armenia, Bolivia and Colombia slashed their original poverty levels the most – cutting poverty by a whopping 10% per year in the case of Bolivia. Each of the top-performing countries – Nepal, Rwanda, Bangladesh, Tanzania, Ghana, Cambodia – sliced their starting MPI by 5% to 8% per year – making them successes in both relative and absolute terms, too.

Solid gains: A range of countries like Uganda, Ethiopia, Lesotho, Nigeria, Kenya, Malawi, Zimbabwe, India, and Armenia had slower but still significant reductions in poverty.

Poverty on hold: Four countries – Madagascar, Senegal, Jordan and Peru – had no statistically significant reduction in poverty during the previous period.

MPI and $1.25/day Poverty: Not Identical Twins

Most countries reduced both multidimensional poverty and income poverty during the same period,[5] which is good news. Let's look at the patterns.

As fast or faster: Nepal, Rwanda, Bangladesh, Ghana, and Bolivia all reduced MPI and H as fast or faster than income poverty, both in absolute and relative terms. Nepal made stellar progress in cutting both kinds of poverty. Rwanda, Ghana and Bolivia reduced MPI

Figure 1: Absolute Reduction of MPI and $1.25/day Incidence Per Year

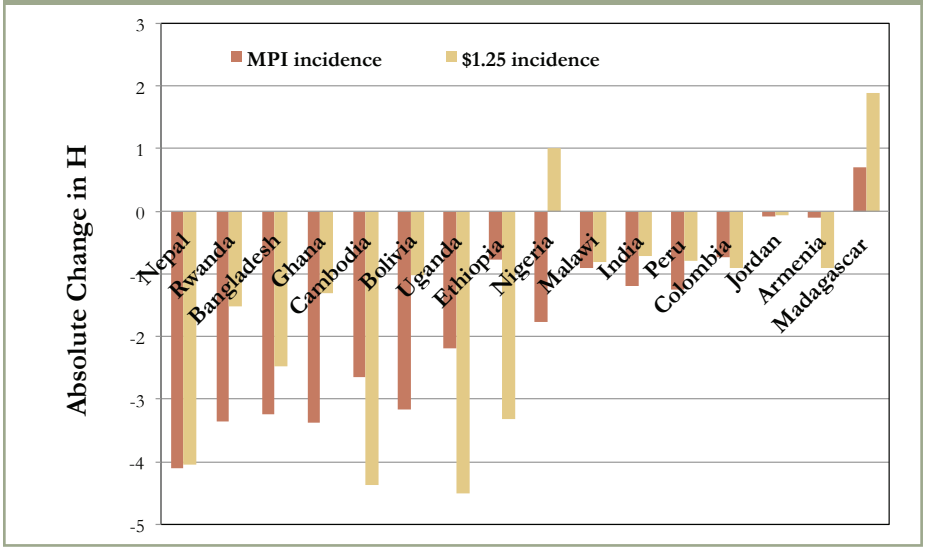
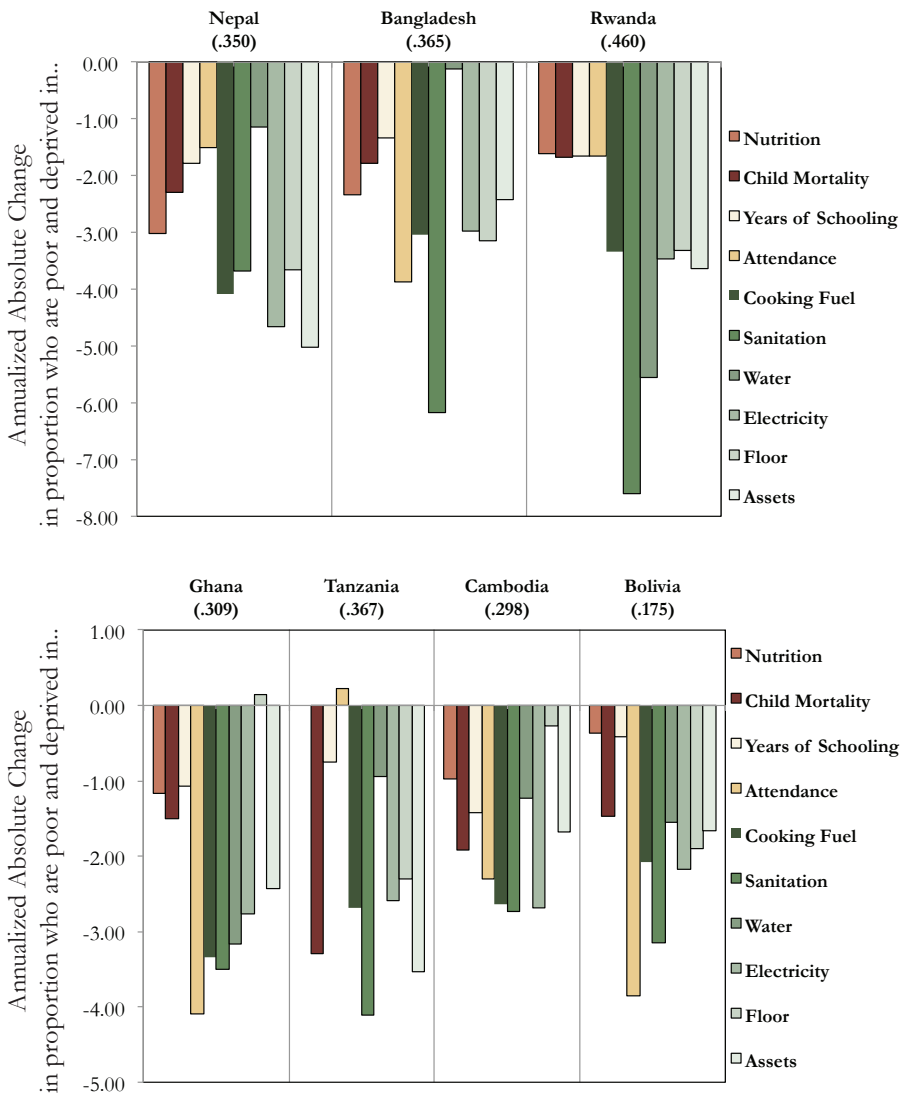


