GOVERNMENT OF NEPAL
NATIONAL PLANNING COMMISSION

NEPAL

Multidimensional Poverty Index

ANALYSIS TOWARDS ACTION

2018

In partnership with

OPHI
Oxford Poverty & Human Development Initiative

UNIVERSITY OF OXFORD

NEPAL
Multidimensional Poverty Index

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Preface

Nepal's pathbreaking decision was to use the global Multidimensional Poverty Index, very lightly adapted, as its national MPI. The global MPI met Nepal's primary purpose in designing a national MPI, which was to monitor multidimensional poverty, including undernutrition and other SDG-related and national priorities, and to look at poverty both nationally and across regions and groups.

There are several reasons for this choice: First, it enables Nepal to compare its national MPI with the level and trends of other countries, which is important to help calibrate and incentivize Nepal's own progress. Second, the global MPI is already familiar within Nepal's policy circles; its structure has been academically validated, it is transparent, and is a trusted measure, which makes its communication easier. Third, the global MPI addresses a key subset of SDG poverty-related indicators – and these include the most pressing poverty issues in Nepal. Fourth, the global MPI covers a subset of priorities that were independently articulated in Nepal's national plan and in its Constitution. Fifth, the global MPI uses most of the relevant indicators that are present in the 2014 MICS dataset. This decision to adopt a national MPI similar to the global MPI was taken after careful consideration – both technical and substantive – including the implementation and full analysis of a set of alternative national MPIs.

This empirical and analytical study should be useful for the provincial governments as they take office for the first time, enabling them to accelerate poverty reduction by seeing the different forms it takes in each province.

I'd like to thank my colleagues at the National Planning Commission and the Central Bureau of Statistics for their rigourous preparatory work on the MPI. I am particularly grateful to Sabina Alkire, the Director of the Oxford Poverty and Human Development Initiative, and her team, for their professional support and guidance in this important endeavor that will give Nepal's new beginning as a federal country an influential policy headstart.

Swarnim Waglé
Vice-Chair of the National Planning Commission
December 2017

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Foreword

I am delighted with the publication of Nepal's Multidimensional Poverty Index (MPI) as an official national poverty measure which is aligned with the Sustainable Development Goals.

Nepal's MPI is a joint product of the Central Bureau of Statistics and OPHI under the leadership of the National Planning Commission. As such, Nepal's MPI is both a technically rigorous measure of poverty and a measure that has been designed to support current national and provincial policy priorities. It has been a genuine pleasure to collaborate with such professional institutions and competent colleagues.

What is striking and gives hope from this study is the pattern of multidimensional poverty reduction in Nepal. According to strictly harmonised data, Nepal halved its MPI 2006–2014. The multidimensional poverty rate also fell by about half. Change was driven by statistically significant reductions in each of the 10 component indicators. Deprivations in child mortality and lack of access to electricity fell especially sharply. Across provinces – the poorest of which are provinces 2 and 6 – the poorer provinces often saw faster poverty reduction.

In an era of the SDGs, Nepal's decision to use the global MPI structure, lightly adapted, in its national MPI – showing the level and composition both nationally

and disaggregated by groups such as provinces and age cohorts – may be of interest to other countries that are designing their national MPIs using similar datasets. Naturally, Nepal's first national MPI – like the global MPI – does not contain all aspects relevant to poverty in Nepal due to data constraints. But this powerful policy tool still provides meaningful information to guide more effective policies and monitor progress. And when data permit it can be strengthened.

This report presents not only the level of and trends in poverty but also its composition by dimensions. From the perspective of planning and policy design, this information from the MPI can be used to target poor people and groups, allocate resources to have the biggest poverty impact, coordinate multisectoral policies, and to manage interventions and make evidence-based policy adjustments that accelerate impact. In this way, the MPI complements monetary poverty both as a diagnostic tool and as a guide to policy.

Our hope is that Nepal's MPI will further support energetic public action to confront and end poverty in all its dimensions.

Sabina Alkire
Director
Oxford Poverty and Human Development Initiative,
University of Oxford

Acknowledgements

This report was prepared under the direction of Swarnim Waglé Vice Chair of the National Planning Commission (NPC) of the Government of Nepal, in cooperation with the Oxford Poverty and Human Development Initiative (OPHI) at the University of Oxford, led by Sabina Alkire.

The technical work was performed by the Central Bureau of Statistics (CBS), led by Director General Suman Raj Aryal, with the support of Deputy Director General Nebin Lal Shrestha and Suresh Basnyat. Further guidance and support was offered by Joint Secretary Khomraj Koirala, Joint Secretary of the Economic Management Division at the National Planning Commission, and Teertha Raj Dhakal, Joint Secretary of the Monitoring and Evaluation Division at the National Planning Commission.

The team are also grateful to others whose inputs and insights improved this report, including Abdul Alim, Regional Advisor for Social Policy at UNICEF South Asia, Narayan Raj Poudel, Program Director, NPC, and Ram Hari Gaihre, Director of Poor Households Support Coordination Board Secretariat, Ministry of Cooperatives, and Poverty Alleviation. The team also expresses its gratitude to all Members of NPC and Bishnu Prasad Lamsal, Member-Secretary of NPC, for their endorsement of this joint initiative.

The estimations of MPI were calculated by Suresh Basnyat at CBS and Christian Oldiges and Sabina Alkire of OPHI. Technical support was generously offered by the World Bank, and the team are particularly grateful for the work of economist Hiroki Uematsu of the World Bank, who wrote a section on monetary poverty and participated proactively in the work to design Nepal's national MPI as well as in the provincial disaggregations. We are also grateful for the generous financial support provided by the World Bank and the UK's Department for International Development (DFID).

Photos for this report, which are credited in-text, were from online sources as well as from the World Bank's library, and we are grateful for permission to use them.

To finalize this report, we are grateful for drafting and editing from OPHI's Ann Barham, Adriana Conconi, and Corinne Mitchell. The layout and report design was done by Maarit Kivilo, also at OPHI. The report was printed in Kathmandu by the Government of Nepal.

The team also expresses its gratitude to all Members and the Member-Secretary of NPC for their endorsement of this joint initiative.

Executive Summary

This report presents Nepal's official national Multi-dimensional Poverty Index (MPI) using the latest data from the Multiple Indicator Cluster Survey (MICS) 2014. Based on the Alkire Foster methodology, the MPI counts the joint deprivations faced by individuals. Following the indicators of the global MPI, the Nepal MPI includes multiple indicators related to health, education, and living standards.

Our computations show that 28.6% of Nepal's population is multidimensionally poor. The indicators that contribute most to multidimensional poverty in Nepal are undernutrition and households that lack any member who has completed five years of schooling.

A unique feature is that the Nepal MPI can be disaggregated by the newly formed seven provinces of Nepal. Naturally, the rural-urban divide is evident, with 7% of the urban population and 33% of the rural population being multidimensionally poor. We find that Provinces 6 and 2 have the highest rate of multidimensional poverty – with every second person being multidimensionally poor (50%) – followed by Provinces 5 and 7 (approximately 30%). The major contributing indicators to overall poverty in Nepal and in rural Nepal are malnutrition and insufficient years of schooling.

Looking backwards, we find that ground-breaking and continuous progress has been made in reducing multidimensional poverty. According to strictly harmonised data, Nepal halved its MPI 2006–2014. The incidence of multidimensional poverty has gone down (using harmonised datasets) from 59% in 2006 to 39% in 2011 and 29% in 2014. At the same time, we see statistically significant progress being made across all of the ten indicators of multidimensional poverty. To highlight just one, the incidence of those who are multidimensionally poor and lack access to adequate sanitation facilities went down from more than 50% to less than 20%.

To keep up the momentum of these achievements will require ongoing efforts and political leadership in the coming years. Major investments in health and education will be necessary to lift the poorest of the poor out of multidimensional poverty. Further, in order to reduce regional inequalities across provinces, greater interventions for the poorest provinces are required.

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I. Introduction

Given Nepal's history and its trajectory of social indicators, instituting a multidimensional poverty measure represents a natural progression in thought, policy analysis, and statistical application. This chapter serves as an introduction Nepal's first official national Multidimensional Poverty Index (MPI). It has the following sections:

    1.1   Monetary Poverty Measurement in Nepal;

    1.2   Multidimensional Poverty Measurement in Nepal;

    1.3   The Purpose of Nepal's MPI.

1.1 MONETARY POVERTY MEASUREMENT IN NEPAL[1]

As in many other countries, poverty in Nepal was traditionally measured by a monetary indicator. Using data from Living Standard Surveys, monetary values of consumption expenditures on multiple aspects of life, including food, education, housing, and assets, were calculated for surveyed households and compared against poverty lines below which individuals are deemed poor. Poverty lines were estimated based on the Cost of Basic Needs (CBN) approach (Ravallion, 1994, 1998) and tied to the minimum amount of Nepali rupees needed to satisfy basic caloric requirements and basic needs for non-food goods and services.

Nepal's first comprehensive poverty assessment was published in 1991 and was based on the Multi-Purpose Household Budget Survey conducted in 1984/85.

Using what was considered a very conservative poverty line then, at least 40% of the population was identified as poor (World Bank, 1991). Since then, three rounds of Nepal Living Standard Surveys (NLSS) were conducted in 1995/96, 2003/04 and 2010/11 to monitor poverty and understand the drivers of changes in poverty. Poverty headcount rates were 42% in 1995, 31% in 2003, and 25% in 2010. While the estimates from the first two rounds of the NLSS are comparable, the same is not true for the most recent estimate. This is mainly due to methodological changes in the way the poverty lines were calculated in 2010.

If the poverty line originally estimated in 1995 were to be used in 2010 with adjustments made for inflation, the poverty rate would have been as low as 12.5%. This, however, was not adopted as the official poverty rate because of the growing perception and mounting evidence about improving living standards in Nepal. Overall economic wellbeing in Nepal had improved so much that the definition of poverty had changed between 1995 and 2010. Some of what used to be luxury items became necessities. In order to reflect the rising consumption patterns in 2010, a new poverty line was estimated using consumption data from the 2010 NLSS. The new poverty line was set at Rs. 19,262, an increase in real value of 35% compared to the original poverty line. The poverty rate using the new poverty line was 25% in 2010. On the one hand, some may argue that even the new poverty line may be too parsimonious and the resulting poverty estimates too low. On the other hand, it speaks to the renewed

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1   This section largely borrows from World Bank (2016), and Uematsu, Rizal and Tiwari (2016).

commitment to poverty reduction by the Government of Nepal as this change significantly increased the monetary poverty rate as well as the number of poor.

Monetary poverty in Nepal has been predominantly rural. In 2010, the urban poverty rate was 15.5%, significantly lower than the rural poverty rate of 27.4% with notable regional disparities. There is a regional disparity in poverty incidence, with the Mid-western and Far Western regions of the country being poorer than the rest of the country. Recalculation of monetary poverty across provinces under the new federal structure shows levels of poverty incidence ranging from 17% to 46%. Ranking of provinces by poverty incidence is difficult due to overlapping confidence intervals (Table 1.1).

1.2 MULTIDIMENSIONAL POVERTY MEASUREMENT IN NEPAL

The Sustainable Development Goals recognise and seek to end poverty in all its forms and dimensions. Thus a multidimensional concept of poverty is now embedded in the SDGs. Poverty does encompass monetary poverty, which has been the traditional measure of poverty in Nepal. But as no one indicator captures all

aspects of poverty, many countries, including Nepal, are complementing the national monetary poverty measure with a national multidimensional poverty index.

There are multiple motivations for introducing a national MPI in Nepal to complement the monetary poverty measure. First, it brings into view people who may not be poor according to monetary metrics. Gaihre (2013, 2014) implemented an MPI using the 2010/11 Nepal Living Standard Survey, which also included consumption poverty, and found that over half of the persons identified as multidimensionally poor were not consumption poor, even though the poverty rate by both measures was roughly equal. Thus an MPI directs attention to sets of deprivations not captured by consumption poverty. Second, the MPI can be affected directly by public actions that may not affect monetary poverty in the short term. Reductions in deprivations of water, sanitation, road access, school attendance, undernutrition, and so on are likely to reflect social and infrastructure policies immediately, but reducing these deprivations may not affect consumption poverty for some time. Further, reductions in income poverty are in part subject

TABLE 1.1 Provincial Monetary Poverty in 2010

Province	Poverty headcount rate (%)	Standard error	95% confidence interval	
			Lower bound (%)	Upper bound (%)
1	16.7	0.02	12.5	21.0
2	26.7	0.02	22.3	31.1
3	20.6	0.03	15.4	25.7
4	21.0	0.03	14.9	27.1
5	25.3	0.03	19.7	30.9
6	38.6	0.05	28.1	49.2
7	45.6	0.04	38.3	52.9

Source: World Bank Staff Calculation using 2010/11 Nepal Living Standard Survey

to international fluctuations – from remittances to exchange rates – whereas the MPI is effectively a monitoring tool because any deprivation of a poor person that is reduced, directly reduces MPI. Third, because of its construction and ability to be broken apart in different ways, the MPI can act as a tool for policy coordination, and for the design of integrated multisectoral policies.

Conceptually, the MPI may reflect the concept of capability. Nobel Laureate, Amartya Sen has argued that social evaluation should be based on the extent of the freedoms that people have to further the objectives that they value – things like education, housing, health, and nutrition. Poverty in this framework becomes 'capability failure' – people's lack of the capabilities to enjoy key 'beings and doings' that are basic to human life. The concept is inherently multidimensional.

Nepal's first multidimensional measure was the global MPI – an internationally comparable measure of acute poverty developed by the Oxford Poverty and Human Development Initiative (OPHI) at the University of Oxford with the United Nations Development Programme Human Development Report Office (UNDP HDRO). The global MPI complements monetary poverty measures by reflecting the acute deprivations that people face simultaneously in other dimensions which are also essential to guarantee a dignified life. Like the Human Development Index (HDI), the MPI has three dimensions: education, health and living standards.

The first global MPI was released in 2010 using data from Nepal's 2006 DHS survey. The global MPI for Nepal has been updated using the 2011 DHS and 2014 MICS. The website of the OPHI (www.ophi.org.uk) carries detailed tables, disaggregation by subnational units and ages, graphics, policy briefings, and academic papers on the MPI. The global MPI served to create awareness about the value-added of a complementary

measure to that of consumption poverty, and thus laid the groundwork for a conversation about Nepal's national MPI.

1.3 PURPOSE OF NEPAL'S MPI
The purpose of Nepal's national MPI is to monitor key simultaneous disadvantages that affect multi-dimensionally poor people. The indicators constituting Nepal's MPI reflect national priorities. Nepal's MPI is to monitor progress across a set of interlinked and policy-responsive Sustainable Development Goals and targets that are of recognised national and global importance. Detailed MPI analysis, such as that presented in this report, will support more effective integrated and multi-sectoral policies at both national and provincial levels. Analysis of MPI by province, age cohort, and other characteristics, will identify the poorest groups in order that they can be prioritized to leave no one behind.

Nepal's MPI reflects national priorities. The MPI was developed on the basis of insights about multidimensional poverty in Nepal that come from a wide range of sources: key informant interviews; consultations with academic, civil society, and government leaders; participatory work; academic research; the national development plan; the Constitution; and the SDGs. Each of these sources stressed the need for Nepal's consumption poverty measure to be complemented by a multidimensional poverty measure. They articulated dimensions and indicators that are of importance in Nepal, assessed data quality in the DHS and MICS surveys used, drew attention to aspects of poverty the MPI does not cover, as well as those that are most aligned with the current plans, priorities, and ambitions.

The first launch of the global MPI stirred interest because its headcount ratio – at 65% – was considerably higher than the consumption poverty rate. Shortly after its launch in 2010, UNDP convened a panel of

experts to clarify the differences between the global MPI results and consumption poverty, and to seek advice. One recommendation that emerged and is reflected in Nepal's national MPI was that roofing material needed to be considered, because in some climactic zones roofing, rather than flooring, is the pivotal housing material. Other issues raised at that meeting – such as the importance of load-shedding rather than mere access to electricity and the importance of micronutrients as well as undernutrition – continue to be recognised as important but are not possible to measure using the MICS 2014 dataset.

In 2013 Nepal was highlighted particularly for reduction of the global MPI from 2006–2011. During this period, Nepal reduced acute multidimensional poverty as measured by the global MPI faster in annualized terms than any other country of the 34 countries (2.5 billion persons) covered. The baseline in 2006 was at a nadir for Nepal, being the year the Peace Accord was signed. Still, as a least-developed country which has had a rapid succession of governments, this rate of MPI reduction is a tremendous achievement.

When it became apparent that Nepal's rate of MPI reduction was notably swift, a series of interviews with the data providers and other experts were undertaken by OPHI to probe these findings and ascertain whether the data had significant quality issues. After extensive critical enquiry, the results were validated. The updated global MPI was launched in March 2013 in Kathmandu at an event organised by UNDP, with the participation of the National Planning Commission (NPC), the Central Bureau of Statistics (CBS), and independent experts, and the academic

study documenting Nepal's experience leading 34 countries was presented and subsequently published (Alkire Roche and Vaz 2017).

Later in 2013, conversations about a national MPI began within Nepal. Interest in building a national MPI for Nepal continued intermittently at the NPC and within CBS. For example, in 2013 and 2014 CBS's Statistical Bulletin published two papers exploring an MPI built from the 2010–2011 Nepal Living Standard Surveys.[2] In 2016, participatory field studies on multidimensional poverty were conducted after the earthquake in central Nepal. The case studies elucidated the ongoing importance of the indicators now used in Nepal's MPI and exposed missing indicators such as roofing and load-shedding. In addition, deprivations in land tenure, and safety (e.g. from wildlife in nearby forests) were voiced. Positive aspects of the lives of poor and deprived persons – such as warm family and community relationships, and spiritual wellbeing – were also articulated.

In 2017, under the leadership of the NPC, the national MPI was developed. The 2014 MICS survey was unanimously selected as the appropriate dataset, because it was a recent nationally representative dataset with many relevant indicators and clear national ownership. A universe of indicators was computed from the MICS and the technically validated indicators were identified. A set of candidate MPI measures with estimated, analysed, and presented to the NPC, as well as joint secretaries and other experts. The candidate measures reflected different indicators relating to gender, child poverty, rights, and SDG

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2   A similar study was published by Mitra (2016).

indicators. Nepal's national MPI is lightly adapted from the global MPI, mainly because key national and SDG priorities measured by MICS, such as child undernutrition, schooling, and water and sanitation, are included. In this way Nepal's national MPI also enjoys the familiarity of the global MPI structure and its comparability across countries.

Gajendra Shrestha/World Bank

II. Methodology

2.1 ALKIRE FOSTER METHODOLOGY

The global MPI, which was developed by Alkire and Santos (2010, 2013) in collaboration with the UNDP, and first appeared in the 2010 Human Development Report, is one particular adaptation of the adjusted headcount ratio (M_0) proposed in Alkire and Foster (2014) and expanded on in Alkire, Foster, Seth, Santos, Roche, and Ballon (2015). This section outlines the methodology and relevant properties that are used in subsequent sections to understand the changes in Nepal's multidimensional poverty.

For the detailed technical methodology, and its properties, please see Appendix.

2.2 DATA: THE 2014 MICS

The data used to compute Nepal's national poverty measure is the 2014 Multiple Indicator Cluster Survey (MICS), because it is a recent survey with national ownership containing the relevant variables. A partial comparison over time is possible with the 2011 and 2006 DHS surveys.

The MICS survey tool provides one of the main sources of information to track the poverty-related SDGs in the country, as it includes questions on demographic characteristics, education, health, employment, household assets, household amenities, water supply, and sanitation, among others.

The focal population of this survey consists of all urban and rural areas of the seven provinces. The sample size of the 2014 MICS is approximately

Sabina Alkire and James Foster created a new method for measuring multi-dimensional poverty. Extending the Foster Greer Thorbecke (1984) unidimensional poverty methodology, it identifies who is poor by considering the intensity of deprivations they suffer and includes an aggregation method. Mathematically, the MPI combines two aspects of poverty:

$$MPI = H \times A.$$

1. Incidence: the percentage of people who are multidimensionally poor, or the headcount, H.

2. Intensity of people's poverty: the average percentage of dimensions in which poor people are deprived, A.

12,000 households and approximately 54,300 people. A two-stage stratified sample design was adopted in this survey.

2.3 MEASUREMENT DESIGN

Nepal's national MPI utilizes the global MPI's dimensions, indicators, and cutoffs as mentioned above, because these reflect its priorities as expressed in Nepal's strategy to meet the Sustainable Development Goals (SDGs), Nepal's Constitution, the 14th National Development Plan (2017–2019), and can be implemented using the 2014 MICS dataset. Furthermore, the global MPI can be compared across countries, which means that Nepal's progress may be readily understood in relationship to other countries using the global MPI. This section describes these parameters.

2.3.1 Unit of Identification and Analysis

The unit of identification refers to the entity that is identified as poor or non-poor – usually the individual or the household. In the case of Nepal's MPI, the unit of identification is the household: the household members' information is considered together. This acknowledges intra-household caring and sharing – for example, educated household members reading for other members or multiple household members being affected by a child's malnutrition. In addition, it allows the measure to include indicators that are specific to certain age groups (for instance, school attendance).

The unit of analysis, meaning how the results are reported and analysed, is the individual person, as is customary for monetary poverty statistics. This means that, for instance, the headcount ratio is the percentage of people who are identified as poor.

