BHUTAN
Multidimensional Poverty Index 2012

A key objective of this report is to produce a different approach to measuring poverty in addition to conventional income poverty methods. It is intended to complement Bhutan's income poverty measure and provide an important source of additional information for public policy.

BHUTAN
Multidimensional
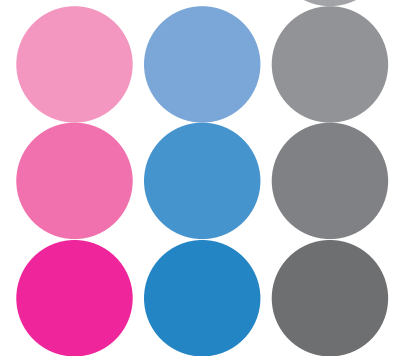# Poverty Index
2012

Contents

Acknowledgements

Foreword

This Multidimensional Poverty Index (MPI) 2012 report is the first of its kind to be published by the National Statistics Bureau (NSB). It is based on data from Bhutan Living Standards Survey (BLSS) 2012, conducted by NSB (with support from the Asian Development Bank). Bhutan is the first country in the South Asia region to produce such an in-depth report on a national MPI.

A key objective of this report is to produce a different approach to measuring poverty in addition to conventional income poverty methods. It is intended to complement Bhutan's income poverty measure and provide an important source of additional information for public policy.

The MPI value is estimated to be at 0.051, indicating that poor people in Bhutan experience $1/20^{th}$ of the deprivations that would be experienced if all people were deprived in all indicators. The multidimensional poverty rate stands at 12.7 percent of the population, with the urban and rural poverty rates of 1.3 percent and 17.8 percent respectively. These rates are not significantly different from the income poverty rates. However the analysis presented here shows that across many *Dzongkhags* the two poverty rates in fact diverge. Further, the people that are income poor are not necessarily multidimensionally poor - in fact, only 3.2 percent of the 12 percent of people that are income poor are also multidimensionally poor.

The report also covers the change in the MPI over time using three datasets: BLSS 2007, the Bhutan Multiple Indicators Survey (BMIS) 2010, and BLSS 2012. For the purpose of comparability over time, a subset of indicators with strictly comparable definitions have been used to create two alternative MPIs for the two different time periods. Changes in the MPIs over time according to *Dzongkhags* are also clearly illustrated in the report. The result shows that poverty has reduced over time due to two factors: by reducing the percentage of people who are poor (the headcount) and by reducing the intensity of the poverty experienced by those who remain poor. Overall, it shows a positive picture of a range of initiatives that have been implemented by different agencies in different situations aimed at enhancing quality of life for all. However, there still remains scope for much more to be done.

I hope that the report will be a useful input into the formulation of plans and policies, as we collectively engage to address poverty in Bhutan in all its dimensions in multidimensional ways.

Finally, NSB would like to thank the UNDP country office in Bhutan for their financial support in producing this report. The data analysis and report writing team also deserve much appreciation for their persistent efforts in bringing out this report.

Kuenga Tshering
Director General

Executive summary

This report presents Bhutan's national Multidimensional Poverty Index (MPI) which is based on the Alkire Foster methodology. It retains the three dimensions of health, education, and standard of living used in the global MPI. To tailor the measure to Bhutan's priorities, instead of the 10 indicators used in the global MPI, 13 indicators are used here. Two indicators each are under the health dimension (Child Mortality and Food Security) and the education dimension (School Attendance and Schooling), while nine indicators are used within the standard of living dimension (Cooking Fuel, Sanitation, Electricity, Water, Road, Housing, Asset, Land and Livestock). Each of the dimensions is given an equal weight of 1/3.

Multidimensional poverty rate

In 2012, the multidimensional poverty rate is estimated at 12.7 percent of the population. The average intensity of deprivation, which reflects the share of deprivations each poor person experiences on average, is 40 percent. The MPI, which is the product of the percentage of poor people and the average intensity of poverty, stands at 0.051. This indicates that poor people in Bhutan experience 1/20th of the deprivations that would be experienced if all people were deprived in all indicators. The urban poverty rate of 1.3 percent is very much lower than the rural poverty of 17.8 percent.