Figure 2: Absolute Change in indicators



two to three times faster than $1.25/day poverty in absolute terms and closed the gap to eradication faster in relative terms, too.

Mild reduction: Among lower performing countries, Nigeria, India, and Peru all reduced MPI at faster rates than income poverty in both relative and absolute terms.

Impressive $1.25/day reduction: Uganda, Cambodia, Nepal, and Ethiopia had the highest rates of income poverty reduction.[6] Income poverty reduction outstripped MPI reduction in Ethiopia and Uganda, falling two to four times faster.

MPI – Making progress visible: If income and multidimensional poverty measures moved together, we wouldn't need two measures. One would suffice. But for at least 20 of these countries, that didn't happen. If we had only looked at progress in reducing income poverty, our leaders would have been Uganda, Cambodia, Nepal, and Ethiopia. The tremendous gains of Rwanda, Ghana, and Bolivia, for example, would have been invisible. The MPI helps us to notice their progress at-a-glance – and in more detail if we wish.

Let's zoom in on these changes now.

What Changed: One Measure, Many Angles

This section highlights some insights from across 189 regions and 10 indicators to share what MPI analyses look like. For a more detailed country study, see our research brief on India or the full paper (Alkire and Seth 2013a,b).

Variation on the ground: Comparing MPI reduction across subnational regions illuminates diverse patterns of reduction across regions.[7] Bangladesh and Rwanda reduced MPI significantly in every region, Nepal in 10 out of 13 regions, Cambodia in 12 out of 19 regions, and Nigeria in only one of its six regions.

What happened in the poorest regions? Here's a story of success: Bolivia had significant poverty reduction in all areas, but its two poorest regions originally – Chuquisaca and Beni – made the fastest progress of all. A similar tale of strong progress in the poorest regions could be told for Colombia's region of Litral Pacifico, Kenya's Northeastern region, Cambodia's Mondol Kiri/Rattanak Kiri, or Lesotho's Qacha's-Nek region.

In other countries like Tanzania, India, or Nigeria, the poorest regions did not lead the nation –

Population Growth and Poverty Reduction

In order to eradicate poverty, poverty reduction has to outpace population growth. It did in our star performers – but in Ethiopia, Madagascar, Malawi, Senegal, and Uganda, the absolute number of poor people still went up. Our 'eradicating poverty' scenarios assume a medium rate of population growth in each country.

rather, disparity increased. India's poorest regions had slower progress 1999–2006, and two poor states – Rajasthan and Bihar – did not significantly reduce MPI. India's fastest gains occurred in Andhra Pradesh and Kerala, followed by Tamil Nadu.