2.3.2 Dimensions, Indicators, and Deprivation Cutoffs

Nepal's MPI has the same three dimensions as the global MPI. The choice of indicators reflects the country's context within data constraints. Nine indicators are the same as those in the global MPI. For example, in the education dimension, school attendance and years of schooling are used in both Nepal's MPI and the global MPI. Nepal's MPI adjusts one indicator: flooring. The global MPI takes into account flooring as a household indicator, whereas Nepal's MPI considers both flooring and roofing – i.e. if a household is deprived in either flooring or roofing the household is considered deprived in the housing indicator.

The selection of the dimensions, as well as the particular indicators, deprivation cutoffs, and weights, was based on a thorough discussion with government officials, representatives of Nepal's statistics office, international organizations, experts in the field, and regional consultations. It was agreed to largely follow the global MPI framework in order to allow for international comparisons.[3]

Figure 2.1 shows the level of deprivations in each of the ten MPI indicators in 2014. The 'uncensored headcount ratio' of each indicator represents the proportion of the total population of Nepal who are deprived in that particular indicator, irrespective of their poverty status.

As can be seen in the figure, the highest deprivations are for cooking fuel (with 74.5% of the population deprived in this indicator), flooring and roofing (67.3%), and sanitation (39.6%). The deprivations are lowest for school attendance (7.9%), drinking water (11.3%), and child mortality (13.9%).

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3   Redundancy matrices between the different indicators are included in Appendix A2.

TABLE 2.1 Nepal's National MPI – Indicators, Deprivations Cutoffs, and Weights

Dimensions of poverty	Indicator	Household is deprived if…	Weight
Health	Nutrition	Any child for whom there is nutritional information is undernourished in terms of weight for age[a]	1/6
	Child Mortality	Any child has died in the family in the 5-year period preceding the survey	1/6
Education	Years of Schooling	No household member aged 10 years or older has completed 5 years of schooling	1/6
	School Attendance	Any school-aged child is not attending school up to the age at which he /she would complete class 8	1/6
Living Standard	Cooking Fuel	The household cooks with dung, wood, or charcoal	1/18
	Improved Sanitation	The household's sanitation facility is not improved (according to MDG guidelines) or it is improved but shared with other households[b]	1/18
	Improved Drinking Water	The household does not have access to improved drinking water (according to MDG guidelines) or safe drinking water is at least a 30-minute walk from home, roundtrip[c]	1/18
	Electricity	The household has no electricity	1/18
	Flooring and Roofing	The household has a dirt, sand, dung, or 'other' (unspecified) type of floor or has roof made of thatch/palm leaf, sod, rustic mat, wood planks, or 'other' (unspecified)	1/18
	Assets Ownership	The household does not own more than one of these assets: radio, TV, telephone, bicycle, motorbike, or refrigerator, and does not own a car or truck	1/18

Note for Table 1:

a. Children are considered malnourished if their z-score of weight-for-age is below minus two standard deviations from the median of the reference population.

b. A household is considered to have access to improved sanitation if it has some type of flush toilet or latrine, or ventilated improved pit or composting toilet, provided that they are not shared.

c. A household has access to clean drinking water if the water source is any of the following types: piped water, public tap, borehole or pump, protected well, protected spring or rainwater, and it is within 30 minutes' walk (roundtrip).

FIGURE 2.1 National Uncensored Headcount Ratios, 2014
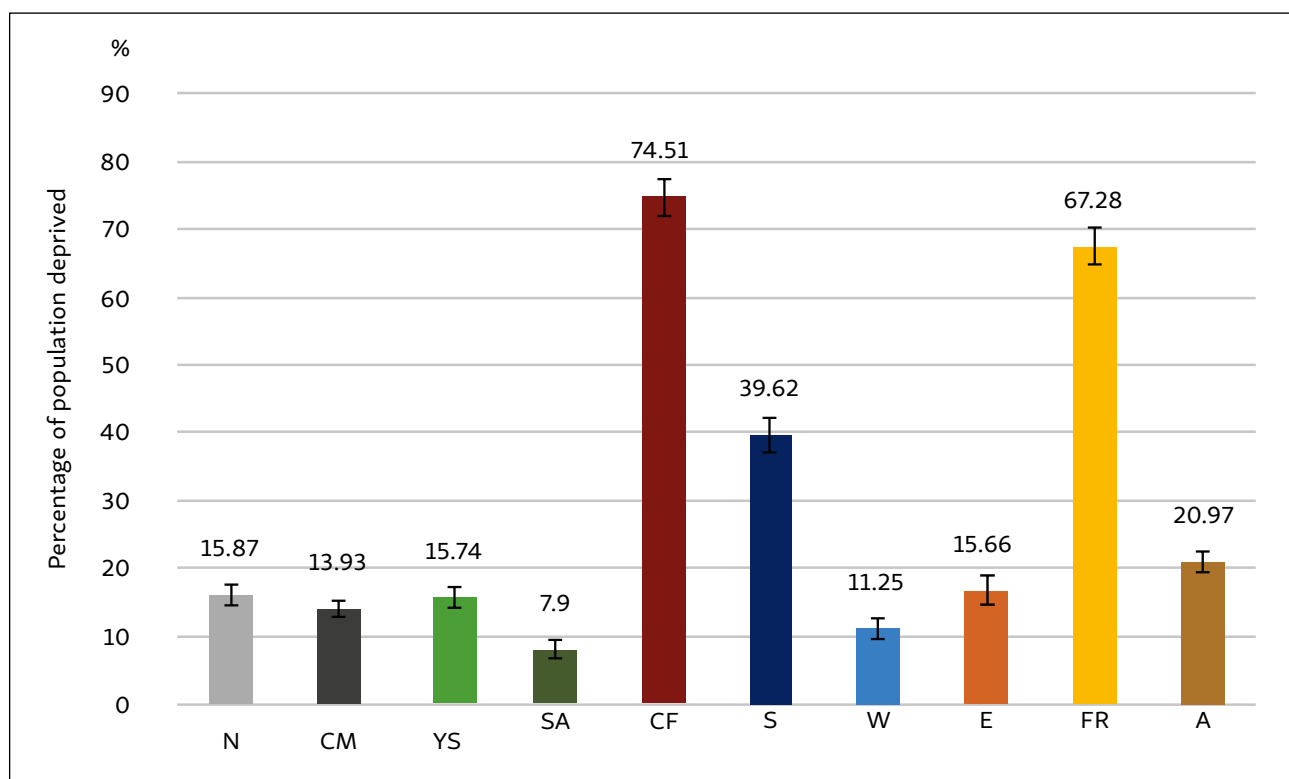
Source: Calculations based on data from MICS 2014

	N	Nutrition
	CM	Child mortality
	YS	Years of schooling
	SA	School attendance
	CF	Cooking fuel
	S	Sanitation
	W	Water
	E	Electricity
	FR	Flooring and roofing
	A	Assets

2.3.3 Weights and Deprivation Scores

The weights used in Nepal's MPI assign one-third of the total weight to each of the three dimensions of education, health, and living standards. Each component indicator is also equally weighted, as in the global MPI, with health and education indicators accruing one-sixth and living standards indicators, one-eighteenth. Overall, the weights add up to 100%. The deprivation score is the sum of the weights of the indicators in which the person is deprived and shows the percentage of total possible deprivations that the person experiences.

2.3.4 Poverty Cutoff

The Alkire Foster measurement framework employs a dual-cutoff strategy. It first applies a dimension-specific cutoff (deprivation cutoff) to each indicator. A person is considered deprived in each indicator if their achievement falls below the cutoff. Next, a single cross-dimensional poverty cutoff identifies whether each person is multidimensionally poor or not. A person is identified as poor if the weighted sum of their deprivations (their deprivation score) meets or exceeds the poverty cutoff.

For Nepal's MPI the main poverty cutoff is chosen to be at one-third of indicators; that is, a person who is deprived in $k \geq 33.33\%$ of the weighted indicators is identified as multidimensionally poor. The technical appendices present poverty figures for alternative poverty lines of 20% and 50%.

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III. Results

This chapter provides a detailed exposition of the national MPI results for Nepal using the 2014 MICS. We identify who is poor and present the national MPI as well as the poverty rate and intensity among the poor. The next section explores the measure's robustness and how the index we use is affected by the choice of the k-value and the weighting structures. Finally, we present disaggregated results by household and individual characteristics. This chapter has the following sections:

3.1   The Level of Multidimensional Poverty in Nepal;
3.2   MPI across Rural and Urban Areas;
3.3   The Composition of MPI by Indicator;
3.4   MPI by Age Group and Gender of the Household Head;
3.5   Multidimensional Poverty by Province.

3.1 THE LEVEL OF MULTIDIMENSIONAL POVERTY IN NEPAL

Table 3.1 shows Nepal's MPI for 2014, as well as its partial indices: the incidence of poverty (or poverty rate: the proportion of people identified as multidimensionally poor, H) and the intensity of poverty (or the average proportion of weighted indicators in which the poor are deprived, A). The incidence of multidimensional poverty is 28.6%. Since this estimate is based on a sample, it has a margin of sampling error. The 95% confidence interval is also presented in the table. In words, we can say with 95% confidence that the true multidimensional poverty headcount ratio is between 26.2% and 31.0% of the population.

The average intensity of poverty, which reflects the share of deprivations each poor person experiences on average, is 44.2%. That is, each poor person is, on average, deprived in 44% of the weighted indicators – so deprived for example in two health or nutrition indicators plus two living standard indicators.

TABLE 3.1 Incidence, Intensity, and Multidimensional Poverty Index (MPI), 2014
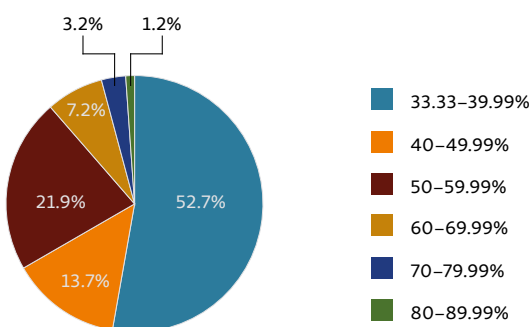
Poverty cutoff (k)	Index	Value	Confidence interval (95%)	
k-value = 33%	MPI	0.127	0.115	0.138
	Headcount ratio (H, %)	28.62	26.19	31.04
	Intensity (A, %)	44.23	43.4	45.06

Source: Calculations based on data from MICS 2014

The MPI, which is the product of H and A is 0.127. This means that multidimensionally poor people in Nepal experience 12.7% of the total deprivations that would be experienced if all people were deprived in all indicators. The MPI is used as the official national statistic to declare whether poverty has fallen or risen in Nepal over time, because it takes into account progress in both H and A. Sometimes one goes down over time and not the other – yet both are important. If we used only the poverty rate, for example, it might be that a very poor person had a significant decline in their deprivation score, but this would not be noticed if they were still poor. The MPI would, however, show this decrease in intensity.

Figure 3.1 depicts the distribution of the intensity of poverty among the poor. More than one half (53%) of all poor people in Nepal are in the lowest intensity band, which is between 33.33% and 40% of all weighted indicators. About 14% of the poor are in the next highest gradient of intensity. About 22% of the poor are deprived in 50% to 59.99% of the weighted indicators. This is good news, as it means that very few Nepalis are deprived in nearly every indicator. But while it will be easier for poor persons with low intensity to move out of poverty (so expect to see an ongoing fast pace of poverty reduction), the greater concern are those deprived in 50% or more of the dimensions. Analysis using the MPI over time can help ensure that the poorest are not left behind.

3.2 MPI ACROSS RURAL AND URBAN AREAS

Next we disaggregate by rural and urban areas and by provinces. In Table 3.2, the MPI, incidence, and intensity of poverty are shown for urban and rural areas. As can be seen in the table, the rural poverty headcount ratio is much higher than for urban areas – 33.2% and 7%, respectively. It is worth noticing that almost 80% of Nepal's population of nearly 30 million live in rural areas. Figure 3.2 compares the distribution of the poor and general population across urban and rural areas. While about 80% of the population reside in rural areas in 2014, more than 90% of multidimensionally poor people live in those areas. Only about 5% of the country's multidimensionally poor people reside in urban areas; 95% of Nepal's poor people live in rural areas.[4]

FIGURE 3.2 Distribution of Poor and Population by Rural/Urban Areas, 2014

Source: Calculations based on data from MICS 2014

FIGURE 3.1 Intensity Gradient among the Poor, 2014
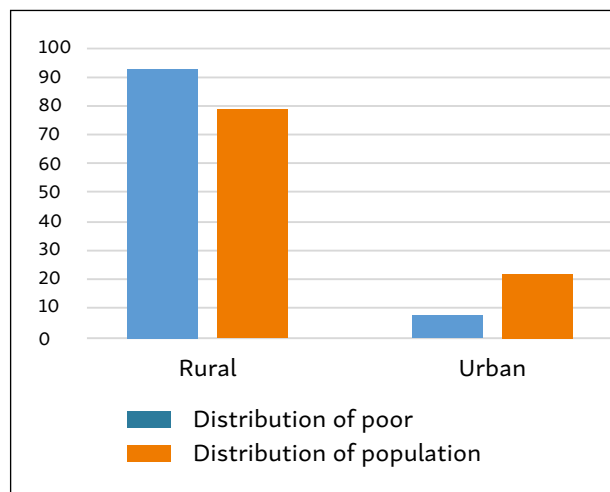
Source: Calculations based on data from MICS 2014

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4 Note that the definition of urban/rural and consequently the population share changed under the new federal structure, such that a smaller percentage of the population now live in rural areas. This report uses the former definitions.

TABLE 3.2 Multidimensional Poverty by Rural/Urban Areas, 2014

Index	Urban				Rural			
	Population share (%)	Value	Confidence interval ((95%)		Population share (%)	Value	Confidence interval ((95%)	
MPI		0.031	0.020	0.041		0.147	0.133	0.161
Headcount ratio (H, %)	21.5%	7.0%	4.8%	9.3%	78.5%	33.2%	30.3%	36.0%
Intensity (A, %)		43.8%	41.8%	45.8%		44.3%	43.4%	45.1%

Source: Calculations based on data from MICS 2014

3.3 THE COMPOSITION OF MPI BY INDICATOR

What deprivations create this poverty – and how can they be reduced? To answer this question, it is useful to the MPI down by indicator and examine its composition. The censored headcount ratio of an indicator represents the proportion of the population that is multidimensionally poor and also deprived in that indicator. The MPI can also be computed as the sum of the weighted censored headcount ratios. Thus, reducing any of the censored headcount ratios changes poverty. Figure 3.3 shows that the largest censored headcount ratio is found in the cooking fuel indicator (28.2%). About 27% of the population are multidimensionally poor and do not have adequate flooring and roofing material. Furthermore, about 19% are both multidimensionally poor and suffer from inadequate sanitation. Because the education and health indicators carry higher weights than living standard indicators (1/6 rather than 1/18), the deprivations in nutrition and years of schooling are also particularly important.

For a more in-depth view of multidimensional poverty, it is useful to see the percentage contribution of each of the 10 indicators to overall multidimensional poverty in both rural and urban areas of Nepal.

In Figure 3.4, the weighted percentage contribution of each indicator is depicted to show the composition of multidimensional poverty in rural and urban areas. Percentage contributions reflect both the weights and the censored headcount ratios. Recall that the weights for the health and education indicators are three times higher than those for the living standards indicators, because there are only two indicators for these dimensions, whereas there are six indicators for the living standards dimension. So the contribution of health and education indicators to MPI is higher, because there are fewer indicators in total.
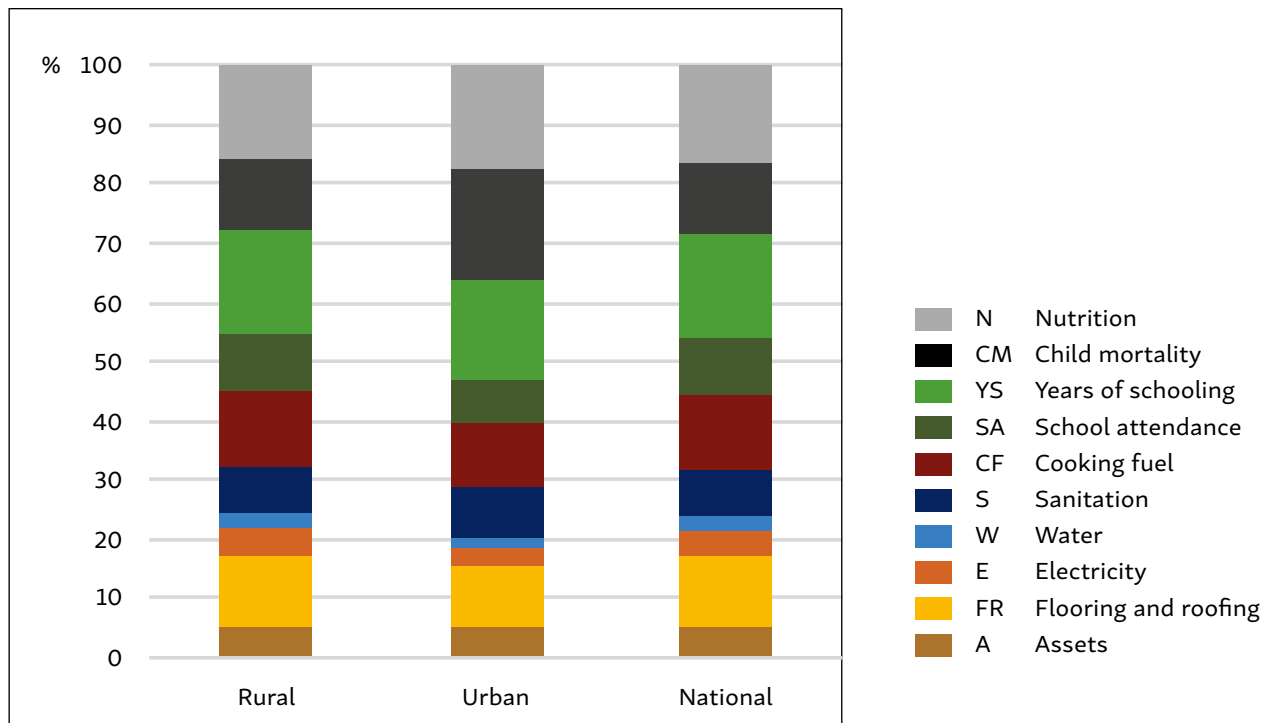
The largest contributors to rural and national poverty are deprivations in years of schooling (17.7%) and nutrition (15.8% and 15.9%, respectively). In terms of dimensions, living standards is the largest contributor

FIGURE 3.3 National Censored Headcount Ratios, 2014
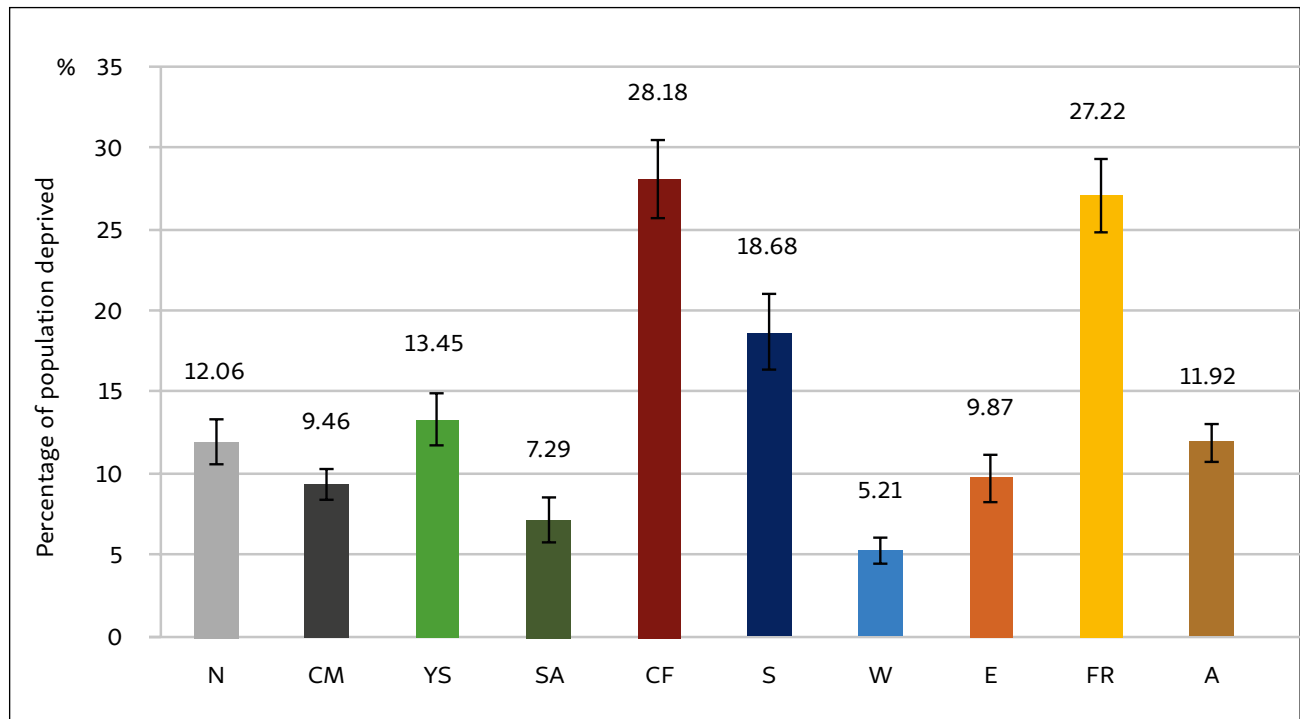
Source:Calculations based on data from MICS 2014

FIGURE 3.4 Percentage Contribution of Each Indicator to Rural and Urban MPI, 2014

N	Nutrition
CM	Child mortality
YS	Years of schooling
SA	School attendance
CF	Cooking fuel
S	Sanitation
W	Water
E	Electricity
FR	Flooring and roofing
A	Assets

Source: Calculations based on data from MICS 2014

to multidimensional poverty in rural areas, with a contribution of 44.6%. The dimensions of health and education contribute roughly 28% each.