In terms of the percentage contribution of each of the 13 indicators to overall multidimensional poverty, the largest contribution to national poverty is deprivations in years of education (30%), followed by child mortality (14%) and school attendance (13%). If aggregated by dimensions, the largest contribution is due to educational deprivations (43%). The living standard and health dimensions contribute 32 percent and 25 percent, respectively to overall poverty.

Household characteristics

When comparing households whose head is male with those where the head is female, the analysis shows that there is no difference in the multidimensional poverty rate. However, the educational level and literacy status of the household head plays an important role. The higher the level of educational attainment of the household head, the lower the poverty rate. When the household head is literate, the chance of being multidimensionally poor is three times lower than when the household head is illiterate.

The findings show that the employment status of the household head in different sectors also had a bearing on the poverty rate. The poverty rate is 23 percent among those whose household head is employed in the agriculture sector. However, the poverty rate is much lower (around 4% each) among those whose household head is employed in the industrial and service sectors.

When analysed for the household size, there is not much variation in the proportion of poor according to different household sizes. The poverty rate is higher if a household is comprised of nine or more members, but the share of the population living in such households represents just nine percent of the population.

Multidimensional poverty reduction

Between 2007 and 2012, the 2007 value of MPI was reduced by 12 percentage points, and the headcount rate by 20 percentage points. The reduction is statistically significant nationally, and statistically significant reductions occurred in

each of the indicators. Deprivation in sanitation, for example, reduced by a total of 20 percent, that in solid cooking fuel by 18 percent, and electricity deprivation by 17 percent. Across all households in Bhutan (poor and non-poor alike), deprivation is highest in cooking fuel, sanitation and years of schooling, but lowest in access to safe drinking water, food security and school attendance.

Amongst the *Dzongkhags*, 18 *Dzongkhags* had statistically significant reductions in MPI, and in head count, and 16 in intensity of people's poverty. In absolute terms, the highest reduction in headcount poverty was made in Dagana (55%) and Zhemgang (39%) and the lowest reduction was made in Paro (2%). In relative terms, good progress in reducing multidimensional poverty was observed in Samdrupjongkhar, Sarpang, Zhemgang and Bumthang; progress was slower in Paro, Punakha, Wangdue Phodrang and Trongsa.

Recommendations

The report concludes with a set of recommend- ations. These include: promoting the use of both MPI and income poverty data for resource allo- cation, since both measures can complement each other for public policy; promoting the use of the MPI for *Dzongkhag*-level policies; and the inclusion of MPI variables in future surveys and censuses for comparability and the evaluation plans and programs over time.

The other recommendations include: promot- ing further research to understand the causes of poverty reduction; promoting parental education levels and literacy rates, since that is shown to have a positive impact on poverty levels; and promoting the diversification of agricultural employment.

Based on the 2012 MPI, the need for intensified poverty reduction efforts is recommended partic- ularly in Gasa, Monggar and Wangdue Phodrang where poverty rates according to the index are high. Finally, the composition of poverty in terms of indicators for different subgroups must be taken into consideration in the design of policies to ulti- mately eradicate multidimensional poverty.

Chapter 1.
Introduction

This chapter serves as an introduction to the report on the Multidimensional Poverty Index (MPI) of Bhutan and has the following sections:

1.1 History of poverty measurement
1.2 Context and framework
1.3 Purpose of the measure

1.1. History of poverty measurement

Bhutan's first official poverty measurement was carried out in 2000 and was based on the pilot Household Income and Expenditure Survey 2000. Since then, income poverty[1] rates based on consumption expenditure have been estimated regularly using the data from the corresponding Bhutan Living Standards Survey (BLSS) of 2003, 2007 and 2012.

Although no such poverty estimates were carried out before 2000, data and estimates do exist on other social and economic indicators, which have direct relevance to poverty. The plans and programs then, though they did not explicitly mention poverty reduction, were pro-poor. The government addressed issues of poverty through the expansion of social services, rural development and income generation activities. It is to be noted that the concept of poverty has become more pronounced in recent years and 'Poverty Reduction' was the theme of the

10th Five Year Plan (2008-2013).

The recent poverty analysis carried out using BLSS 2012 data estimates that the country's income poverty rate at 12 percent, a significant reduction from 23 percent in 2007. The poverty rate calculated is, like the previous estimates, based on the World Bank's Cost of Basic Needs (CBN) approach. This approach estimates the food component of the poverty line as the cost of a food bundle that provides a predetermined minimum required level of food energy. The total poverty line (or simply referred as "poverty line") is obtained by adding to the food component the cost of the non-food allowance. The household and all members of the households are considered to be poor if the per capita consumption expenditure is less than the poverty line.