What changed? MPI changes because deprivations among the poor in its ten indicators go down. Reductions in each of the ten indicators contributed to MPI reduction. Nepal, Rwanda, Bolivia, India and Colombia had statistically significant changes in all ten indicators.[8] As Figure 2 shows, the three countries had slightly different compositions of change, with Nepal having higher reductions in undernutrition, electricity, and assets; Rwanda in sanitation and water, and Bangladesh in school attendance.

Each indicator made the highest or second highest contribution to MPI reduction in at least one country. For example, in eight countries the largest reduction of deprivations occurred in sanitation.

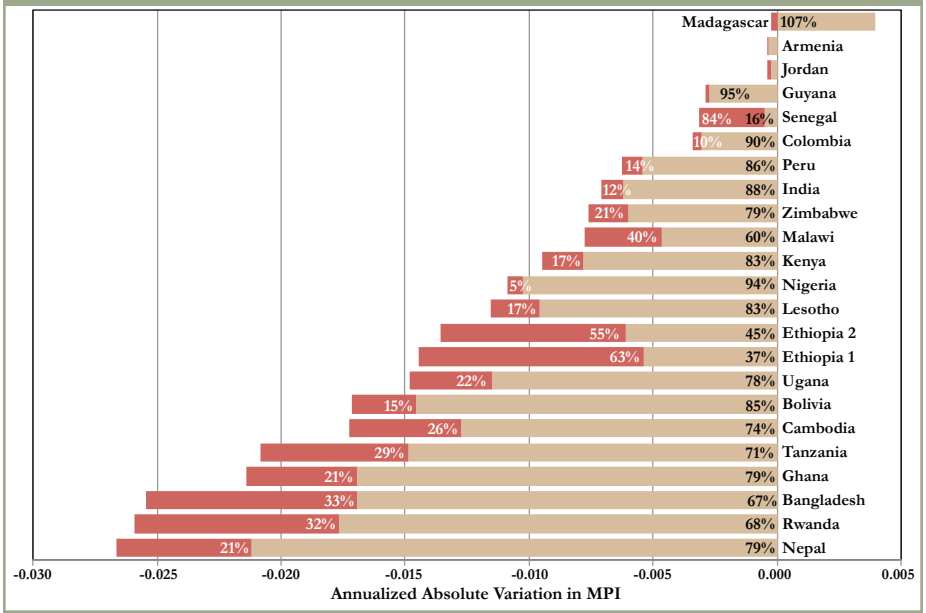
Contributions: When we apply the MPI's weights to re-balance our attention to health and education dimensions which have fewer indicators,[9] reductions in child mortality and in children not attending school contribute most to changes in MPI in eight countries each. Overall, a health or education indicator is among the top two contributors to MPI reduction in all countries except Rwanda.

Incidence and intensity: exiting poverty and being less poor

The MPI provides incentives to reduce poverty in two ways:

1. Reduce **H**, the incidence of poverty

Figure 3: Absolute Change in MPI and Decomposition of the Incidence and Intensity effect



2. Reduce **A**, the intensity of poverty among poor persons.

Either of these two options reduces MPI. So what did countries do? As usual, it varied.

The 'top-performing countries' reduced H and A. Interestingly, the 'top performing' countries reduced *both* the headcount of poverty *and* the intensity of poverty.

Incidence-focused: Nearly all countries reduced incidence more than intensity. In India, Colombia, and Nigeria, the reduction in incidence accounted for 88%, 90% and 94% of the overall reduction in MPI.

Intensity-focused: A reduction in intensity of poverty among the poor accounted for 84%, [63%, 55%] and 40% of MPI reduction, respectively, in Senegal, Ethiopia [2000-5 and 2005-10] and Malawi. Reductions in intensity were strongest in poorer countries, showing the vital importance of using MPI, not just the percentage of poor people, in order to document and celebrate progress in the poorest countries.