In urban areas, the picture is slightly different. Here, the highest contributor to overall poverty is child mortality, followed by nutrition and years of schooling. The dimension of health contributes 36% to multidimensional poverty in urban areas.

Since the Alkire Foster method allows for sub-group decomposability and dimensional breakdown, it is possible to explore the dimensional composition of the MPI not only at the national and urban/rural levels but also by social groups.

3.4 MPI BY AGE GROUP AND GENDER OF THE HOUSEHOLD HEAD

In this section, we examine how multidimensional poverty varies according to household characteristics. For example, we disaggregate the MPI by age group and by gender of the household head.

When we disaggregate by age group, the results show disparities among them. According to Figure 3.5, children below the age of 10 years represent the poorest age sub-group, with an MPI of 0.194 in 2014. There is a decreasing and then flattening trend in the MPI as age increases. Thus, the older age group (individuals aged 25 or older) have an MPI of 0.111 to 0.120.[5] Naturally, because Nepal's MPI is constructed at the household level, the information by age group is not as precise as an individual child or adult MPI would be. Also, there are some design issues: because the survey only obtains information on undernutrition for children, and also has school attendance in it, households without children will automatically be non-deprived in these indicators. Still, given this MPI structure it is clear that children are disproportionally affected by multidimensional poverty.
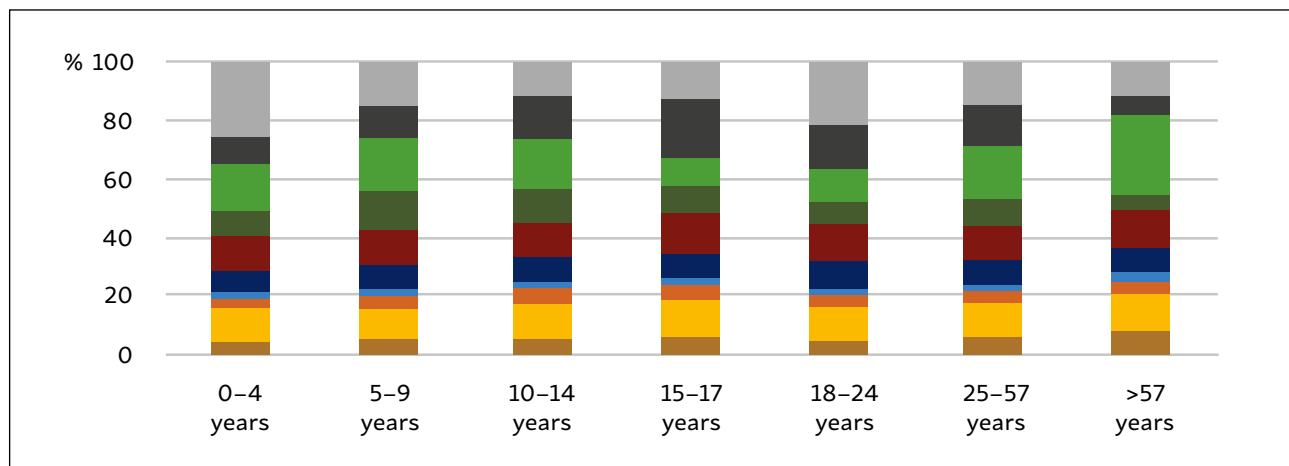
5 Children up to 10 years of age represent 21% of the population, while the population share of the age groups 10–17, 18–24, 25–57, and 57+ are equal to 19%, 12%, 37%, and 10%, respectively.

FIGURE 3.5 Multidimensional Poverty by Age Group, 2014
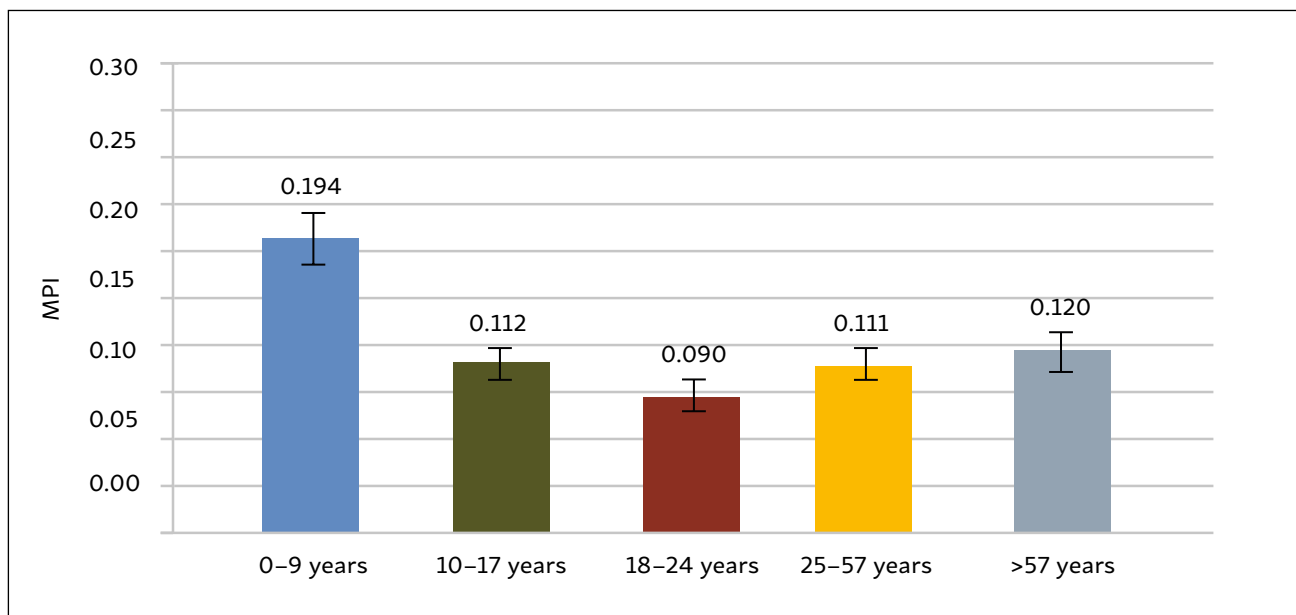
Source: Calculations based on data from MICS 2014

FIGURE 3.6 Contribution to MPI by Indicator by Age Group, 2014

Source: Calculations based on data from MICS 2014

N	Nutrition	CF	Cooking fuel	FR	Flooring and roofing
CM	Child mortality	S	Sanitation	A	Assets
YS	Years of schooling	W	Water		
SA	School attendance	E	Electricity		

It would be desirable to have an MPI that could be meaningfully broken down by gender. However, the MICS Survey – like most surveys available globally – does not permit this because intrahousehold data on adults' achievements in health, employment, or asset ownership, for example, is not included.

Figure 3.7 highlights the differences between female-headed households and male-headed households in terms of the MPI. Twenty-three point eight percent of the population live in female-headed households, and 28.6% of people are MPI poor. But only 6.6% of people are poor and are living in female-headed households. Looking across the distribution it is clear that female-headed households are equally likely to suffer from multidimensional poverty as male-headed households.

In particular, the proportion of poor female-headed households to all poor households (female- and male-headed) reflects the proportion of female-headed to

male-headed households in the sample population (about 23%). This means that female- and male-headed households face the same likelihood of being multidimensionally poor.

To illustrate a different kind of group-based analysis, consider whether the household faces an unmet need for contraception. According to the 2014 MICS, 31% of people live in households in which a woman faces an unmet need for contraception, and 28.6% of people, as we know, are multidimensionally poor. However, only 8.5% of people experience both deprivations.

As Figure 3.8 shows, the unmet need for contraception is not actually associated with poverty – both poor and non-poor are equally likely to have unmet needs for contraception. These kinds of direct analyses are useful to probe interlinkages across variables in a meaningful way.

FIGURE 3.7 Proportion of Poor and Population by Household Head, 2014

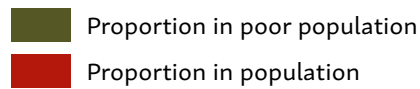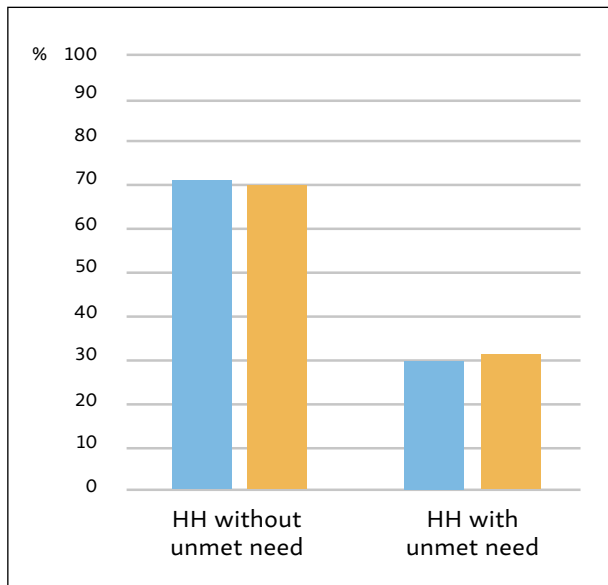Source: Calculationsbased on data from MICS 2014
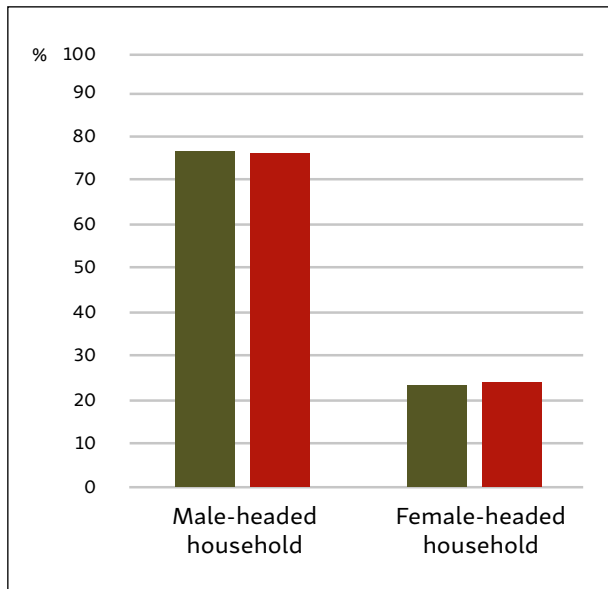
- ■ Proportion in poor population
- ■ Proportion in population

FIGURE 3.8 Proportion of Poor and Population by Unmet Contraception Need, 2014

Source: Calculations based on data from MICS 2014

- ■ Proportion in poor population
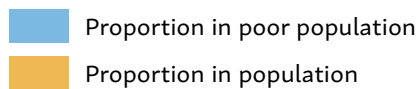- ■ Proportion in population

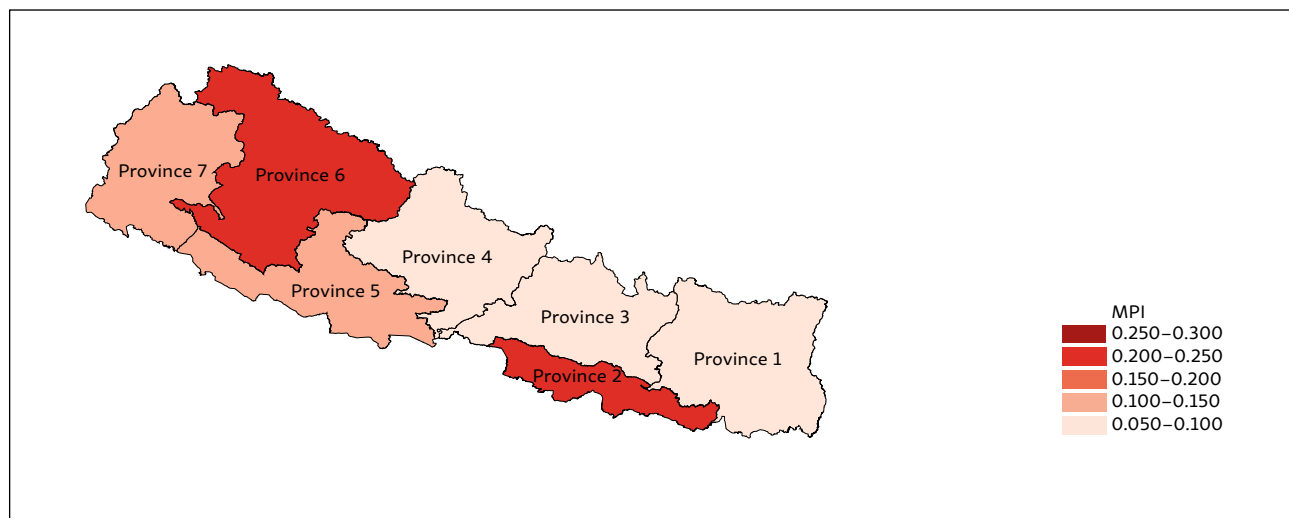**FIGURE 3.9 Multidimensional Poverty Index (MPI) Map by Province, 2014**

TABLE 3.3 Multidimensional Poverty by Province, 2014

Sub-national region	Population share (%)	MPI			Headcount ratio (H, %)			Intensity (A, %)		
		Value	Confidence interval (95%)		Value	Confidence interval (95%)		Value	Confidence interval (95%)	
Province 1	17.6%	0.085	0.062	0.108	19.7	14.9	24.4	43.2	41.2	45.2
Province 2	18.4%	0.217	0.180	0.254	47.9	40.7	55.0	45.3	43.4	47.3
Province 3	22.0%	0.051	0.033	0.069	12.2	8.3	16.2	41.9	39.6	44.1
Province 4	11.6%	0.061	0.036	0.085	14.2	8.9	19.5	42.9	40.4	45.3
Province 5	16.5%	0.133	0.107	0.158	29.9	24.7	35.1	44.3	42.7	45.9
Province 6	5.4%	0.230	0.198	0.261	51.2	44.7	57.8	44.9	43.4	46.4
Province 7	8.5%	0.146	0.127	0.165	33.6	29.9	37.2	43.5	42.2	44.8

Source: Calculations based on data from MICS 2014

3.5 MULTIDIMENSIONAL POVERTY BY PROVINCE

The next step is to examine the distribution of MPI across the newly structured seven provinces in Nepal. Detailed analyses of multidimensional poverty in each of the seven provinces is provided in Chapter 5.

As Figure 3.9 highlights, decomposition by province is particularly important as multidimensional poverty varies substantially across regions.

Table 3.3 shows the provincial estimates for the MPI, incidence (H), and intensity (A) of poverty. Provinces 2 and 6 have the highest level of multidimensional poverty and incidence of poverty, with roughly half of their

population being poor. On the other end of the spectrum, Provinces 3, 4, and then 1 have the lowest MPI and incidence at roughly 12%, 14%, and 20%, respectively.

Figure 3.10 illustrates the level of MPI in each province. The figure shows that due to overlapping confidence intervals, it is not possible to rank many regions in terms of poverty. Still, the graph shows that multidimensional poverty in Provinces 2 and 6 is significantly higher than the other regions.

FIGURE 3.10 MPI by Province, 2014
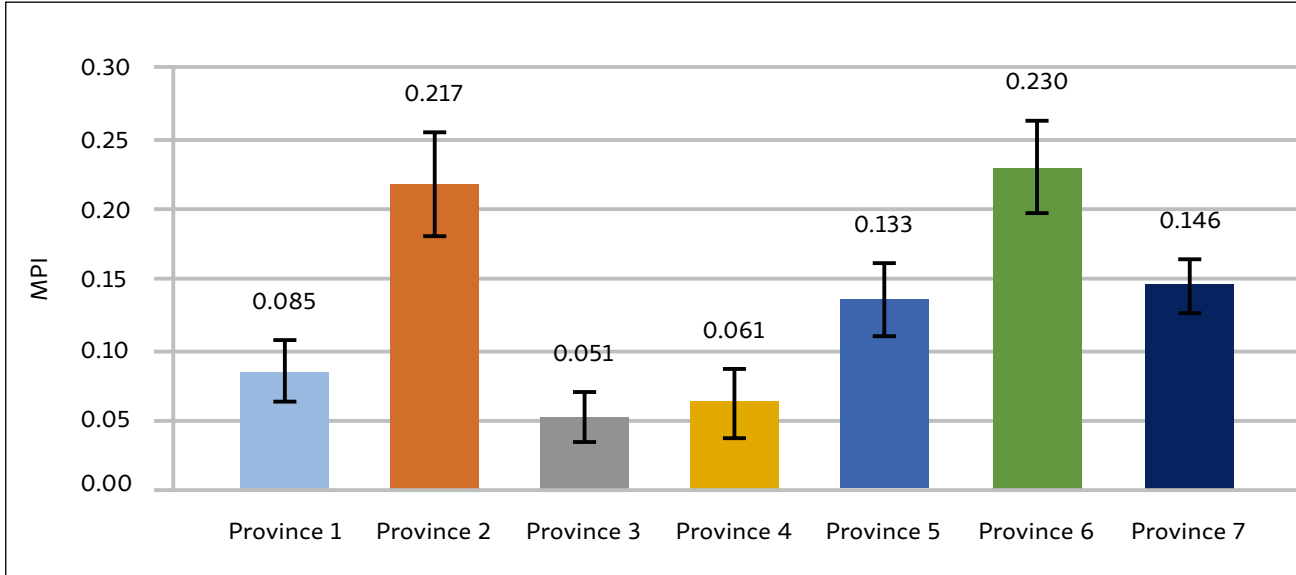
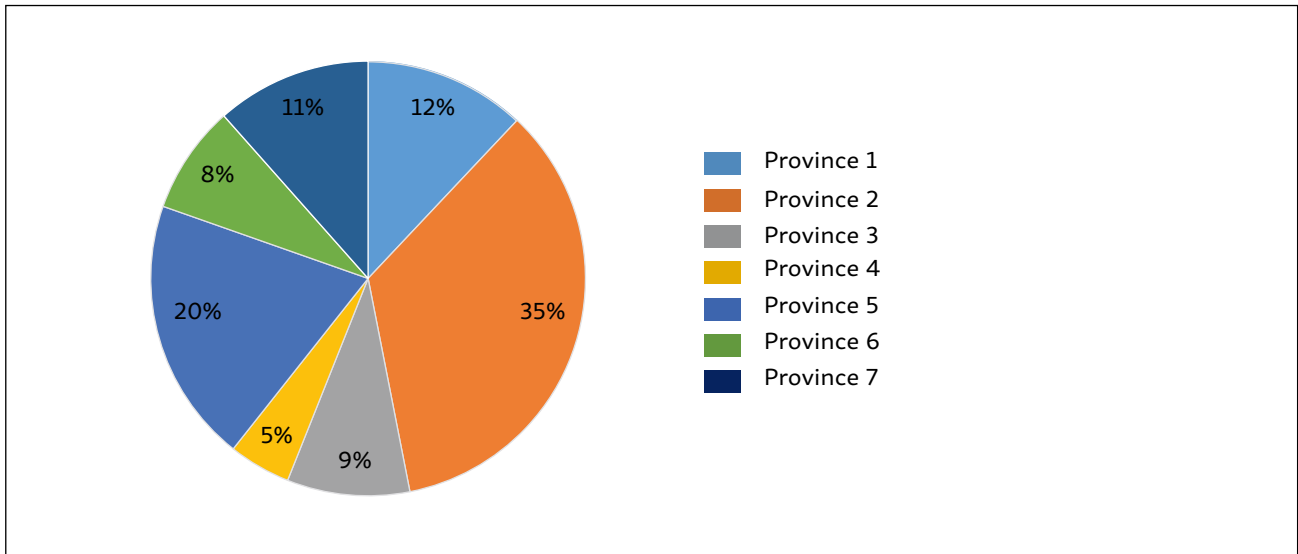Source: Calculations based on data from MICS 2014

Figure 3.11 depicts where the MPI poor people live, across the seven provinces. This is important because, as the province briefings mention, some of the provinces with lower levels of poverty nonetheless house many more poor people than the poorest provinces. Province 2 houses the largest number of multidimensionally poor followed by Province 5. Province 4 has the lowest number of poor people.