The first global MPI was released in 2010 with an aim to encourage the development of national versions of the MPI, which are tailored to their national circumstances. Bhutan is among a pioneer set of countries to do this. The Oxford Poverty and Human Development Initiative (OPHI) in collaboration with NSB produced a trial measure of MPI using the Bhutan Multiple Indicator Survey (BMIS) 2010.

1.2. Context and framework

Going by the 11th Five Year Plan, presented in the National Assembly in 2013, by the end of the Plan in 2018 Bhutan should have reduced poverty

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[1] To maintain consistency in the report, 'income poverty' is mentioned instead of 'consumption poverty'

in a multidimensional way. This means Bhutan should have more people who not only have a better income, but also have better access to health, education and enjoy a decent standard of living. Thus, the priority for the 11th Plan is to monitor poverty reduction in a multidimensional manner.

Until recently, many countries (including Bhutan) have measured poverty by income or consumption. But no one indicator (such as income) can capture the multiple aspects of poverty. The global MPI is a new international measure of poverty developed by OPHI and the United National Development Programme Human Development Report Office (UNDP HDRO). The MPI complements income poverty measures by reflecting the acute deprivations that people face at the same time. It has three dimensions: health, education and living standard.

The MPI is based on the concept of capability. Nobel Laureate, Professor 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. The term 'capability' or 'capability set' provides information on the array of functionings that a person could achieve. 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.

1.3. Purpose of the measure

Bhutan's national MPI indicators have been selected in order to provide a clearer way of designing programs that deliberately target the poor. It can help in monitoring and evaluating plans and programs. One of the main purposes is to compare districts in terms of MPI poverty and thereby allow government and other stakeholders to focus services and policies accordingly. Targeted regional interventions can thus be more easily achieved.

This analysis is also an attempt to construct a baseline national MPI that will be a yardstick to measure its progress in the coming years. It can thus help government to assess how its various policies are affecting people, particularly the poor. To see the extent of progress the government has achieved over the years, comparisons are made with the latest available data – BLSS 2007 and BMIS 2010.

To complement Bhutan's income poverty measure, it is felt that a national MPI should be estimated using the recently conducted BLSS 2012. The poverty analysis using the BLSS 2012 showed that there has been significant reduction in income poverty. It is imperative that these two measures are compared and a better resource allocation formula is developed.
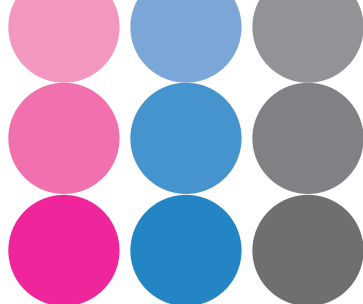
Chapter 2.
Methodology

The analysis is based on the Alkire Foster methodology. This chapter presents the Alkire Foster methodology, a description of the MPI and its properties, along with the measurement design. It concludes with a section on the data used for the analysis. It has the following five sections:

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 (2011). This section outlines the methodology and relevant properties that are used in the subsequent sections to understand the change in Bhutan's multidimensional poverty.

Sabina Alkire and James Foster have created a new method for measuring multidimensional poverty. 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:

$$MPI = H \times A$$

2.6   Incidence ~ the percentage of people who are poor, or the headcount: H
2.7   Intensity of people's poverty ~ the average percentage of dimensions in which poor people are deprived: A

2.2. The Multidimensional Poverty Index: an 'adjusted headcount ratio'

Suppose at a particular point in time, there are n people in Bhutan and their wellbeing is evaluated by d indicators.[2] 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 $\sum_{j=1}^{d} w_j = 1$.

For 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 multidimensional analysis based

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[2]   The meaning of the terms 'dimension' and 'indicator' are slightly different in Alkire and Foster (2011) and in Alkire and Santos (2010). In Alkire and Foster (2011), 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.

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.[3] The deprivation scores of all n persons are summarized by vector c.