Figure 4: Absolute Change in Incidence and Intensity

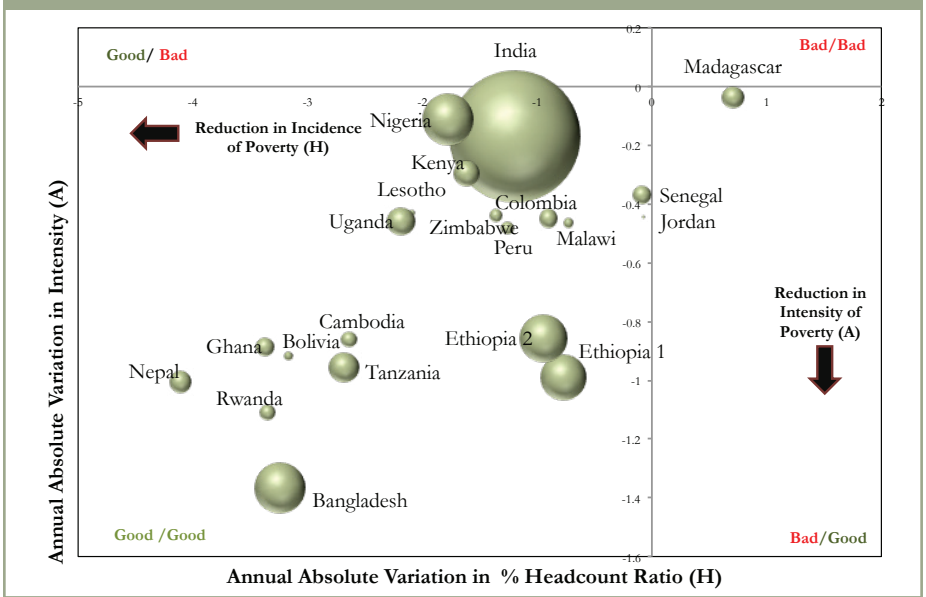


Photo by Mihika Chatterjee

Population Growth and Poverty Reduction

"Debates about justice – if they are going to relate to practicalities – cannot but be about comparisons. We do not abstain from comparisons even if we are unable to identify the perfectly just. For example, it may well turn out that the introduction of social policies that eliminate widespread hunger, or remove rampant illiteracy, can be endorsed by a reasoned agreement that it would be an advancement of justice. But the implementation of such policies could still leave out many improvements that we can propose individually and even accept socially. … Justice-enhancing changes or reforms demand comparative assessments, not simply an immaculate identification of 'the just society' (or 'the just institutions')."

Amartya Sen, *The Idea of Justice* 2009, Chapter 18

Invitation for improvement: Figure 4 also shows that some countries could have accelerated progress by balancing their efforts. Ghana or Bolivia would have reached the levels of Bangladesh had they reduced intensity more, for example.

Eradicating Multidimensional Poverty[10]

Current generations may see the eradication of acute multidimensional poverty in some countries. The anticipated date of eradication depends on starting poverty levels, population growth, and the assumptions made.

To take a straightforward scenario, let's simply assume the 'top performing' countries, Nepal, Rwanda, and Bangladesh, continue reducing poverty steadily at the current absolute rate until it's gone. In that case, they would halve poverty in less than 10 years and eradicate it within 20.

If we run the same scenario for all 22 countries, we find that half of the countries would eradicate MPI poverty within 20 years, 18 within 41 years, and all 22 within 95 years. For example, at the observed rates of progress it would take India 41 years and Malawi 74 years to eradicate acute poverty as measured by the MPI. However, the top performers suggest it may possible to accelerate these rates.[11]

Progress with Imperfect Institutions

The 'star performers' in reducing MPI are not impeccable countries with unrealistically strong institutions. Nepal's GNI per capita is $540; Rwanda's is $570; and Bangladesh's is $770. All are low income countries, with Rwanda's pace of growth being the fastest at over 8% during the survey period.

Despite imperfect institutions, these countries prove that real progress is possible. In Nepal and Bangladesh, at least, an active, vocal, and at