Figure 3.12 shows the percentage contribution of each indicator to multidimensional poverty for each region. The composition of multidimensional poverty across provinces varies. For instance, there is a declining trend in the contribution of years of schooling to overall poverty across provinces from Southeast to the Northwest. While in Province 7, the indicator for years of schooling contributes just 11%, it contributes more
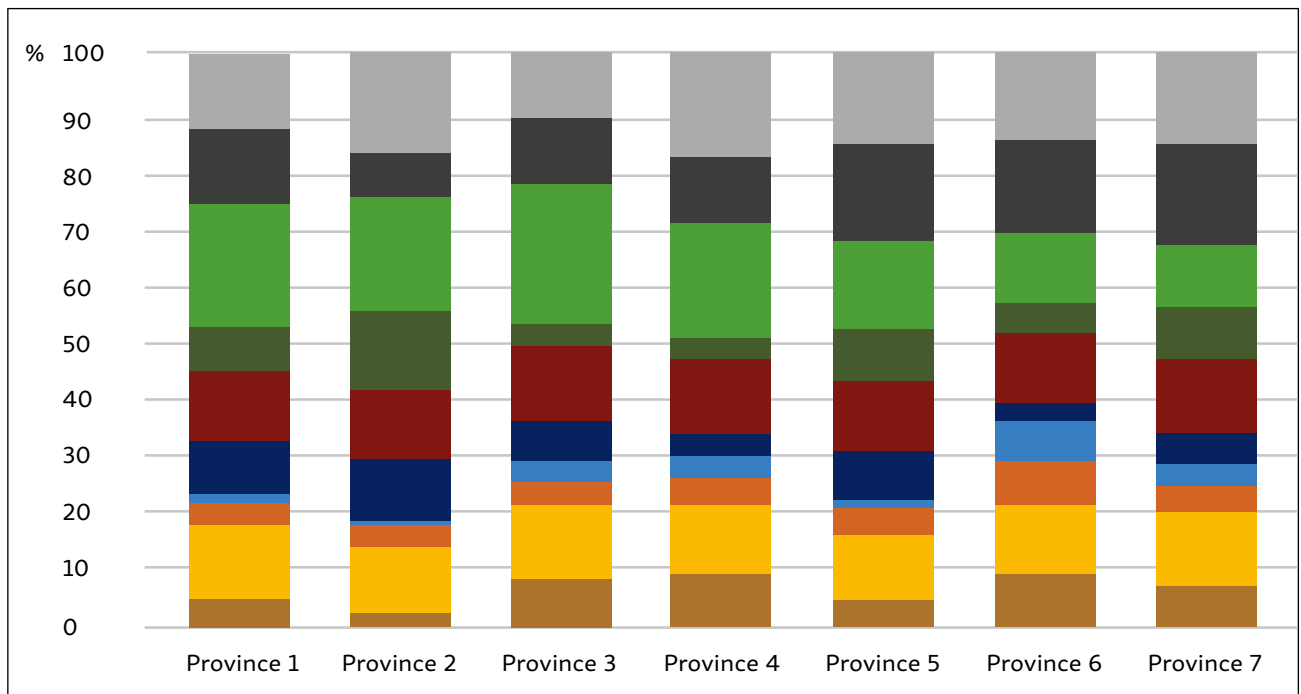
than 21% in Province 1. Thus, while in the eastern provinces the dimension of education contributes about 30% to overall poverty and health between 23% and 26%, in the western provinces the pattern is reversed.

FIGURE 3.11 Distribution of MPI Poor by Region, 2014

Source:: Calculations based on data from MICS 2014
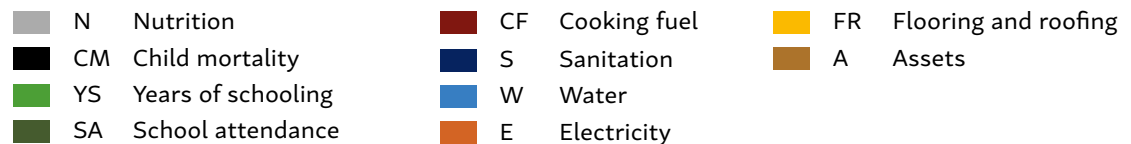
FIGURE 3.12 Percentage Contributions of Each Indicator to Sub-National Regions' MPI, 2014

Source: Calculations based on data from MICS 2014

N	Nutrition	CF	Cooking fuel
CM	Child mortality	S	Sanitation
YS	Years of schooling	W	Water
SA	School attendance	E	Electricity
FR	Flooring and roofing	A	Assets

IV. Multidimensional Poverty Reduction over Time

A key question is how poverty has changed over time. This chapter examines the evolution of multidimensional poverty in Nepal between 2006 and 2014. Two waves DHS data are available for this time period, plus the MICS 2014. We create a completely harmonised MPI and compare it and its sub-indices across these three time periods. This allows us to infer broad trends over time in terms of poverty alleviation. In particular, we focus on regional and dimensional changes over time.

The MICS and DHS for these three waves share a common survey design and questionnaire, allowing exactly the same indicators to be constructed for each year and robustly compared across time.

Turning to the three key statistics of the MPI, we find that between 2006 and 2014, Nepal has reduced MPI, H, and A, and these reductions are statistically significant (Table 4.1). Figure 4.1 gives an overview of how the incidence and intensity of poverty and the MPI have changed over the four points in time. It is evident that multidimensional poverty drops sharply between 2006 and 2014. Most impressively, the MPI more than halves (and this is statistically significant), decreasing from 0.313 to 0.127. The headcount ratio (H) reduces from 59% to 29%. The intensity also declines significantly.

It is interesting to analyse the extent to which these improvements in H, A, and MPI depend on the k-value. Figures 4.2 to 4.4 show the value of these

TABLE 4.1 Change in H, A, and MPI, 2006—2014

Cutoff (k = 33%)	MPI	Incidence (H)	Intensity (A)
2006	0.313	59.35%	52.69%
2011	0.186	39.13%	47.50%
2014	0.127	28.62%	44.23%
Change 2006–2014	-0.19***	-30.74***	-8.46***
Combined SE	0.012	0.021	0.007
Test statistic	14.919	14.766	11.684
p-value	0.0000	0.000	0.000

Source: Calculations based on data from MICS and DHS, various waves

*** 1% significance level, two-tailed tests

FIGURE 4.1 Multidimensional Poverty in Nepal, 2006–2014
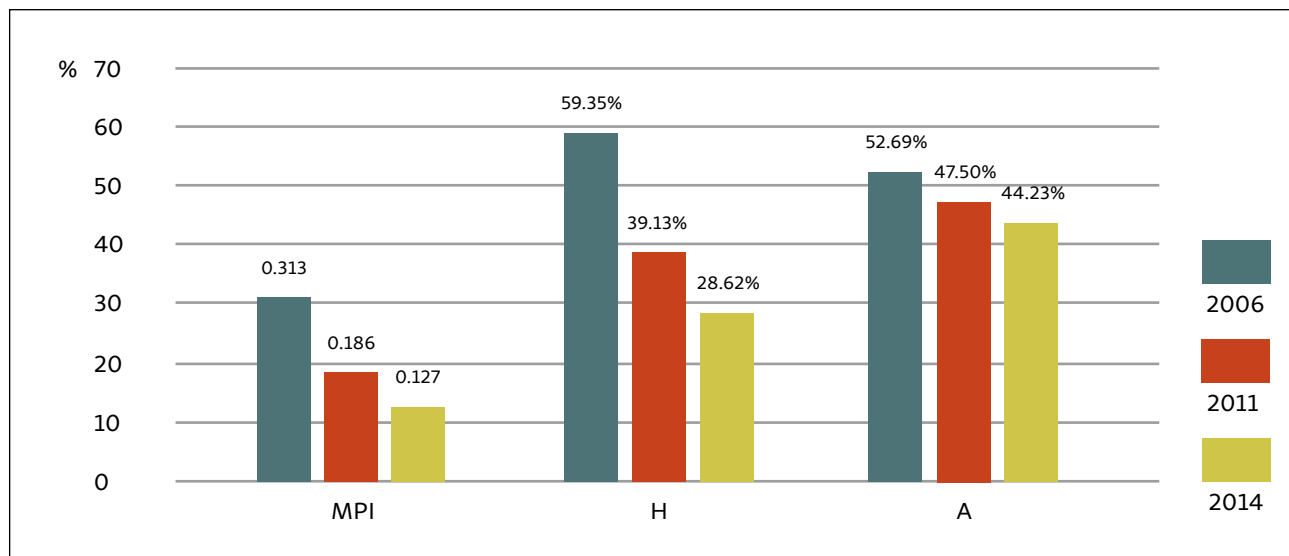
Source: Calculationsbased on data from MICS and DHS, various waves

three indicators for all possible values of k, and for the three waves under study. As can be seen when comparing 2006 and 2014, the curves for H and the MPI do not overlap for any k-value, with the curves for the latter always falling below the one for the former. Additional statistical analyses consistently indicate

significant reductions in the poverty rate (H) and the MPI, regardless of the k-value chosen.

To understand how poverty has decreased – what indicator changes drove the reduction – it is essential to break down the change in MPI by each of its

FIGURE 4.2 National Headcount Ratio (H) for Different Values of the Poverty Cutoff k
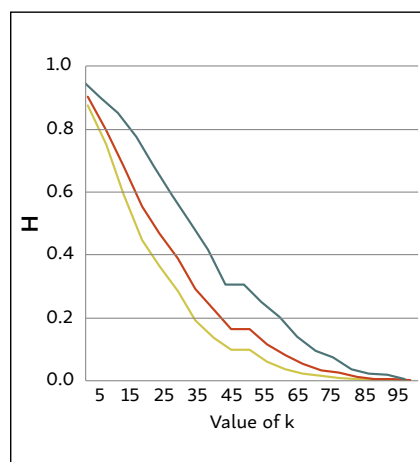
FIGURE 4.3 National Intensity of Poverty (A) for Different Values of the Poverty Cutoff k
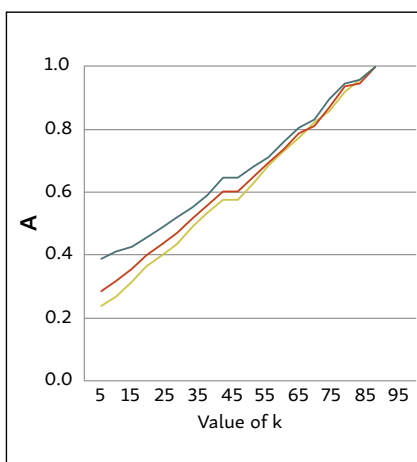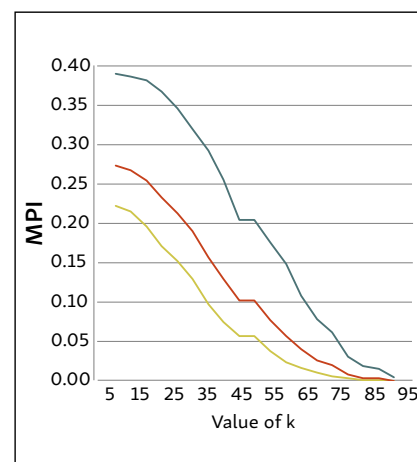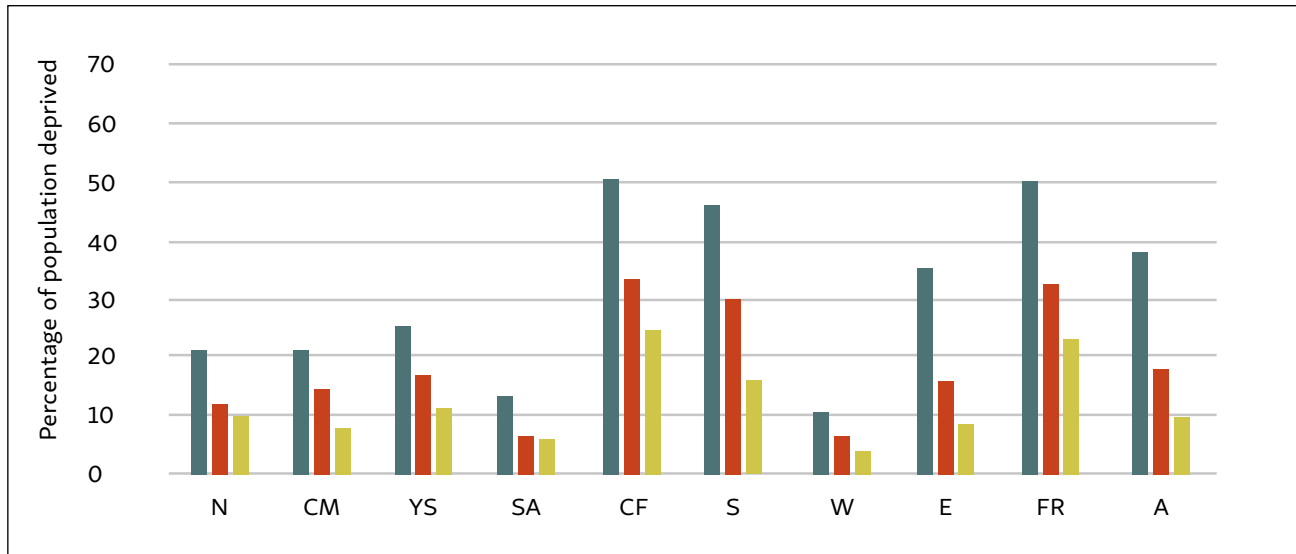
FIGURE 4.4 MPI for Different Values of the Poverty Cutoff k

Source: Calculations based on data from MICS and DHS, various waves

2006   2011   2014

FIGURE 4.5 National Censored Headcount Ratios, 2006–2014

Source: Calculations based on data from MICS and DHS, various waves

N	Nutrition	
CM	Child mortality	2006
YS	Years of schooling	
SA	School attendance	
CF	Cooking fuel	2011
S	Sanitation	
W	Water	
E	Electricity	2014
FR	Flooring and roofing	
A	Assets	

component indicators. Figure 4.5 provides a more refined view of what drove the substantial reduction in multidimensional poverty over time. Censored headcount ratios, which measure the percentage of people who are MPI poor and deprived in the given indicator, are depicted for each of the three points in time. We find that all censored headcount ratios have declined statistically significantly, with the largest absolute reductions being in assets, sanitation, and

FIGURE 4.6 Absolute Change in Censored Headcount Ratios between 2006 and 2014

Source: Calculations based on data from MICS 2014 and DHS 2006

*** 1% significance level, two-tailed tests

electricity. Figure 4.6 depicts in percentage points the absolute change in the censored headcount ratios between 2006 and 2014. Clearly, improvements in assets, sanitation, and electricity outperform similarly impressive reductions in the censored headcount ratios of other indicators like child mortality (-19.2 percentage points) and years of schooling (-14.6 percentage points).

The population-wide trends in each indicator included in the MPI are important to analyse alongside the trends in deprivations of the poor. Figure 4.7 presents the proportion of the population deprived in each of the 10 indicators used in the MPI, or the uncensored headcount ratios. The figure shows that all 10 indicators have registered statistically significant improvements over time; that is, there was a significant reduction in the proportion of people deprived in them. Figure 4.8

displays the absolute change in the uncensored headcount ratios between 2006 and 2014. This figure shows that access to assets, adequate sanitation, and electricity are the indicators showing the largest absolute improvements (-38.5 and -36.2 and -35.3 percentage points, respectively).

N	Nutrition
CM	Child mortality
YS	Years of schooling
SA	School attendance
CF	Cooking fuel
S	Sanitation
W	Water
E	Electricity
FR	Flooring and roofing
A	Assets

FIGURE 4.7 National Uncensored Headcount Ratios, 2006–2014

Source: Calculations based on data from MICS and DHS, various waves

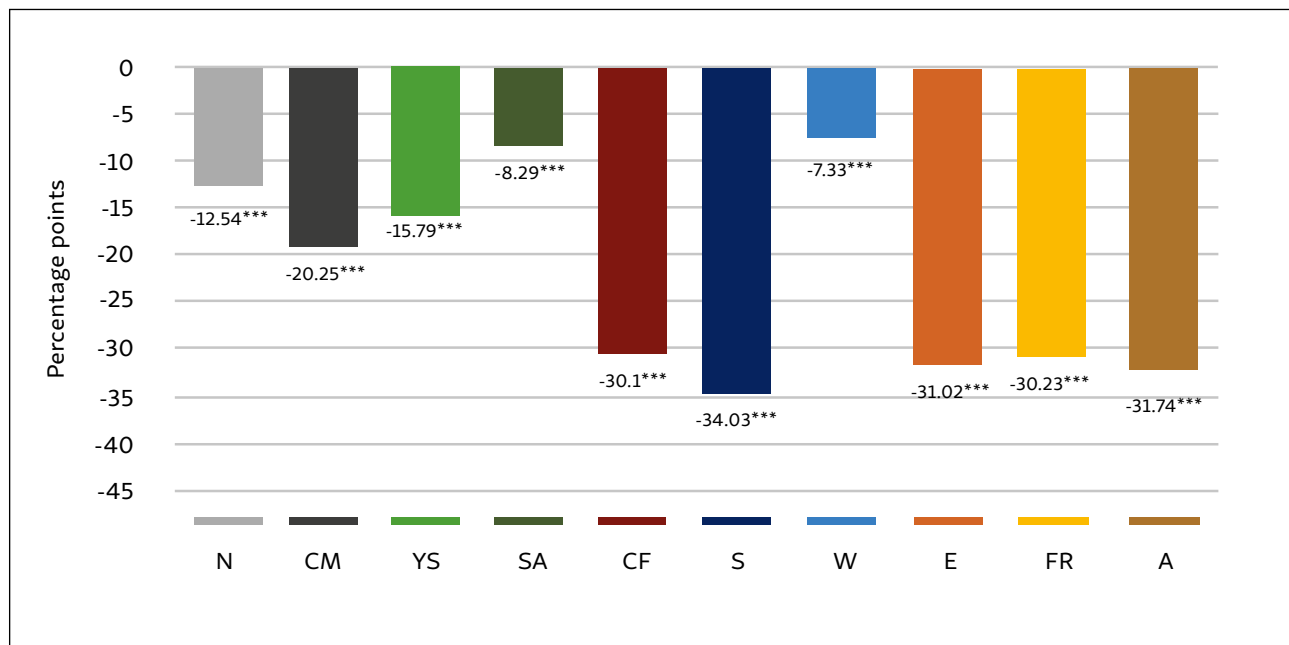2006   2011   2014
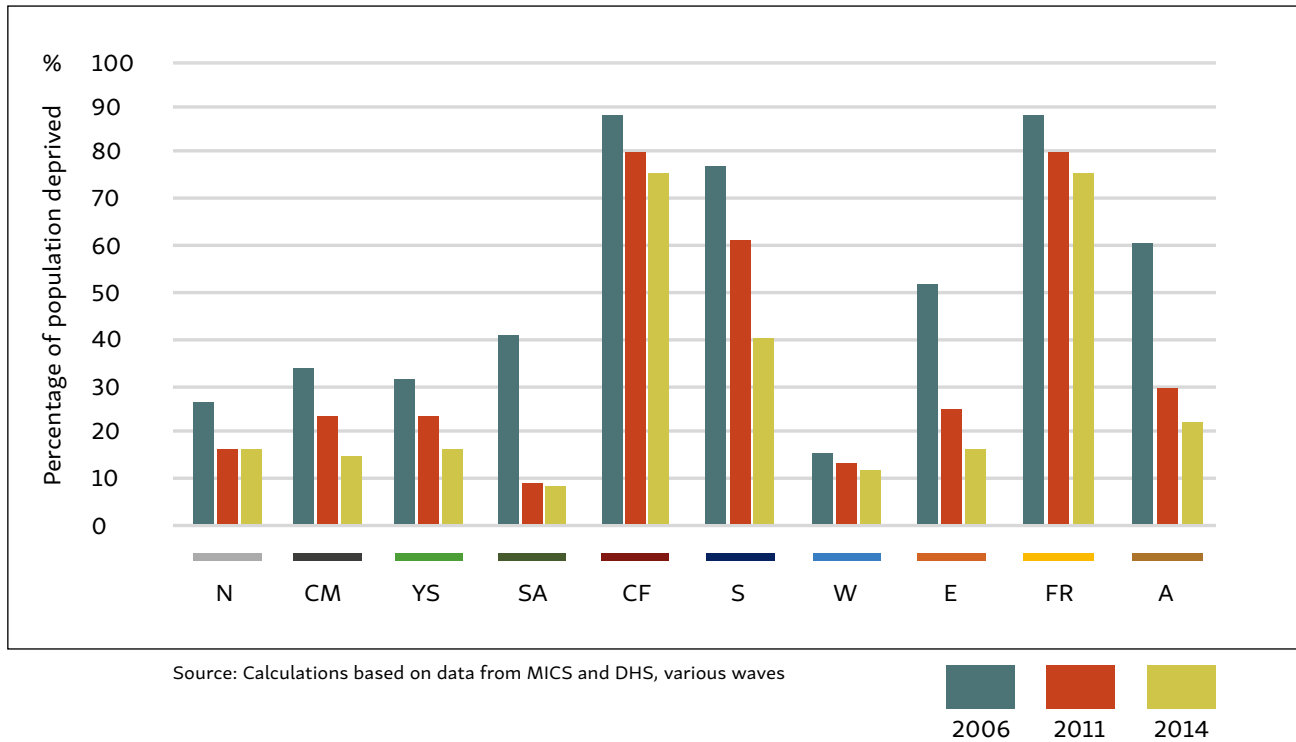
FIGURE 4.8 Absolute Change in Uncensored Headcount Ratios between 2006–2014

Source: Calculations based on data from MICS and DHS, various waves

**   5% significance level, two-tailed tests
*** 1% significance level, two-tailed tests
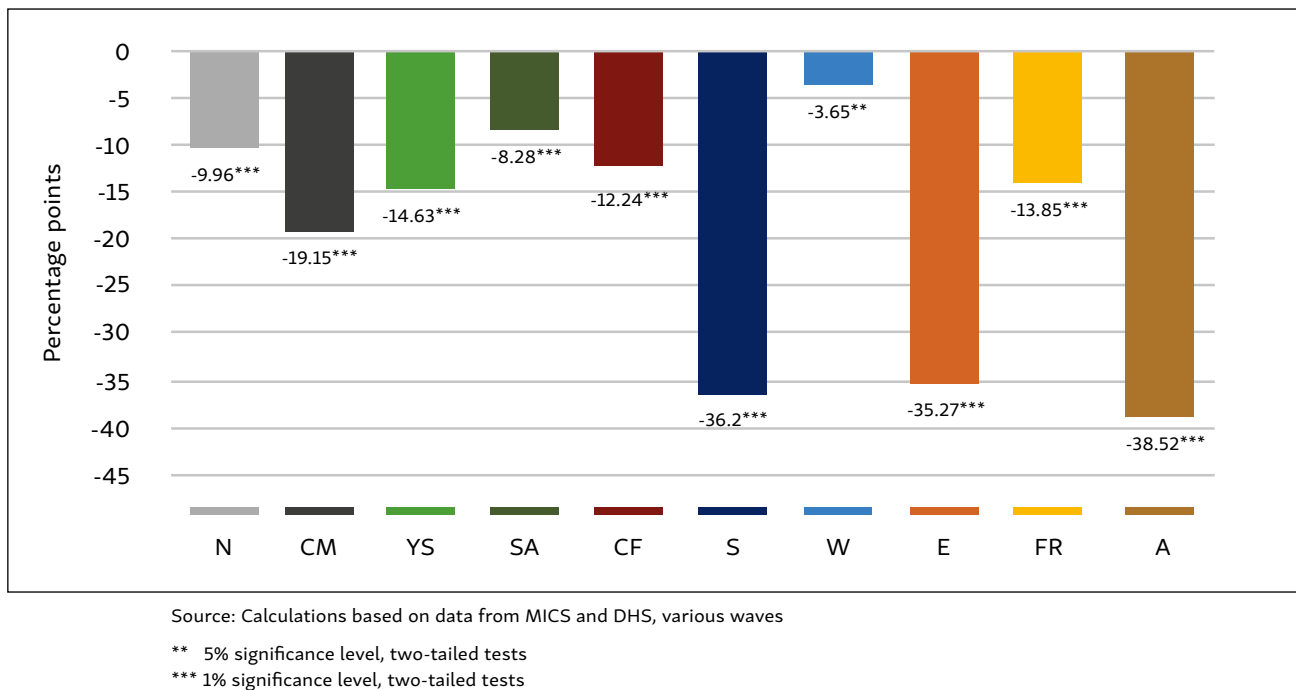
Turning now to the contribution of each of the 10 indicators of the MPI, Figure 4.9 shows each indicator's weighted contribution to overall poverty in Nepal for each of the three waves under study. It appears that the general composition of the MPI stays relatively unchanged between 2006 and 2014. One can conclude from this observation that the multidimensional poverty profile of the poor remains largely the same over the three waves. In all years, an insufficient number of years of schooling contributes very strongly to poverty (16–18%). The good news is that the contribution of child mortality decreased from 16% to 13%. However nutrition's contribution has increased from 13% to 16%. Other indicators' weighted contribution is smaller than these.