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.[4] 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. Then M_0 is equal to the average of the censored deprivation scores:

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

2.3. Properties of the Multidimensional Poverty Index

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 (A). Technically:

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

where q is the number of poor.[5] 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 by merely reducing 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 occurs by reducing the deprivation of the poorest of the poor, then A decreases, but H may not.[6]

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 subgroups, where weights are the respective population shares. We denote the achievement matrix, the population, and the adjusted headcount ratio of subgroup ℓ by X^ℓ, n^ℓ, and $M_0(X^\ell)$, respectively. Then the overall

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[3] For $k = 100\%$, the identification approach is referred to as the *intersection approach*; for $0 < k \leq \min_i \{w_1, \ldots, w_d\}$, it is referred to as the *union approach* (Atkinson 2003); and for $\min_i \{w_1, \ldots, w_d\} < k < 1$, it is referred to as the dual cutoff approach by Alkire and Foster, or more generally as the *intermediate approach*.

[4] In the multidimensional context, there are two types of focus axioms. One is deprivation focus, which requires that any increase in already non-deprived achievements should not affect a poverty measure. The other is 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 (2011).

[5] 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.

[6] Apablaza and Yalonetzky (2011) has shown that the change in M_0 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.

M_0 can be expressed as:

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

This feature is also known as *subgroup decomposability* and is useful for understanding the contribution of different subgroups to overall poverty levels.[7] Note that the contribution of a subgroup to the overall poverty depends both on the poverty level of that subgroup and that subgroup's population share.

The third feature of M_0 is that M_0 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:

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

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 the 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:

$$\phi_j = w_j \frac{h_j}{MPI} = w_j \frac{h_j^p}{A}$$

2.4. Measurement design

Bhutan's national MPI utilizes a set of dimensions, indicators, and cutoffs that reflect its priorities as expressed in the national plans, and that can be implementing using the BLSS 2012 dataset. This section describes these parameter choices.

2.4.1. Dimensions, indicators and cutoffs

Bhutan's MPI builds upon the global MPI, and retains three dimensions: health, education, and standard of living. The indicator choice, however, is affected by the BLSS datasets used in the analysis. Instead of the 10 indicators used in the global MPI, 13 indicators are used. Eight indicators are the same as the international MPI. Instead of the nutrition indicator (in the health dimension), food security is used as a proxy indicator. Three additional indicators – access to roads, land ownership and livestock ownership (in the living standards dimension) – are included as additional indicators (as shown in Table 2.1).

2.4.2. Weights

The weights used in this report follow the standard MPI structure of equal-nested weights, assigning 1/3 to each of the three dimensions of education, health and living standard. Within health and education, each of the two indicators are again equally weighted (1/6). However, within the living standard dimension nine indicators are used. One-seventh of the weight (1/21) is assigned to six indicators: electricity, sanitation, water, housing material, cooking fuel and road access, and the

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

Table 2.1 Bhutan's National MPI: Dimension, Indicator and Deprivation Cutoff

Dimension (weight)	Indicator (weight)	Deprivation Cutoff
Health (1/3)	Child Mortality (1/6)	A child has passed away in the household
	Food Security (1/6)	The household suffers a shortage of food
Education (1/3)	School Attendance (1/6)	Any school-aged child (6-14 years) in the household is not attending school up to class VIII
	Schooling (1/6)	No household member has completed five years of schooling
Living Standard (1/3)	Cooking Fuel (1/21)	The household cooks with dung, wood or charcoal
	Sanitation (1/21)	The household's sanitation facility is not improved or it is shared with other households
	Electricity (1/21)	The household has no electricity
	Water (1/21)	The household does not have access to safe drinking water or safe water is more than a 30-minute walk (round trip)
	Road (1/21)	The household is more than 30-minute walk from the road head
	Housing (1/21)	The household does not have adequate materials in two of: floor, wall and roof
	Asset (1/63)	The household does not own more than one of: radio, telephone, TV, bike, motorbike or refrigerator; and does not own a car or truck
	Land (1/63)	The rural household does not own more than one acre of land
	Livestock (1/63)	The household does not own more than three of: cattle, horses, sheep, goats, chickens, pigs, buffalo, yaks

remaining one-seventh of the weight is equally distributed among assets, land ownership and livestock ownership, with a weight of 1/63 each.