Figure 5: Changes Over Time in the Adjusted MPI_T

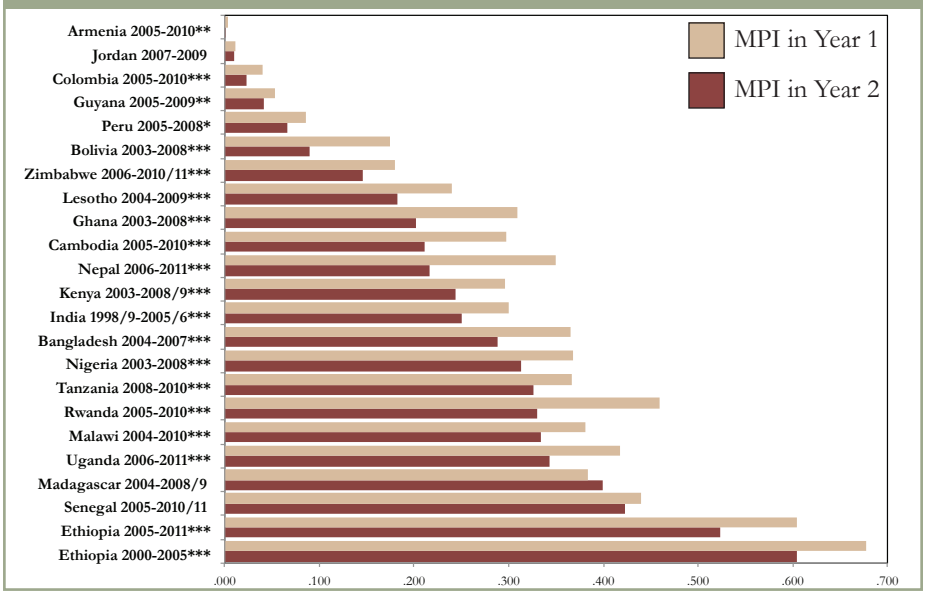


Photo by Mihika Chatterjee

India: Multidimensional Poverty At-A-Glance:

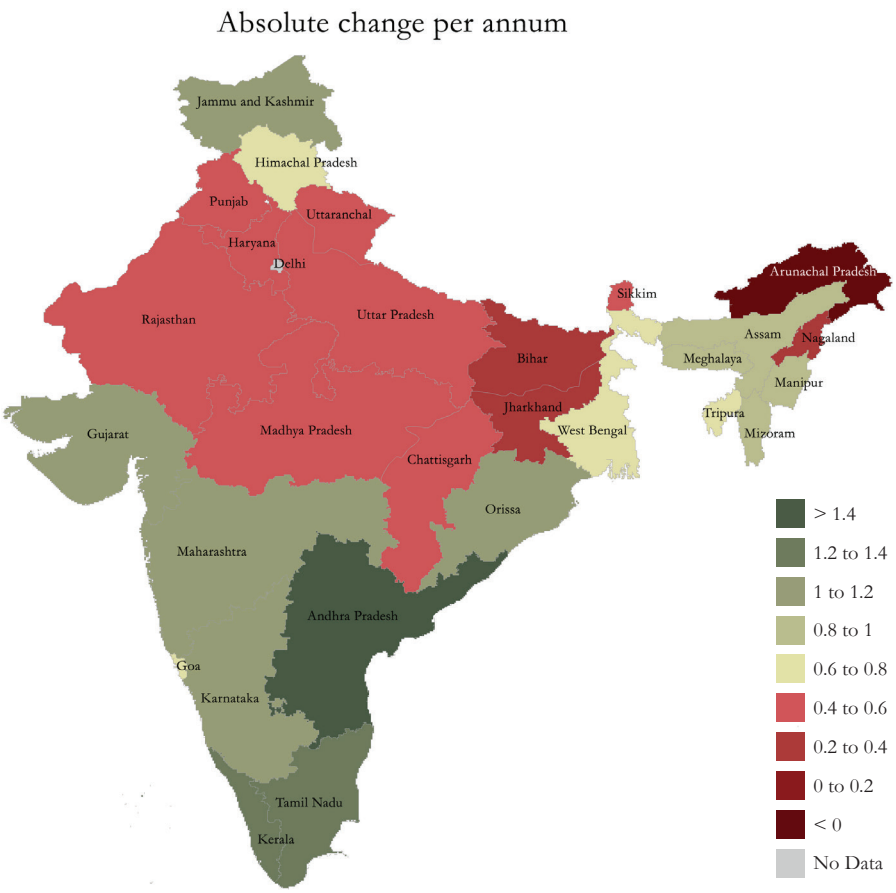
Significant Reductions: India reduced multidimensional poverty significantly between 1998/9 and 2005/6, with strong reductions among scheduled caste groups and across all indicators, as well as among the ultra-poor.

Faster than Income Poverty Reduction: The rate of MPI headcount reduction was more than 50% faster than the rate of income poverty reduction in both absolute and relative terms. India reduced MPI twice as fast as the income poverty gap measure.

Slower in Poor States and Groups: India's MPI reduction was, however, considerably slower in the poorest states and among the poorest groups, such as Scheduled Tribes, Muslims, and female-headed households.

International Comparisons: From a cross-country perspective, India reduced MPI at less than one-third the rate of its poorer neighbours Bangladesh and Nepal – just a bit slower than Zimbabwe or Peru, and a bit faster than Ethiopia or Malawi.