Figures 4.10, 4.11, and 4.12 show province-level trends in changes over time in multidimensional poverty in absolute and relative terms, respectively. As the map shows, ever region has registered a reduction in poverty 2011–2014. To specify how these regions have reduced multidimensional poverty, Figure 4.11 displays the absolute change in provincial multidimensional poverty (MPI), incidence (H) and intensity (A) of poverty between 2011 and 2014. Figure 4.12 provides the relative change in poverty – that is, the percentage that the original level of poverty was reduced between 2011 and 2014. We see really rather dramatic changes – for example in Province

FIGURE 4.9 Contribution of Each Indicator to National MPI, 2006–2014
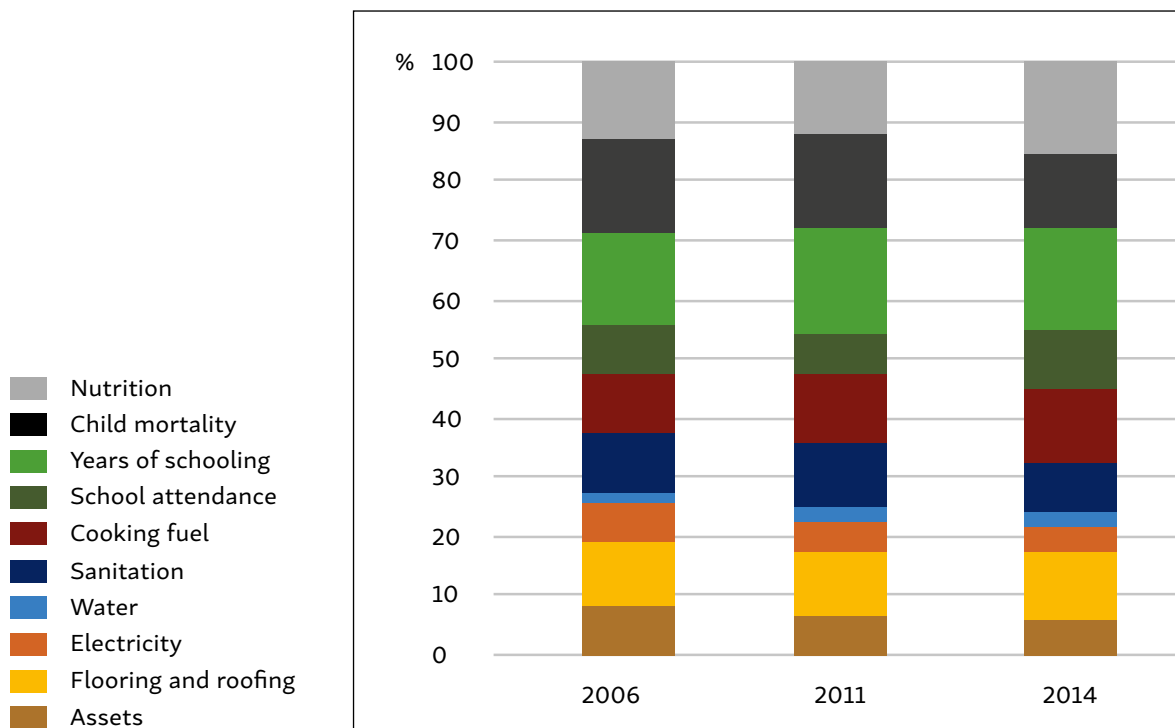
Source: Calculations based on data from MICS and DHS, various waves

FIGURE 4.10 Maps of MPI by Province, 2011–2014

MPI
- 0.250–0.300
- 0.200–0.250
- 0.150–0.200
- 0.100–0.150
- 0.050–0.100
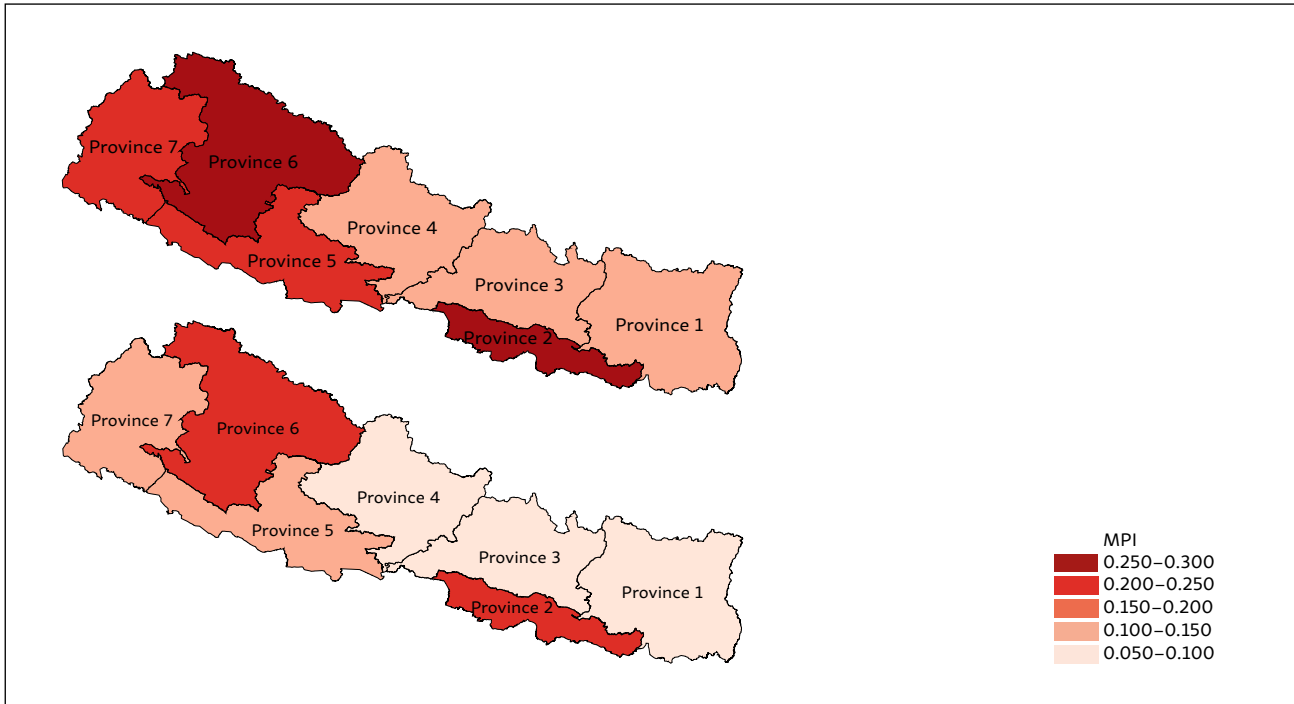
FIGURE 4.11 Absolute Change in Sub-National Regions' MPI, 2011–2014
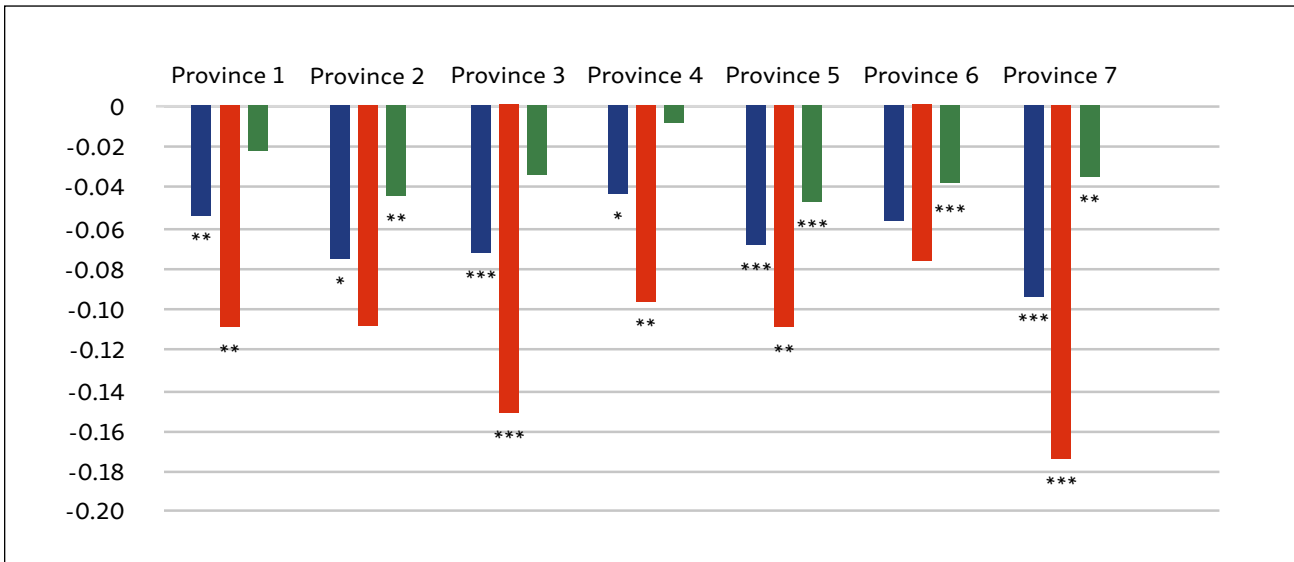
Source: Calculations based on data from MICS 2014 and DHS 2006

*   10% level significance
**   5% level of significance, two-tailed test.
***   1% level of significance

MPI   H   A

FIGURE 4.12 Percentage Change in Provinces' MPI, H, and A, 2011–2014
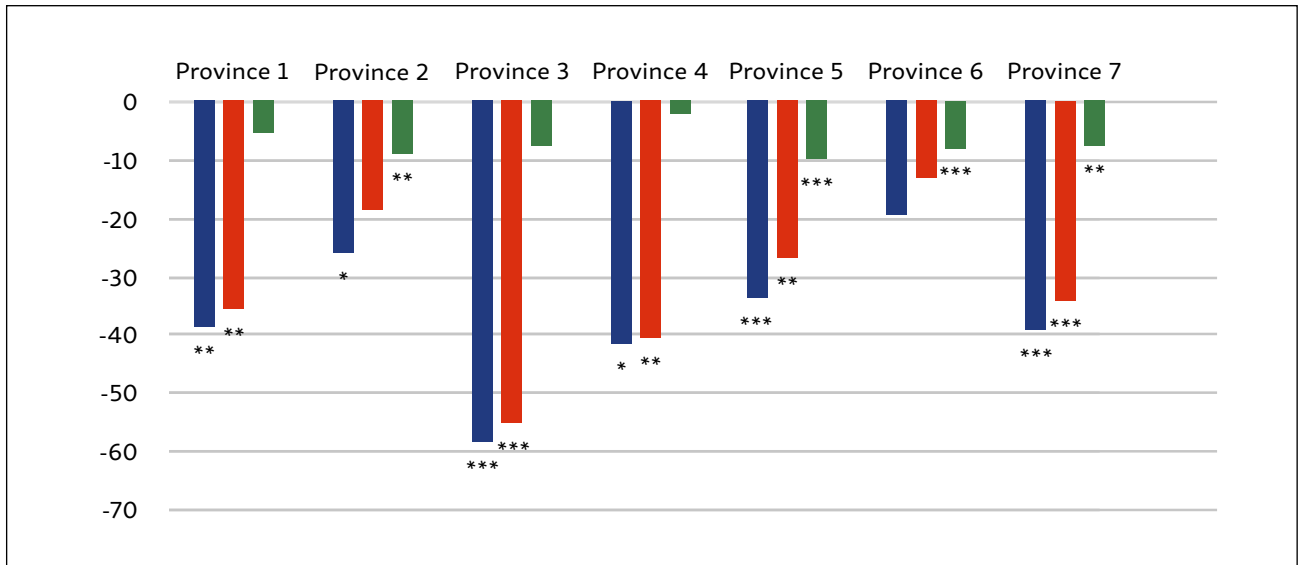
Source: Calculations based on data from MICS 2014 and DHS 2006

*   10% level significance
**   5% level of significance, two-tailed test.
***   1% level of significance

FIGURE 4.13 Maps of Headcount Ratios by Province, 2011–2014
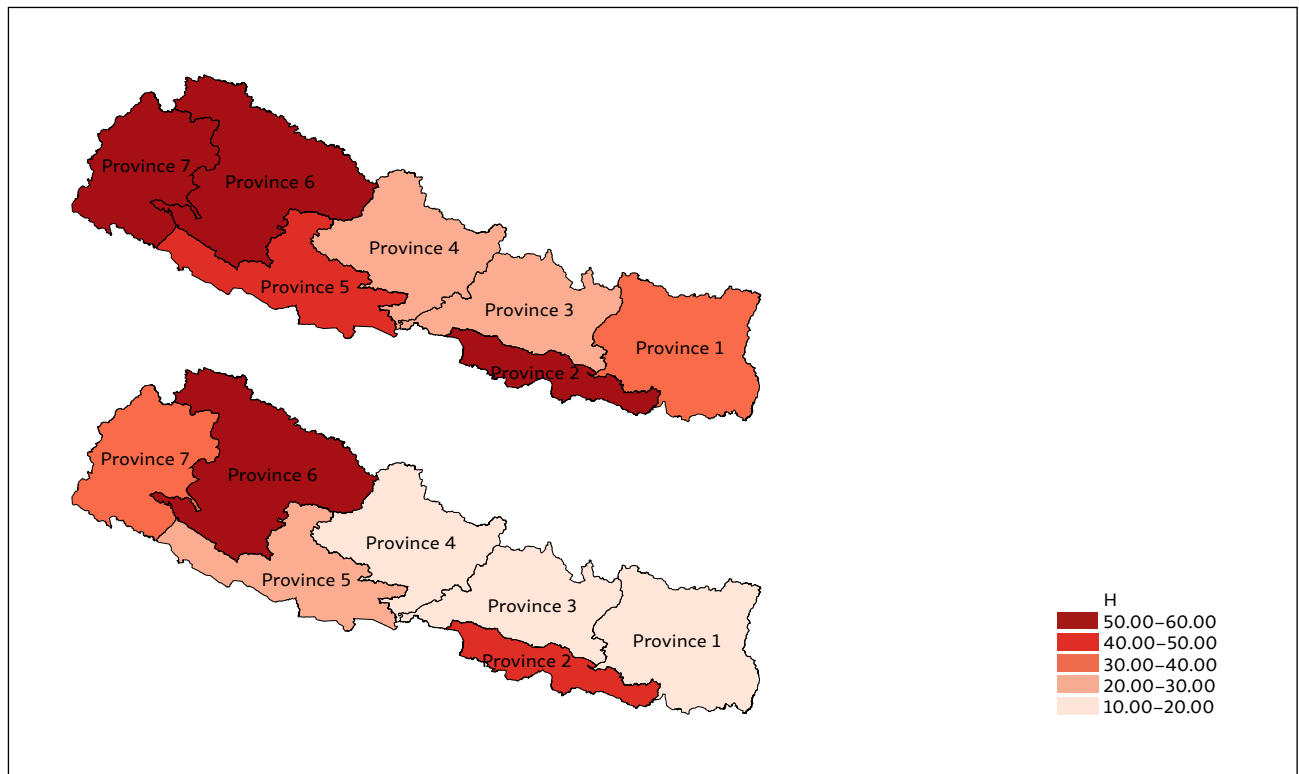
FIGURE 4.14 Poverty Reduction in Provinces, 2011–2014
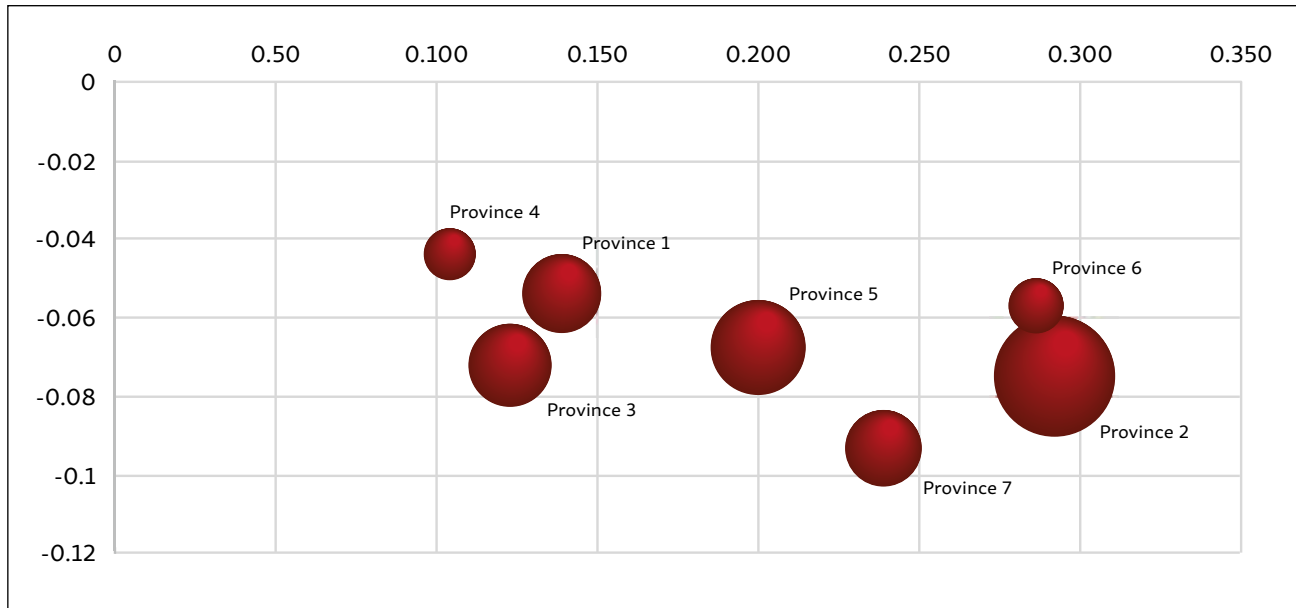
Source: Calculations based on data from MICS 2014 and DHS 2011

3 MPI and H each reduced by more than 50% of their original levels in only three years.

To investigate if the gap between the poorest and richest provinces is closing in absolute terms, Figure 4.14 plots the absolute change in MPI on the vertical axis against the initial MPI for all regions. The size of the bubble shows the number of poor people. The negative trend between the initial level of MPI and the absolute change in MPI means that, by and large, in

Nepal poorer regions have tended to reduce poverty more than less poor regions, hence they are converging in absolute terms.

To further analyse improvements in each of the seven provinces of Nepal, Figure 4.15 highlights the changes in censored headcount ratios between 2011 and 2014. While there are clear improvements across most of the indicators in all provinces, there are a few indicators that do not seem to show a significant reduction over time (none of the apparent increases are statistically significant). On the other hand, reductions of up to 30 percentage points can be found for the indicators of sanitation (Provinces 7 and 6); around 15 percentage reduction in indicators of cooking fuel and flooring and roofing in Provinces 7 and 3. Equally impressive are the reductions in the censored headcount ratios of child mortality and electricity in Province 2, the poorest province in 2011.

It also can be very useful to compare the multi-dimensional poverty rates with the monetary poverty rates. However in Nepal, the most recent monetary poverty figures are from 2010. Thus Figure 4.16 plots the monetary poverty figures (on the left) and the MPI poverty rates for 2011 and 2014. What we see is that a somewhat different picture emerges, particularly in Province 2. This was the poorest or second poorest by multidimensional poverty, but is a middle poor province by monetary poverty measures. Using both together arguably gives a fuller view.

FIGURE 4.15 Absolute Change in Censored Headcount Ratios by Region, 2011–2014
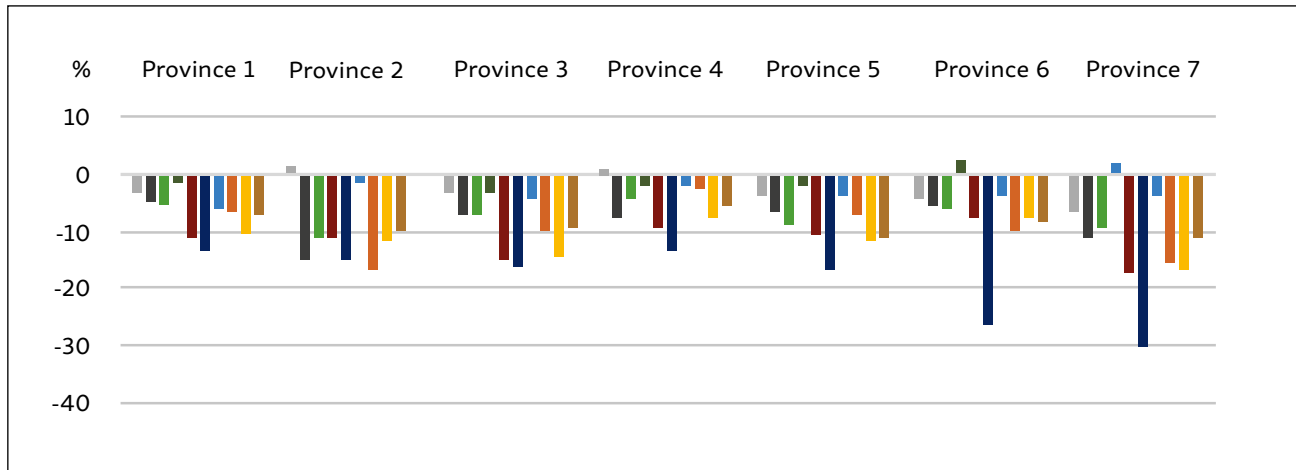
Source: Calculations based on data from MICS 2014 and DHS 2011

N	Nutrition	CF	Cooking fuel	FR	Flooring and roofing
CM	Child mortality	S	Sanitation	A	Assets
YS	Years of schooling	W	Water		
SA	School attendance	E	Electricity		

FIGURE 4.16 Monetary Poverty and Changes in Headcount Ratios, 2011–2014
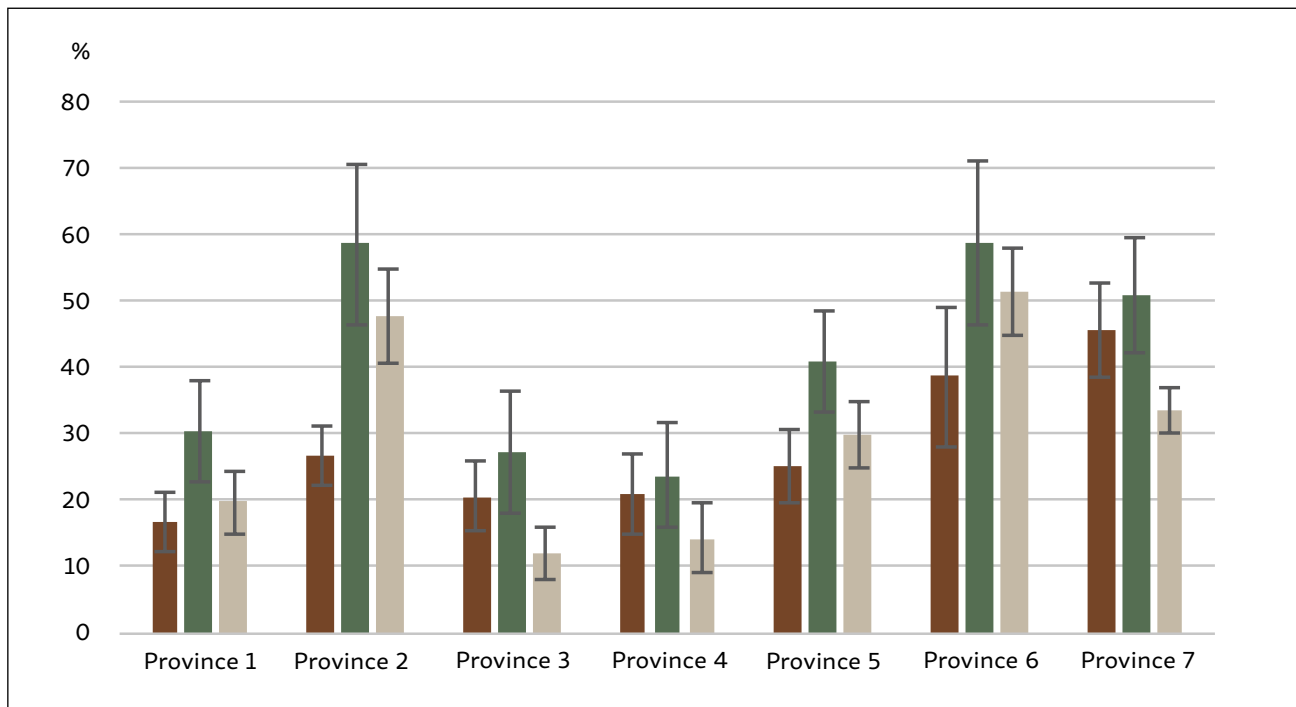
Source: Calculations based on data from MICS 2014 and DHS 2011 and World Bank Staff Calculation using 2010/1 Nepal Living Standard Survey

Monetary poverty 2011   MPI H 2011   MPI H 2014

V. Provincial Analyses of Multidimensional Poverty

Given that the provincial structure of Nepal is new and will be a new policy framework, it is very important to see precisely what the MPI has to offer at the provincial level. This chapter presents the multidimensional poverty analysis for each province in Nepal. These analyses include discussions of the poverty rate and intensity of poverty for each province, as well as its composition and changes over time.

5.1 PROVINCE 1

Province 1 has the third lowest MPI of any province in Nepal, at 0.085. This is below the national MPI of 0.127. Still, the headcount ratio of multidimensional poverty in Province 1 is 19.7%, meaning that nearly 20% of the population in the province is multidimensionally poor. This is lower than the national multidimensional poverty rate of 28.6% and substantially lower than that of Province 6, the poorest province, where more than half the population is identified as poor. The intensity of poverty in Province 1 is 43.2%, which means that those who are identified as multidimensionally poor are deprived, on average,

TABLE 5.1 MPI, Headcount Ratio, and Intensity of Province 1

	MPI	H (%)	A (%)
National	0.127	28.62	44.23
Province 1	**0.085**	**19.67**	**43.22**
Province 2	0.217	47.89	45.32
Province 3	0.051	12.24	41.86
Province 4	0.061	14.19	42.88
Province 5	0.133	29.92	44.33
Province 6	0.230	51.22	44.88
Province 7	0.146	33.56	43.51

Source: Calculations based on data from MICS 2014

FIGURE 5.1 MPI, Headcount Ratio, and Intensity of Province 1
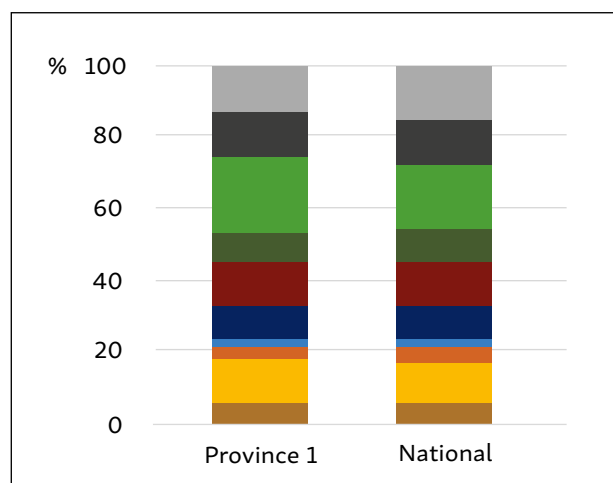
Source: Calculations based on data from MICS 2014

in 43.2% of the weighted indicators. Nationally, the poor in Nepal are deprived in 44.2% of indicators, so the intensity of deprivation is lower in Province 1 than it is nationally.

Province 1 is the third largest province in Nepal, with 17.6% of the population, behind Province 3 (22.0%) and Province 2 (18.4%). There are approximately 900,000 MPI poor people living in Province 1, which represents 12% of all MPI poor people in Nepal.

The indicator that contributes the most to the MPI in Province 1 is years of schooling. This indicator is weighted at 1/6 of the measure, but is responsible for more than 1/5 of the total MPI for the province. Other deprivations with high contributions to poverty are nutrition (13.0%), child mortality (12.9%), cooking fuel (12.6%), and flooring and roofing (12.5%). Lack of access to clean water (1.6%), electricity (3.8%), and sufficient assets (5.3%) all contribute relatively little to poverty in Province 1. Compared to national contributions by indicator, Province 1 faces greater challenges in years of schooling (21.3% in Province 1 compared to 17.7% nationally) and sanitation (9.2% vs. 8.2%). Nutrition (13.0% vs. 15.9%) and school attendance (7.8% vs. 9.6%) are relatively lower in Province 1 than nationally.

Between 2011 and 2014, Province 1 reduced the proportion of MPI poor people by more than 10 percentage points, from 30.54% in 2011 to 19.67% in 2014. This reduction is statistically significant with a 95% confidence level. Using 2011 census figures, this represents a move out of poverty for nearly 500,000 people from Province 1. There was also a statistically significant decrease in the MPI, as well as a decrease in the intensity of poverty (though that decrease is not statistically significant). All indicators improved over this period, with statistically significant decreases in child mortality, electricity, sanitation, clean water, flooring and roofing, cooking fuel, and lack of assets.

The largest reduction was in sanitation, which saw a decline of more than 13 percentage points in the proportion of MPI poor who are deprived of adequate sanitation. This is also the indicator that improved the most nationally over that period. Flooring/roofing and cooking fuel also had declines of more than 10 percentage points in their censored headcount ratios, although these were still the indicators with the greatest rates of deprivation among the poor in 2014.

The figures for changes over time are encouraging, as multidimensional poverty in Province 1 has been significantly reduced, even over a short period of three years. However, more effort is needed to further reduce poverty in Province 1, particularly in indicators such as cooking fuel and housing, which had substantial reductions but still affect a significant number of poor people in the province.

5.2 PROVINCE 2

TABLE 5.2 MPI, Headcount Ratio, and Intensity
of Province 2

	MPI	H (%)	A (%)
National	0.127	28.62	44.23
Province 1	0.085	19.67	43.22
Province 2	**0.217**	**47.89**	**45.32**
Province 3	0.051	12.24	41.86
Province 4	0.061	14.19	42.88
Province 5	0.133	29.92	44.33
Province 6	0.230	51.22	44.88
Province 7	0.146	33.56	43.51

Source: Calculations based on data from MICS 2014

FIGURE 5.2 MPI, Headcount Ratio, and Intensity
of Province 2

Source: Calculations based on data from MICS 2014

Province 2 has the second highest MPI of any province in Nepal, at 0.217. This is well above the national MPI of 0.127. The headcount ratio of multidimensional poverty in Province 2 is 47.9%, meaning that nearly half of the province's population is multidimensionally poor. This is substantially higher than the national multidimensional poverty rate of 28.6%. The intensity of poverty in Province 2 is 45.3%, which means that those who are identified as multidimensionally poor are deprived, on average, in 45.32% of the weighted indicators. Nationally, the poor in Nepal are deprived in 44.2% of indicators, so the intensity of deprivation is higher in Province 2 than it is nationally.

Province 2 is the second largest province in Nepal, with 18.4% of the population, behind only Province 3 (22.0%). There are more than 2.5 million MPI poor people living in Province 2, which represents 35% of all MPI poor people in Nepal. Province 2 is home to the largest number of MPI poor people of any province.
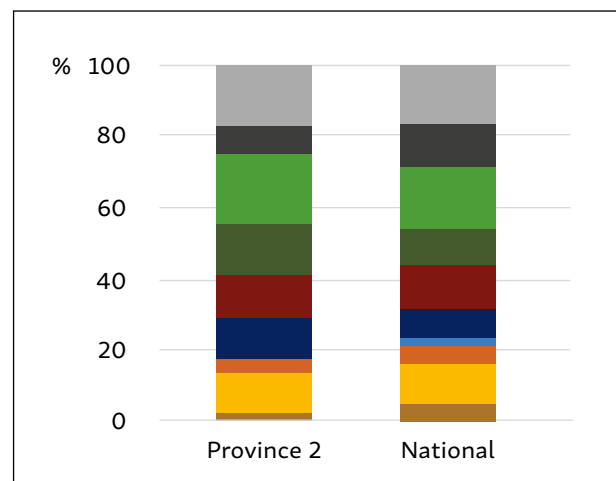
The indicator that contributes most to the MPI in Province 2 is years of schooling. Because this indicator carries three times the weight of the living standard indicators, its contribution is higher even though the number of people affected are lower. This single indicator, out of ten, is responsible for almost 1/5 of the total MPI for the province. Other indicators with high contributions to poverty are nutrition (17.4%), school attendance (14.1%), and cooking fuel (12.2%). Lack of access to clean water (0.4%), sufficient assets (2.5%), and electricity (3.4%) all contribute relatively little to poverty in Province 2. Compared to national contributions by indicator, Province 2 has relatively higher deprivations in school attendance (14.1% in Province 2 compared to 9.6% nationally) and sanitation (11.0% vs. 8.2%). Child mortality (7.8% vs. 12.5%) and assets (2.5% vs. 5.2%) contribute relatively less to poverty in Province 2 than nationally.

Between 2011 and 2014, there were statistically significant decreases in the MPI and in the intensity of poverty in Province 2. It appears to have reduced

the proportion of MPI poor from 58.6% in 2011 to 47.9% in 2014, although because this dataset has high sampling errors, this reduction is technically not statistically significant. Statistically significant improvements were made in years of schooling [90% confidence], child mortality, electricity, sanitation, flooring and roofing [90%], and assets. The greatest improvement was in access to electricity, in which the percentage of poor people who lack electricity was reduced by more than 16 percentage points. Province 2 is the only province in Nepal in which the largest reduction was in an indicator other than sanitation, though sanitation still improved by almost 15 percentage points between 2011 and 2014. Deprivations in water saw a small but significant increase over these three years, from 0% in 2011 to still a quite low rate at 1.5% in 2014.

While the reductions in multidimensional poverty observed over this period are encouraging, the high percentage of Nepal's MPI poor who live in Province 2 – Province 2 has over 1 million more MPI poor people than any other province – suggests that Province 2 should receive considerable attention and resources for reducing poverty. In addition to education deprivations, policymakers may want to focus on policies that target cooking fuel, flooring and roofing, and improved sanitation.
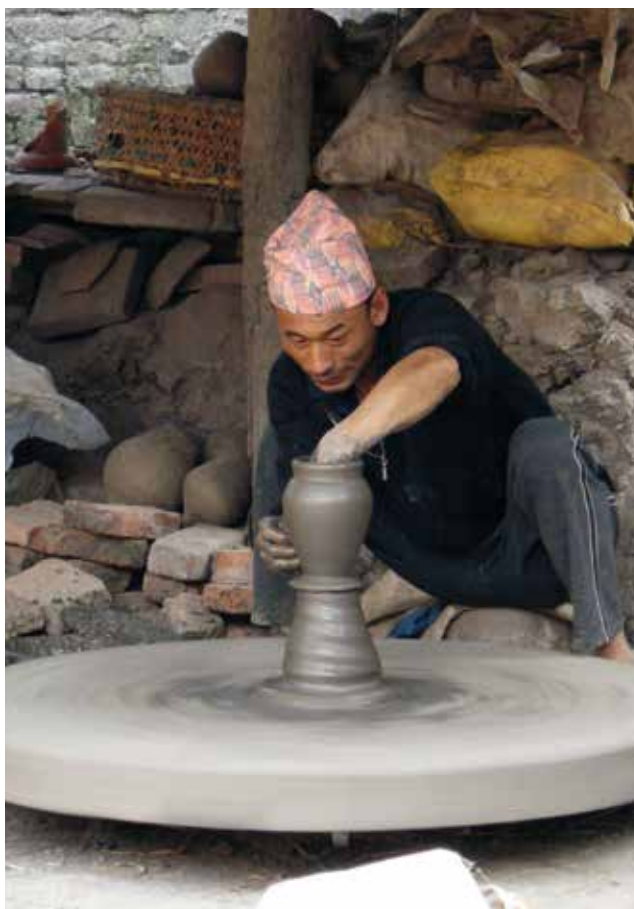
5.3 PROVINCE 3

TABLE 5.3 MPI, Headcount Ratio, and Intensity of Province 3

	MPI	H (%)	A (%)
National	0.127	28.62	44.23
Province 1	0.085	19.67	43.22
Province 2	0.217	47.89	45.32
Province 3	**0.051**	**12.24**	**41.86**
Province 4	0.061	14.19	42.88
Province 5	0.133	29.92	44.33
Province 6	0.230	51.22	44.88
Province 7	0.146	33.56	43.51

Source: Calculations based on data from MICS 2014

FIGURE 5.3 MPI, Headcount Ratio, and Intensity of Province 3

Source: Calculations based on data from MICS 2014

Province 3 has the lowest MPI of any province in Nepal, at 0.051. This is well below the national MPI of 0.127. The headcount ratio of multidimensional poverty in Province 3 is 12.2%, meaning that a little over 12% of the province's population is multidimensionally poor. This is substantially lower than the national multidimensional poverty rate of 28.6%. The intensity of poverty in Province 3 is 41.9%, which means that those who are identified as multidimensionally poor are deprived, on average, in 41.9% of the weighted indicators. Province 3 has the lowest intensity of poverty of any province in Nepal.

Province 3 is the largest province in Nepal, with 22% of the population. More than 675,000 MPI poor people live in Province 3, which represents 9% of all MPI poor people in Nepal. Province 3, despite being the largest province in terms of population, has the third lowest number of poor persons of any province.

The indicator that contributes the most - nearly 25% - to the MPI in Province 3 is deprivation in years of schooling. Other deprivations with high contributions to poverty are cooking fuel (12.7%) and flooring and roofing (12.5%). School attendance (3.3%), electricity (3.6%), and water (4.3%) all contribute relatively little to poverty in Province 3. Compared to the composition of MPI nationally, Province 3 has relatively higher contributions in years of schooling (24.8% in Province 3 compared to 17.7% nationally) and assets (8.7% vs. 5.2%). School attendance (3.3% vs. 9.6%) and nutrition (11.8% vs. 15.9%) contribute relatively less to poverty in Province 3 than nationally.
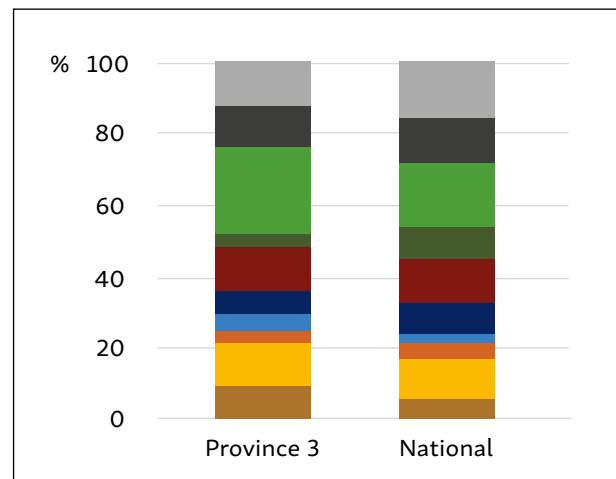
Between 2011 and 2014, Province 3 reduced the proportion of MPI poor people by 15 percentage points, from 27.24% in 2011 to 12.24% in 2014, which represents a halving of multidimensional poverty. This reduction is statistically significant at the 99% confidence level. Using 2011 census figures, this would represent a move out of poverty for nearly 830,000 people from Province 3. There were also decreases in the MPI and in the intensity of poverty, though the decrease in intensity was not statistically

significant. All indicators improved over this period, with statistically significant improvements in years of schooling, school attendance, child mortality, electricity, sanitation, flooring and roofing, cooking fuel, and assets. The greatest improvement was in access to sanitation, in which the percentage of poor people who lack adequate sanitation was reduced by more than 16 percentage points. Cooking fuel and flooring/roofing also had declines of more than 10% in their censored headcount ratios, although these were still the indicators with the greatest rates of deprivation among the poor in 2014.

Although the poverty rate in Province 3 is the lowest of any of Nepal's provinces, its large population share means that there are still a large number of MPI poor people in Province 3. Encouragingly, Province 3 has been successful at reducing multidimensional poverty, with the largest number of people moving out of poverty from 2011 to 2014 of any of the provinces. Consequently, Province 3 reduced its share of Nepal's MPI poor people from 14% to 9%. Further improvements could still be made, particularly in years of schooling, cooking fuel and housing.

5.4 PROVINCE 4

TABLE 5.4 MPI, Headcount Ratio, and Intensity
of Province 4

	MPI	H (%)	A (%)
National	0.127	28.62	44.23
Province 1	0.085	19.67	43.22
Province 2	0.217	47.89	45.32
Province 3	0.051	12.24	41.86
Province 4	**0.061**	**14.19**	**42.88**
Province 5	0.133	29.92	44.33
Province 6	0.230	51.22	44.88
Province 7	0.146	33.56	43.51

Source: Calculations based on data from MICS 2014

FIGURE 5.4 MPI, Headcount Ratio, and Intensity
of Province 4

Source: Calculations based on data from MICS 2014

Province 4 has the second lowest MPI of any province in Nepal, at 0.061. This is well below the national MPI of 0.127. The headcount ratio of multidimensional poverty in Province 4 is 14.2% meaning that a little over 14% of the province's population is multidimensionally poor. This is substantially lower than the national multidimensional poverty rate of 28.6%. The intensity of poverty in Province 4 is 42.9%, which means that those who are identified as multidimensionally poor are deprived, on average, in 42.9% of the weighted indicators. Nationally, the poor in Nepal are deprived in 44.2% of indicators, so the intensity of deprivation is lower in Province 4 than it is nationally.