Updating Progress: Data are not available to update India's progress on reducing the MPI since 2006 (Alkire and Seth 2013a).



times disgruntled civil society has clearly played a role, as has the rise in women's voices in politics as well as civil society. It may be that, as Amartya Sen observed, the process of advancing justice "is not automatic and requires activism on the part of politically engaged citizens." (Sen 2009:351)

Naturally the global MPI is not tailor-made to any national context, so some governments are implementing national MPIs whose indicators, cutoffs and weights reflect their context and policy priorities as well as the voices and visions of the poor. But these comparisons of poverty reduction across 22 countries aid, incentivize, and celebrate the reduction of disadvantages that blight people's lives. They also demonstrate the value-added that a multidimensional poverty measure such as the MPI can bring: to provide insights into progress by region, indicator, and weighted contributions; to incentivize reductions in intensity among the multiply disadvantaged; and to make visible the successes that income poverty overlooks.

Photo by Gisela Robles Aguilar

Notes

1. All population estimates are taken from United Nations, Department of Economic and Social Affairs, Population Division (2011). World Population Prospects: The 2010 Revision, CD-ROM Edition.

2. World Bank (2013). *World Development Indicators*. Washington DC: World Bank, accessed February 2013.

3. Sometimes the surveys and indicator definitions improve in a new survey, but in order to have definitive comparisons of MPI over time, we only used information that was exactly the same in both periods. Thus the MPI_T of Cambodia, Ethiopia, Kenya, Lesotho, Madagascar, Rwanda and Senegal all differ from published MPI values. For details see Alkire, Conconi and Roche 2013 and Alkire and Roche 2013; for India, see Alkire and Seth (2013a).

4. All statistical significance is evaluated at of α=0.05. Note that Ethiopia had comparisons for two periods: 2000–2005 and 2005–2011.

5. This comparison covers the 16 countries for which direct, interpolated, or extrapolated income poverty data were available from PovCalNet. The 6 remaining countries had no income poverty trend or no income data after the start of the MPI-comparison period. Where income poverty data were not available from the same year of a survey, a linear extrapolation between the two closest data points was used to estimate the rate of income poverty reduction. For details see Alkire and Roche (2013).

6. This refers to Ethiopia 2000–2005; the nationally reported rate of income poverty reduction in Ethiopia slowed from 2005–2010 to about the same rate as Ghana's reduction – 1.3% per annum. See http://www.worldbank.org/en/country/ethiopia/overview and http://www.mofed.gov.et/English/Resources/Documents/Interim%20Report%20on%202010-11%20Poverty%20Analysis.pdf.

7. When data permit, we report MPI estimates for subnational regions – states, provinces, and so on. The population and number of regions vary, so detailed analyses reflect population-weighted trends.

8. This is the case for censored headcount but varies on raw headcount.

9. Recall, that there are equal weights on each dimension, and thus the weights on the health and education indicators are one-sixth each, and those on the standard of living indicators are 1/18th each. In other words, each health and education indicator carries a weight that is three times higher than each living standard indicator, in order to create overall parity. This means that, in effect, a one percentage point reduction in the censored headcount ratio of malnutrition has a three times greater impact on changes in MPI than a one percentage point reduction in the censored headcount ratio of the use of cooking fuel, everything else remaining unchanged. The weights rebalance policy incentives, so that each dimension has roughly equivalent prominence.

10. These estimations were computed based on the following assumptions: 1) the population is growing according to the moderate UN projections and evenly across poor and non–poor, and 2) the poverty reduction is constant at the pace of the absolute annual change between year 1 and year 2. This is a very optimistic scenario, as one might expect that as poverty is reduced it becomes harder and the pace of reduction will slow down. So it should be understood that the scenario is a very positive one and goes beyond what is expected, but is based on the current reduction rate. For details see Alkire and Roche (2013).

11. To fine-tune these predictions, we would need to consider additional assumptions and also back analyse MPI across more periods, and update MPI comparisons with the new waves of MICS4 and DHS datasets.

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Oxford Poverty & Human Development Initiative (OPHI)
Oxford Department of International Development (ODID)
Queen Elizabeth House (QEH)
University of Oxford, Mansfield Road
Oxford OX1 3TB UK

Telephone: +44 (0)1865 271915
Email: ophi@qeh.ox.ac.uk
Website: www.ophi.org.uk

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