Province 4 is the third smallest province in Nepal, with 11.6% of the population. There are just over 340,000 MPI poor people living in Province 4, which represents 4.6% of all the MPI poor people in Nepal. Province 4 is home to the fewest MPI poor people of any province.
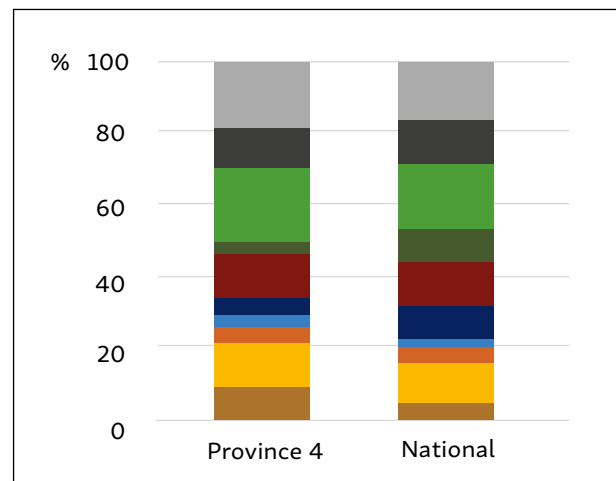
The indicator that contributes most to the MPI in Province 4 is years of schooling, due to its deprivation level combined with the relatively higher weights on health and education indicators. Other deprivations with high contributions to poverty are nutrition (18.1%), flooring and roofing (12.7%), and cooking fuel (12.5%). Water (3.2%), school attendance (3.8%), and sanitation (4.1%) all contribute relatively little to poverty in Province 4. Compared to national contributions by indicator, Province 4 has a relatively higher deprivations in assets (9.4% in Province 4 compared to 5.2% nationally). School attendance (3.8% vs. 9.6%) and sanitation (4.1% vs. 8.2%) contribute relatively less to poverty in Province 4 than nationally.

Between 2011 and 2014, Province 4 reduced the proportion of MPI poor people by almost 10 percentage points, from 23.8% in 2011 to 14.2% in 2014. This reduction is statistically significant at the 95% confidence level. Using 2011 census figures, this would represent a move out of poverty for more than 230,000 people from Province 4. There were also decreases in

the MPI and in the intensity of poverty, though the decrease in the intensity was not statistically significant. All indicators except nutrition improved over this period, with statistically significant improvements in school attendance [90% confidence level], child mortality, sanitation, and cooking fuel [90% confidence level]. The greatest improvement was in access to sanitation, in which the percentage of poor people who lack adequate sanitation was reduced by more than 13 percentage points. There appears to be a slight increase in the percentage of poor people who were malnourished, but this increase is not statistically significant.

Province 4's low population share and low headcount ratio means that it has the fewest MPI poor people of any province in Nepal. Despite this, it still had a fairly substantial reduction in poverty over the three years from 2011–2014, moving more people out of poverty than another province with a larger population. Further improvements could be made through policies that target deprivations in education, nutrition, housing, cooking fuel, and assets.

David Waldorf/World Bank

5.5 PROVINCE 5

TABLE 5.5 MPI, Headcount Ratio, and Intensity
of Province 5

	MPI	H (%)	A (%)
National	0.127	28.62	44.23
Province 1	0.085	19.67	43.22
Province 2	0.217	47.89	45.32
Province 3	0.051	12.24	41.86
Province 4	0.061	14.19	42.88
Province 5	**0.133**	**29.92**	**44.33**
Province 6	0.230	51.22	44.88
Province 7	0.146	33.56	43.51

Source: Calculations based on data from MICS 2014

FIGURE 5.5 MPI, Headcount Ratio, and Intensity
of Province 5

Source: Calculations based on data from MICS 2014

The MPI of Province 5 is the median of all provinces in Nepal, at 0.133. This is slightly above the national MPI of 0.127. The headcount ratio of multidimensional poverty in Province 5 is 29.9%, meaning that nearly 30% of the population of the province is multi-dimensionally poor. This is slightly higher than the national multidimensional poverty rate of 28.6%. The intensity of poverty in Province 5 is 44.3%, which means that those who are identified as multidimensionally poor are deprived, on average, in 44.3% of the weighted indicators. Nationally, the poor in Nepal are deprived in 44.2% of indicators, so the intensity of deprivation is only slightly higher in Province 5.

Province 5 is the fourth largest province in Nepal, with 16.5% of the population. There are almost 1.5 million MPI poor people living in Province 5, which represents 19.7% of all MPI poor people in Nepal. Province 5 is home to the second highest number of MPI poor people of any province.
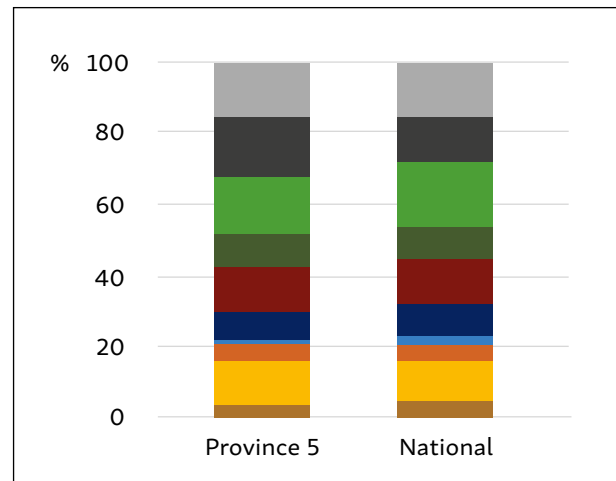
The indicators that contribute most to the MPI in Province 5 are child mortality and undernutrition. Each is responsible for more than 16% of the total MPI for the province. Another deprivation with high contributions to poverty is years of schooling (15.8%). Water (1.8%), assets (4.4%), and electricity (4.6%) all contribute relatively little to poverty in Province 5. Compared to national contributions by indicator, Province 5 has a relatively higher contribution in child mortality (16.4% in Province 5 compared to 12.5% nationally). Years of schooling (15.8% vs. 17.7%) contributes relatively less to poverty in Province 5 than nationally. Overall, the percentage contributions of indicators to the MPI in Province 5 are relatively close to those at the national level.

Between 2011 and 2014, Province 5 reduced the proportion of MPI poor people by 11 percentage points, from 40.8% in 2011 to 29.9% in 2014. This reduction is statistically significant at the 95% confidence level. Using 2011 census figures, this would represent a move out of poverty for more than 530,000

people from Province 5. There were also decreases in the MPI and in the intensity of poverty, both statistically significant at the 99% level. Province 5 had the largest reduction in intensity of poverty of any province in Nepal. All indicators improved over this period, with statistically significant improvements in years of schooling, child mortality, electricity [90% confidence level], sanitation, flooring and roofing, cooking fuel, and assets. The greatest improvement was in access to sanitation, in which the percentage of poor people who lack adequate sanitation was reduced by almost 17 percentage points.

David Waldorf/World Bank

Province 5 has the second highest number of MPI poor of any province in Nepal, and its MPI results and composition tend to be similar to national averages. Province 5's success in reducing the intensity of poverty is encouraging and may offer some lessons for other provinces of Nepal. To further accelerate reductions in MPI requires improvements in nutrition and child mortality as well as cooking fuel, housing, and sanitation.

5.6 PROVINCE 6

TABLE 5.6 MPI, Headcount Ratio, and Intensity
of Province 6

	MPI	H (%)	A (%)
National	0.127	28.62	44.23
Province 1	0.085	19.67	43.22
Province 2	0.217	47.89	45.32
Province 3	0.051	12.24	41.86
Province 4	0.061	14.19	42.88
Province 5	0.133	29.92	44.33
Province 6	**0.230**	**51.22**	**44.88**
Province 7	0.146	33.56	43.51

Source: Calculations based on data from MICS 2014

FIGURE 5.6 MPI, Headcount Ratio, and Intensity
of Province 6

Source: Calculations based on data from MICS 2014

Province 6 has the highest MPI of all provinces in Nepal, at 0.230. This is well above the national MPI of 0.127. The headcount ratio of multidimensional poverty in Province 6 is 51.2%, meaning that more than half of the population of the province is multi-dimensionally poor. This is substantially higher than the national multidimensional poverty rate of 28.6%, making Province 6 the only province in which more than half of the population is poor. The intensity of poverty in Province 6 is 44.9%, which means that those who are identified as multidimensionally poor are deprived, on average, in 44.9% of the weighted indicators. Nationally, the poor in Nepal are deprived in 44.2% of indicators, so the intensity of deprivation is slightly higher in Province 6 than it is nationally.

Province 6 is the smallest province in Nepal, with 5.4% of the population. There are almost 600,000 MPI poor people living in Province 6, which represents 8.1% of all MPI poor people in Nepal. Province 6 has the second fewest number of MPI poor people of any province, though its rate of poverty is the highest.
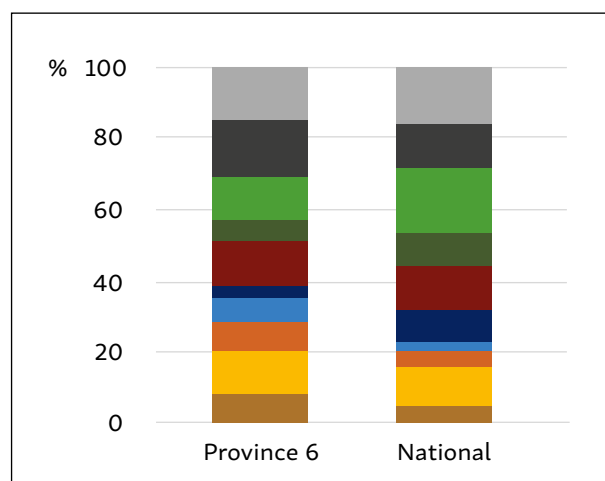
The indicator that contributes most to the MPI in Province 6 is deprivation in child mortality. This single indicator, out of ten, is responsible for nearly 16% of the total MPI for the province. Other indicators with high contributions to poverty are nutrition (15.1%), years of schooling (12.4%), cooking fuel (12.3%), and flooring and roofing (12.3%). Sanitation (3.4%), school attendance (5.5%), and water (6.4%) all contribute relatively little to poverty in Province 6. Compared to national contributions by indicator, Province 6 has relatively higher contributions from water (6.4% in Province 6 compared to 2.3% nationally) and assets (9.1% vs. 5.2%). Years of schooling (12.4% vs. 17.7%) and sanitation (3.4% vs. 8.2%) contribute relatively less to poverty in Province 6 than nationally.

Between 2011 and 2014, Province 6 reduced the proportion of MPI poor people by almost 8 percentage points, from 58.8% in 2011 to 51.2% in 2014. Considering the sampling errors in this dataset, neither the reduction in MPI nor in the headcount ratio are

statistically significant. If it were, using 2011 census figures, this would represent a move out of poverty for only 90,000 people from Province 6. The decrease in intensity is statistically significant. All indicators, except school attendance, improved over this period, but the only statistically significant improvement was in sanitation. Access to improved sanitation showed the greatest improvement, with the percentage of poor people who lack adequate sanitation reduced by almost 26 percentage points. There was a slight increase in the number of MPI poor people who were deprived in the indicator of school attendance, but this finding is not statistically significant.

Province 6 has the smallest population of any of the provinces in Nepal, but it also has the highest rate of multidimensional poverty and the highest intensity of poverty. Furthermore, Province 6 had the least improvement in poverty from 2011 to 2014. Unfortunately, it is being left behind. This suggests that Province 6 may benefit from more targeted poverty reduction policies in order to avoid further polarization and ensure that it catches up. For example, in addition to the above-mentioned deprivations in child mortality and nutrition, more than half of all MPI poor people in Province 6 suffer from inadequate cooking fuel and flooring and roofing, the highest percentages of deprivation among the poor for any indicator in any province. Additionally, the percentage of the poor in Province 6 who lack access to clean water is much higher than in any other province, suggesting that policies aimed at improving access to water may be particularly helpful in alleviating poverty in this province.

5.7 PROVINCE 7

TABLE 5.7 MPI, Headcount Ratio, and Intensity
of Province 7

	MPI	H (%)	A (%)
National	0.127	28.62	44.23
Province 1	0.085	19.67	43.22
Province 2	0.217	47.89	45.32
Province 3	0.051	12.24	41.86
Province 4	0.061	14.19	42.88
Province 5	0.133	29.92	44.33
Province 6	0.230	51.22	44.88
Province 7	**0.146**	**33.56**	**43.51**

Source: Calculations based on data from MICS 2014

FIGURE 5.7 MPI, Headcount Ratio, and Intensity
of Province 7

Source: Calculations based on data from MICS 2014

Province 7 has the third highest MPI of all provinces in Nepal, at 0.146. This is above the national MPI of 0.127. The headcount ratio of multidimensional poverty in Province 7 is 33.6%, meaning that more than a third of the population of the province is multidimensionally poor. This is higher than the national multidimensional poverty rate of 28.6%. The intensity of poverty in Province 7 is 43.5%, which means that those who are identified as multidimensionally poor are deprived, on average, in 43.5% of the weighted indicators. Nationally, the poor in Nepal are deprived in 44.2% of indicators, so the intensity of deprivation is slightly lower in Province 7 than it is nationally.

Province 7 is the second smallest province in Nepal, with 8.5% of the population. There are more than 850,000 MPI poor people living in Province 7, which represents 11.6% of all the MPI poor people in Nepal.

The indicator that contributes most to the MPI in Province 7 is child mortality. This indicator contributes nearly 18% to the total MPI for the province. Other
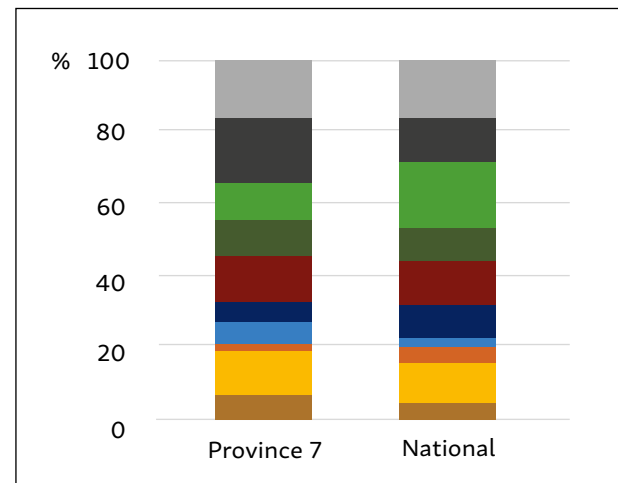
indicators with high contributions to poverty are nutrition (16.0%), cooking fuel (12.7%), and roofing and flooring (12.5%). Water (4.1%), electricity (4.4%), and sanitation (5.5%) all contribute relatively little to poverty in Province 7. Compared to national contributions by indicator, Province 7 has a relatively higher contribution from child mortality (15.8% in Province 7 compared to 12.5% nationally). Years of schooling (10.6% vs. 17.7%) contributes relatively less to poverty in Province 7 than nationally.

Between 2011 and 2014, Province 7 reduced the proportion of MPI poor people by more than 17 percentage points, from 50.8% in 2011 to 33.6% in 2014. This reduction is statistically significant at the 99% confidence level. Using 2011 census figures, this would represent a move out of poverty for nearly 440,000 people from Province 7. There were also decreases in the MPI and in the intensity of poverty, both of which are statistically significant at the 95% level. All indicators except school attendance improved over this period, with statistically significant

improvements in years of schooling, child mortality, nutrition, electricity, sanitation, flooring and roofing, cooking fuel, and assets. Access to improved sanitation had the greatest improvement, with the percentage of poor people who lack adequate sanitation reduced by more than 30 percentage points. There was a slight increase in the number of MPI poor people who were deprived in the indicator of school attendance, but this finding is not statistically significant.

Province 7 had the greatest improvement in poverty rate of all provinces from 2011 to 2014, suggesting that the policies it has implemented have been successful at reducing poverty. Province 7 also had the greatest improvement in any indicator of any province, with a reduction of more than 30% in the percentage of the poor who lack adequate sanitation. For provinces in which deprivation in sanitation is prevalent among the poor, the policies of Province 7 may provide some useful lessons. However, large percentages of the poor in Province 7 still suffer from child mortality, a lack of adequate nutrition, cooking fuel and housing, suggesting that policymakers may want to focus on those sectors for future poverty reduction programs.

VI. Using the MPI for Policy and Management

This MPI report marks Nepal's endeavours to follow a multidimensional approach to measuring poverty, one designed to complement conventional income poverty measures. Both measures provide an important source of information for public policy. Nepal's national MPI can, in particular, help to monitor progress in meeting the social and infrastructure goals in the 14th Periodic Plan of the Government of Nepal. It is expected that the recently elected provincial parliaments and governments will particularly find this report useful.

The national multidimensional poverty rate of 28.6% in 2014 is slightly higher than the income poverty rate of 23.8% in 2014. This is because the MPI is a broader measure.

Nepal's MPI of 0.127 indicates that poor people in Nepal experience 12.7% of the deprivations that would be experienced if all people in Nepal were deprived in all indicators. The largest contributions to national poverty are deprivations in years of schooling (17.7%), followed by nutrition (15.9%). If aggregated by dimensions, the largest contribution is due to living standards (44.4%). The health and education dimensions contribute 28.3% and 27.3%, respectively.

As Nepal moves into a new era of governance, this report provides a rigorous baseline of the level and composition of poverty by province and social groups. The information in this report can thus support decisions pertaining to resource allocation, integrated and multisectoral policy design, policy coordination, and monitoring of the SDGs. This section presents four recommendations based on the analysis in this report.

RECOMMENDATIONS

1. **Use of the MPI to measure multi-dimensional poverty and allocate resources needs to be enhanced.**

    The MPI, which combines the percentage of poor people (H) with the intensity of poverty (A), should be the overarching headline figure of poverty. This measure – which is sensitive to improvements in either intensity or incidence – can be used to determine and declare changes over time. Naturally, prominence will be given to the poverty rate and the estimated number of poor people when communicating with the press and civil society. However, the MPI provides an authoritative measure to compare regions, groups, and changes over time, and it can be broken down by indicator to show how poverty has changed. Allocation of public sector resources should be informed by MPI as well as monetary poverty levels – MPI variables can, to a great extent, be changed directly by sectoral policies. Although the MPI and consumption poverty measures differ, both should be used as complementary tools to guide policy. Normally, consumption poverty is presented as a headcount ratio, so it should then be compared with the headcount ratio of MPI.

    To make clear the policy relevance of the MPI, it could be useful to consider how it can help manage integrated and multisectoral policies to achieve the national development goals, including the SDGs. It can be useful to identify key connections between the MPI and the National Plan (as well as recent commitments Nepal has made with respect to the SDGs) in greater detail and elucidate the synergistic ways that the MPI can reinforce and strengthen the implementation of the National Plan and the SDGs, as well as monitor progress.

2. **Disaggregated MPI reports should inform provincial policies.**

    Drawing upon this report and its component data, short and straightforward policy briefings will need to be prepared in local and national languages and shared with government, academia, and other institutions operating in the provinces. Such briefings are straightforward to prepare (for examples, see OPHI's 'country briefings') and, in time, may generate motivation at the provincial level among those who become leaders in and champions of reducing multidimensional poverty.

    Province-level policies should be informed by the composition of poverty in each province, as well as the overall level of poverty. This report includes province-level reports on MPI, which could be further circulated in province offices. It is good that the poorest provinces have seen faster reductions in poverty. That commitment has to be sustained. It is also important to conduct further analysis and research on each province to better understand the different situations they face and highlight cases of success.

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3. **MPI variables should be included in future surveys and census.**

For strict comparability between different time periods, and to gauge progress over the years, it is recommended that all MPI variables are included in future surveys such as the NLSS. Doing so will enable the MPI to be updated more frequently. This increases its utility as a management tool, because just-in-time information is vital to evidence-based policy. The lag between data collection and MPI release should be minimized towards the same end. The next census should also include as many MPI variables as is feasible so as to map poverty at the local level. This will help with policy intervention at the grassroots level, animate local activism, and provide a razor-sharp picture of MPI in Nepal.

4. **MPI needs to be disseminated transparently and advance policy research.**

It is highly recommended that the files required to compute the MPI – such as the .do files – be posted online and as open access at the same time that the measure is released. This is done by other governments, and it stimulates research by their academic bodies into poverty reduction. It is also recommended that the MPI documentation (such as this report or some improvement of it) be freely accessible online in Nepali and English.

To understand what really caused the reductions in poverty observed in this report, it is recommended that further research is undertaken within Nepal, particularly by the very strong and engaged community of scholars, economists, and statisticians in Nepal. Their expertise can bring a great deal of texture and insight to the issues of multidimensional poverty, which can accelerate its reduction.

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Appendix 1 – The Multidimensional Poverty Index: Methodology and Properties

A1.1 THE MPI METHODOLOGY

Suppose at a particular point in time, there are n people in Nepal and their wellbeing is evaluated by d indicators.[6] We denote the achievement of person i in indicator j by $x_{ij} \in \mathbb{R}$ for all $i = 1, \ldots, n$ and $j = 1, \ldots, d$. The achievements of n persons in d indicators are summarized by an $n \times d$ dimensional matrix X, where rows denote persons and columns denote indicators. Each indicator is assigned a weight based on the value of a deprivation relative to other deprivations. The relative weight attached to each indicator j is the same across all persons and is denoted by w_j, such that $w_j > 0$ and $\sum_{j=1}^{d} w_j = 1$.

In a single-dimensional analysis, people are identified as poor as long as they fail to meet a threshold called the 'poverty line' and non-poor, otherwise. In a multidimensional analysis based on a counting approach – as with the adjusted headcount ratio – a person is identified as poor or non-poor in two steps.

In the first step, a person is identified as deprived or not in each indicator subject to a deprivation cutoff. We denote the *deprivation cutoff* for indicator j by z_j, and the deprivation cutoffs are summarized by vector z. Any person i is deprived in any indicator j if $x_{ij} < z_j$ and non-deprived, otherwise. We assign a *deprivation status score g_{ij}* to each person in each dimension based on the deprivation status. If person i is deprived in indicator j, then $g_{ij} = 1$; and $g_{ij} = 0$, otherwise. The second step uses the weighted deprivation status scores of each person in all d indicators to identify the person as poor or not. An overall *deprivation score $c_i \in [0,1]$* is computed for each person by summing the deprivation status scores of all d indicators, each multiplied by their corresponding weights, such that $c_i = \sum_{j=1}^{d} w_j g_{ij}$. A person is identified as poor if $c_i \geq k$, where $k \in (0,1]$, and non-poor, otherwise.[7] The deprivation scores of all n persons are summarized by vector c.

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6   The meaning of the terms 'dimension' and 'indicator' are slightly different in Alkire and Foster (2014) and in Alkire and Santos (2010). In Alkire and Foster (2014), no distinction is made between these two terms. In Alkire and Santos (2010), however, the term 'dimension' refers to a pillar of wellbeing and a dimension may consist of several indicators.

7   For $k = 100\%$, the identification approach is referred to as the *intersection approach*; for $0 < k \leq \min\{w_1, \ldots, w_d\}$, it is referred to as the *union approach* (Atkinson, 2003). Alkire and Foster's dual-cutoff approach requires $0 < k \leq 1$ thus it includes union, intersection, and also *intermediate* cutoffs.

After identifying the set of poor and their deprivation scores, we obtain the adjusted headcount ratio (M_0). Many countries refer to this as the MPI or Multidimensional Poverty Index. The focus axiom requires that while measuring poverty the focus should remain only on those identified as poor.[8] This entitles us to obtain the censored deprivation score vector $c(k)$ from c, such that $c_i(k)=c_i$ if $c_i \geq k$ and $c_i(k)=0$, otherwise. The M_0 is equal to the average of the censored deprivation scores:

$$M_0 = \text{MPI} = \tfrac{1}{n}\sum_{i=1}^{n} c_i(k).$$

A1.2 PROPERTIES OF THE MPI

We now outline some of the features of M_0 that are useful for policy analysis. The first is that M_0 can be expressed as a product of two components: the share of the population who are multidimensionally poor, or multidimensional headcount ratio (H), and the average of the deprivation scores among the poor only, or intensity (A). Technically,

$$M_0 = \text{MPI} = \tfrac{q}{n}\times\tfrac{1}{q}\sum_{i=1}^{n} c_i(k) = \text{H}\times\text{A};$$

where q is the number of poor.[9] This feature has an interesting policy implication for inter-temporal analysis. A certain reduction in M_0 may occur either by reducing H or by reducing A. This difference cannot be understood by merely looking at M_0. If a reduction in M_0 occurs merely as the result of a reduction in the number of people who are marginally poor, then H decreases but A may not. On the other hand, if

a reduction in M_0 is the result of a reduction in the deprivation of the poorest of the poor, then A decreases but H may not.[10]

The second feature of M_0 is that if the entire population is divided into m mutually exclusive and collectively exhaustive groups, then the overall M_0 can be expressed as a weighted average of the M_0 values of m sub-groups, where the weights are the respective population shares. We denote the achievement matrix, the population, and the adjusted headcount ratio of sub-group ℓ by X^ℓ, n^ℓ, and $M_0(X^\ell)$, respectively. Then the overall M_0 can be expressed as

$$M_0 = \text{MPI} = \sum_{\ell=1}^{m} \tfrac{n^\ell}{n} M_0(X^\ell).$$

This feature is also known as *sub-group decomposability* and is useful for understanding the contribution of different sub-groups to overall poverty levels.[11] Note that the contribution of a sub-group to overall poverty depends both on the poverty level of that sub-group and that sub-group's population share.

The third feature of M_0 is that it can be expressed as an average of the censored headcount ratios of indicators weighted by their relative weight. The censored headcount ratio of an indicator is the proportion of the population that is multidimensionally poor and is simultaneously deprived in that indicator. Let us denote the censored headcount ratio of indicator j by h_j. Then M_0 can be expressed as

$$M_0 = \text{MPI} = \sum_{j=1}^{d} w_j h_j = \sum_{j=1}^{d} w_j \left[\tfrac{1}{n}\sum_{i=1}^{n} g_{ij}(k)\right],$$

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8   In the multidimensional context, there are two types of focus axioms. One is a deprivation focus, which requires that any increase in already non-deprived achievements should not affect a poverty measure. The other is a poverty focus, which requires that any increase in the achievements of non-poor persons should not affect a poverty measure. See Bourguignon and Chakravarty (2003) and Alkire and Foster (2014).

9   This feature is analogous to that of the poverty gap ratio, which is similarly expressed as a product of the headcount ratio and the average income gap ratio among the poor.

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10   Apablaza and Yalonetzky (2014) have shown that the change in $M0$ can be expressed as $\Delta M_0 = \Delta H + \Delta A + \Delta H \times \Delta A$, where Δx is referred to as change in x.

11   See Foster, Greer and Thorbecke (1984) for a discussion of this property.

where $g_{ij}(k)=g_{ij}$ if $c_i \geq k$ and $g_{ij}(k)=0$, otherwise. Similar relationships can be established between A and deprivations among the poor. Let us denote the proportion of poor people deprived in indicator j by h_j^p. Then, dividing both sides of the above relationship by H, we find

$$A = \frac{\text{MPI}}{H} = \sum_{j=1}^{d} w_j \frac{h_j}{H} = \sum_{j=1}^{d} w_j h_j^p.$$

Breaking down poverty in this way allows an analysis of multidimensional poverty to depict clearly how different indicators contribute to poverty and how their contributions change over time. Let us denote the contribution of indicator j to M_0 by Φ_j. Then, the contribution of indicator j to M_0 is

$$\Phi_j = w_j \frac{h_j}{\text{MPI}} = w_j \frac{h_j p}{A}.$$

Appendix 2 – Robustness Analysis of Nepal's MPI

Nepal's national MPI builds upon the well-validated global MPI structure. Yet given the significance of a national MPI, it is essential to re-validate the robustness of the national MPI so it can be legitimately used for policy purposes. This section illustrates some of the numerous robustness tests to which Nepal's MPI was subjected. In particular, one wishes to ascertain the sensitivity of comparisons as to the level and composition of MPI to changes in parameters such as the poverty cutoff k and indicator weights.

There is a technical challenge for robustness tests in Nepal's context. Because the standard errors are high, the province rankings are not distinct. Thus several often-applied statistical tests are not relevant, and the interpretation of others is specific to this case.

Figures A2.1, A2.2, and A2.3 confirm that level, incidence, and intensity of multidimensional poverty (MPI, H, and A) for various levels of the poverty cutoff k follow the expected pattern. They show that when k=5% MPI is 0.216; incidence is 86%, indicating

FIGURE A2.1 MPI for Different Values of the Poverty Cutoff k

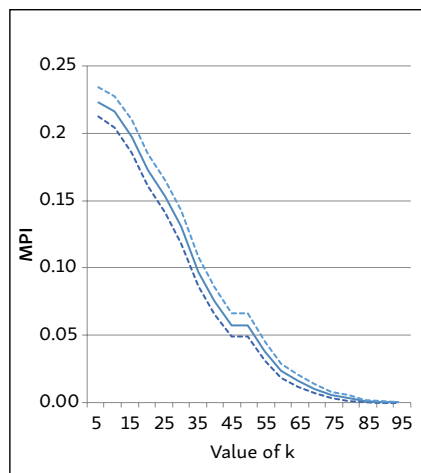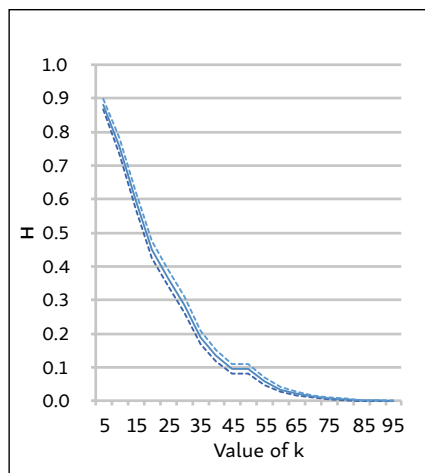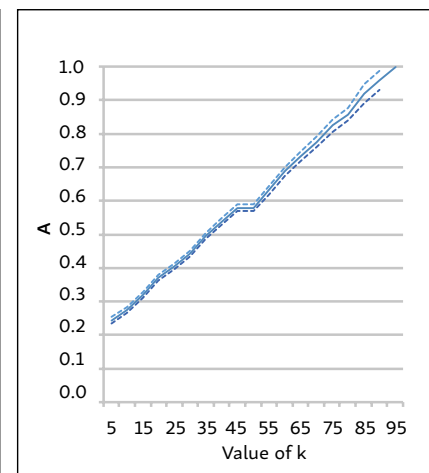FIGURE A2.2 Headcount Ratio for Different Values of the Poverty Cutoff k

FIGURE A2.3 Intensity of Poverty for Different Values of the Poverty Cutoff k

Source: Calculations based on data from MICS and DHS, various waves

- - - - - - - - - - MPI LB
———— MPI
- - - - - - - - - - MPI UB

- - - - - - - - - - H LB
———— H
- - - - - - - - - - H UB

- - - - - - - - - - A LB
———— A
- - - - - - - - - - A UB

that a large majority of the population is deprived in at least one of the weighted indicators; and intensity is 25%, meaning that those 86% are, on average, deprived in one quarter of the indicators. When k is larger than 75%, poverty is practically zero, implying that almost no one is deprived in more than three quarters of the weighted indicators. The figures suggest that there are no sharp discontinuities in MPI and H around the chosen k-value of 33%. We do see here, as in the intensity band diagram, that a noticeable number of persons are deprived in half of the MPI weighted indicators.

Figures A2.4 and A2.5 illustrate the robustness test. They plot the provincial MPI and H for various levels of the poverty cutoff k. As was already evident above, the sampling errors are so large as to prevent a clear distinction between many provinces (the visuals with confidence intervals are hard to read). For poverty cutoffs 20%, 33%, and 50%, the ranking by point estimates of all provinces is identical for MPI and for H for five of the provinces. Provinces 2 and 6 shift

rank but are not statistically distinct. The figure also shows that for poverty cutoffs below 50% there are no dramatic differences in the regions ranking in terms of poverty; when one adds confidence intervals, the same diagnosis pertains. Thus the MPI is robust to changes in the poverty cutoff from 20% to 40% or 50%, so the same broad diagnosis of poverty level by province pertains.

Table A2.1 presents results from redundancy tests for the ten indicators using both uncensored and censored headcount ratios. The redundancy statistic ranges from zero to one and shows the percentage of possible matches (in which a person is deprived in both indicators) that are realized. In construction, it is the percentage of people who are deprived in both indicators, divided by the minimum of the headcount ratios of the two indicators under study. For most pairwise comparisons, the redundancy is low, meaning that the percentage of matches that could have been realized is less than 50%. There are three indicators in which redundancy is higher: cooking fuel, housing (flooring and roofing), and, to a lesser

FIGURE A2.4 Sub-National Regions' MPI for Different Values of the Poverty Cutoff k
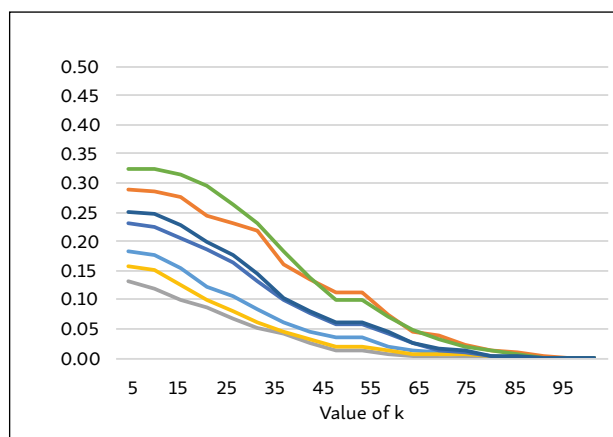
Source: Calculations based on data from MICS 2014

Province 1	Province 5
Province 2	Province 6
Province 3	Province 7
Province 4	

FIGURE A2.5 Sub-National Regions' H for Different Values of the Poverty Cutoff k
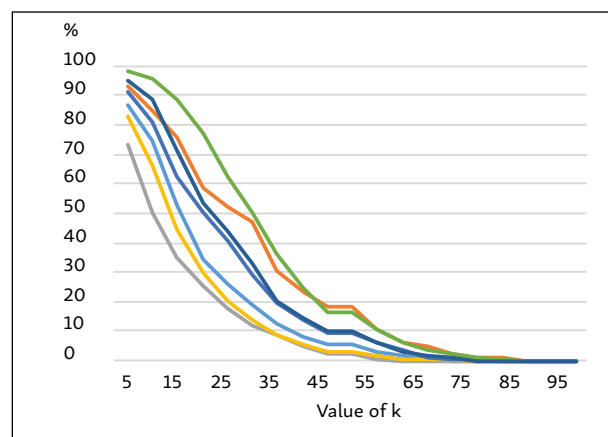
extent, sanitation. However this redundancy is in part mechanical probability rather than unexpected: the headcount ratios of these three indicators – whether uncensored or censored – are the highest across the ten component indicators. Given the disparity in deprivation rates between these and other indicators, it is not surprising that most people deprived in an indicator in which a much lower proportion of persons are deprived are also deprived in the other indicator. Apart from these predictable associations there is no high redundancy across the included indicators: each appears to contribute independent information.

TABLE A2.1 Redundancy Table Raw Headcount Ratios, 2014

Redundancy Test of Censored Headcount Ratio

	Nutrition	Child mortality	Years of schooling	School attendance	Cooking fuel	Sanitation	Water	Electricity	Flooring and roofing	Assets
Nutrition										
Child mortality	0.22									
Years of schooling	0.26	0.15								
School attendance	0.36	0.21	0.41							
Cooking fuel	0.92	0.88	0.93	0.96						
Sanitation	0.50	0.42	0.64	0.69	0.79					
Water	0.15	0.17	0.21	0.13	0.87	0.33				
Electricity	0.25	0.19	0.30	0.36	0.99	0.51	0.33			
Flooring and roofing	0.83	0.79	0.89	0.90	0.95	0.75	0.84	0.96		
Assets	0.26	0.25	0.43	0.31	0.94	0.43	0.44	0.52	0.92	
Raw headcount ratio	0.16	0.14	0.16	0.08	0.75	0.40	0.11	0.16	0.67	0.21

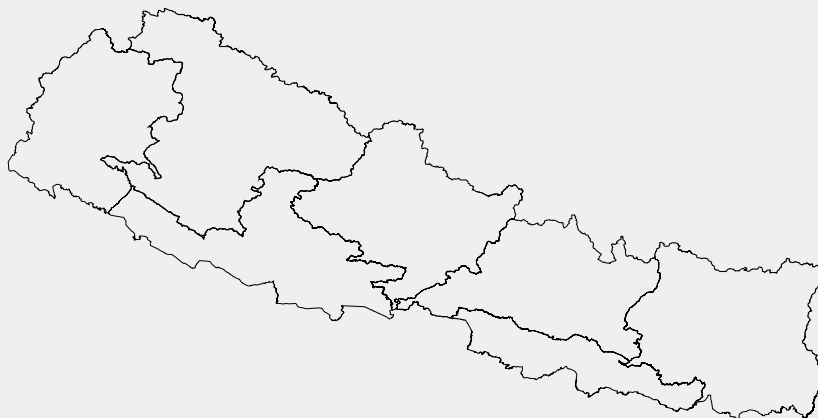Source: Calculations based on data from MICS 2014

TABLE A2.2 Redundancy Table Censored Headcount Ratios, 2014

Redundancy Test of Censored Headcount Ratio

	Nutrition	Child mortality	Years of schooling	School attendance	Cooking fuel	Sanitation	Water	Electricity	Flooring and roofing	Assets
Nutrition										
Child mortality	0.44									
Years of schooling	0.22	0.22								
School attendance	0.34	0.39	0.32							
Cooking fuel	0.47	0.39	0.28	0.40						
Sanitation	0.70	0.73	0.56	0.62	0.60					
Water	0.43	0.19	0.35	0.32	0.47	0.43				
Electricity	0.95	0.92	0.94	0.93	0.99	0.95	0.98			
Flooring and roofing	0.98	0.99	0.98	0.97	1.00	0.99	0.99	0.99		
Assets	0.55	0.33	0.37	0.34	0.58	0.50	0.62	0.97	0.99	
Raw headcount ratio	0.13	0.07	0.09	0.12	0.10	0.19	0.05	0.27	0.28	0.12

Source: Calculations based on data from MICS 2014

APPENDIX A2.3 MPI, Headcount Ratio, and Intensity for Different Values of Poverty Cutoff, k, by Sub-group

	k=33%			k=20%			k=50%		
	MPI	H (%)	A (%)	MPI	H (%)	A (%)	MPI	H (%)	A (%)
National	**0.127**	**28.62**	**44.23**	0.167	45.04	37.17	0.056	9.63	58.06
Province 1	**0.085**	**19.67**	**43.22**	0.122	34.69	35.29	0.034	6.00	57.06
Province 2	**0.217**	**47.89**	**45.32**	0.245	59.32	41.33	0.111	18.9	58.65
Province 3	**0.051**	**12.24**	**41.86**	0.085	26.16	32.67	0.014	2.69	53.78
Province 4	**0.061**	**14.19**	**42.88**	0.101	30.43	33.09	0.02	3.48	58.55
Province 5	**0.133**	**29.92**	**44.33**	0.185	50.67	36.53	0.059	10.16	57.92
Province 6	**0.23**	**51.22**	**44.88**	0.295	77.71	37.98	0.099	16.77	59.10
Province 7	**0.146**	**33.56**	**43.51**	0.198	53.98	36.61	0.062	10.70	58.05
Rural	**0.147**	**33.17**	**44.25**	0.192	51.26	37.44	0.065	11.21	58.05
Urban	**0.031**	**7.02**	**43.79**	0.051	15.55	33.05	0.012	2.12	58.24
Age 0–9	**0.194**	**41.61**	**46.57**	0.237	59.04	40.22	0.104	17.76	58.72
Age 10–17	**0.112**	**25.65**	**43.55**	0.153	42.31	36.16	0.046	7.94	58.18
Age 18–24	**0.09**	**21.34**	**42.32**	0.131	37.83	34.68	0.034	6.02	56.22
Age 25–57	**0.111**	**25.16**	**43.95**	0.15	41.06	36.55	0.048	8.24	57.94
Age >57	**0.12**	**29.07**	**41.14**	0.16	45.06	35.41	0.033	5.75	56.55

Source: Calculations based on data from MICS 2014

APPENDIX A2.4 Censored Headcount Ratios by Sub-group for Poverty Cutoff k=33%

	Nutrition	Child mortality	Years of schooling	School attendance	Cooking fuel	Sanitation	Water	Electricity	Flooring and roofing	Assets
National	**12.1**	**9.5**	**13.5**	**7.3**	**28.2**	**18.7**	**5.2**	**9.9**	**27.2**	**11.9**
Province 1	9.1	9.2	13.0	4.3	33.1	20.2	5.3	10.4	31.4	13.2
Province 2	26.0	11.8	26.7	19.4	58.2	49.5	1.6	16.3	51.7	12.3
Province 3	6.4	6.4	10.9	1.1	21.3	13.1	7.9	4.7	20.8	11.7
Province 4	9.5	7.3	10.9	1.5	27.0	9.8	5.6	9.1	25.9	16.2
Province 5	18.5	20.3	14.4	7.4	48.5	24.7	6.1	14.9	42.9	14.1
Province 6	22.8	24.4	17.5	7.9	77.4	17.3	40.3	48.1	76.7	53.9
Province 7	17.4	21.1	10.5	9.4	52.4	19.8	14.8	16.5	51.3	25.5
Rural	13.9	10.7	15.6	8.5	32.8	21.6	6.1	11.6	31.8	13.9
Urban	3.2	3.5	3.1	1.3	6.1	4.7	1.0	1.8	5.6	2.7
Age 0–4	30.2	11.8	20.2	10.1	42.6	28.3	6.5	15.0	41.1	17.1
Age 5–9	15.7	12.3	20.3	15.1	39.3	26.5	7.2	14.5	37.8	16.9
Age 10–14	8.7	11.8	12.6	9.1	28.6	19.0	5.5	10.6	27.8	12.9
Age 15–17	5.6	9.4	4.5	4.8	18.4	11.90	4.0	7.1	17.8	7.5
Age 18–24	11.2	8.3	6.3	4.0	21.1	14.70	3.6	6.2	20.2	7.0
Age 25–57	9.8	9.0	12.1	6.1	24.7	16.3	4.6	8.6	23.9	10.1
Age >57	8.4	4.7	19.5	3.8	28.9	18.1	6.4	9.5	28.0	15.5

Source: Calculations based on data from MICS 2014

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