2.4.3. Poverty and deprivation cutoffs

Thresholds are used to decide whether a person is multidimensionally poor, using the Alkire and Foster measurement framework. It involves the following steps: (a) a dimension-specific poverty cutoff (deprivation cutoff) – where a person is considered deprived in each indicator if their achievement falls below the cutoff; and (b) a cross-indicator cutoff (or poverty cutoff) - where the minimum number of deprivations necessary across indicators is set to determine whether a person is considered to be poor. For this report, similarly to the global MPI, the poverty cutoff is chosen to be at roughly one-third of indicators. Since the number of indicators taken is 13, a person who is deprived in (k=4) weighted indicators (30.7% of dimensions) is considered multidimensionally

poor. Also, one can also consider a person intensely poor, if they are deprived of more than 50 percent of the indicators (k=7).

2.5. Data for analysis

The data used for the national poverty measure is the BLSS 2012, which is the latest and third in a series of national household surveys that have been conducted by the NSB. The survey followed the World Bank's Living Standard Measurement Study methodology. For comparison purposes, and specifically to show trends over time, the report also used data from BLSS 2007 and BMIS 2010.

The BLSS 2012 is comparable in size to the BLSS 2007 survey. The BLSS 2012 surveyed 8,968 households while BLSS 2007 surveyed 9,798 households across the country from a planned sample size of about 10,000. For BMIS 2010, which

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[8] If a household has no school-aged children, the household is treated as non-deprived.
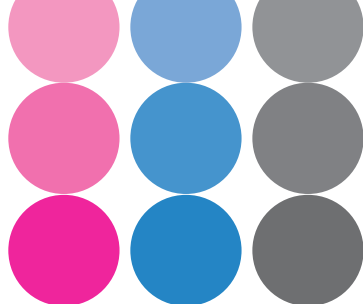
is a customised version of UNICEF's Multiple Indicator Cluster Survey, a sample size of about 15,000 households was used. All three surveys are designed to be representative at the *Dzongkhag* (district) level, by urban and rural areas.[9]

The BMIS 2010 has all the required indicators to construct the internationally comparable MPI. However, both the BLSS 2007 and BLSS 2012 do not have all the required indicators, as they lack malnutrition. Further, the BLSS 2007 does not have an indicator on child mortality. Therefore, for the purpose of making a comparable trend, only the subset of indicators that are common to BLSS 2007 and BLSS 2012, or BMIS 2010 and BLSS 2012 are considered when tracking the reduction of multidimensional poverty over time.

Chapter 2: Methodology

Chapter 3.
Results

This section provides a detailed exposition of the national MPI results for Bhutan using the BLSS 2012 dataset and has the following sections:

3.1 Poverty rate
3.2 Raw headcounts
3.3 MPI and H at alternative values of the poverty cutoff
3.4 Intensity gradient among the poor
3.5 Multidimensional poverty and income poverty

3.1. **Multidimensional poverty rate**

Table 3.1 shows that Bhutan's multidimensional poverty rate for 2012 is 12.7 percent of the population. Since this estimate is based on a sample it has a margin of error of 1.3 percentage points. This can be interpreted as being 95 percent confident that the true multidimensional poverty rate is between 11.4 percent and 13.9 percent of the population. The average intensity of deprivation, which reflects the share of deprivations each poor person experiences on average, is 40 percent. Since MPI is the product of the percentage of poor people (H) and the average intensity of poverty (A), it yields an index of 0.051, which shows that poor people in Bhutan experience 1/20th of the deprivations that would be experienced if all people were deprived in all indicators.

Table 3.1 Multidimensional Poverty

Poverty Cutoff (k)	Index	Value	Confidence Interval (95%)	
	MPI	0.051	0.046	0.056
k value=4	H (%)	12.7	11.4	13.9
	A (%)	40.1	39.3	40.9

The poverty statistics by urban and rural regions are shown in Table 3.2. The urban poverty rate, estimated at 1.3 percent (which could range between 0.9% to 1.7%) is very much lower than the rural poverty, estimated to be at 17.8 percent (which could range between 16.1% to 19.5%).

Table 3.3 shows the *Dzongkhag* level estimates of the multidimensional poverty rate. Owing to

Table 3.2 Multidimensional Poverty by Area

Poverty Cutoff (k)	Index	Urban			Rural		
		Value	Confidence interval (95%)		Value	Confidence interval (95%)	
	MPI	0.005	0.004	0.007	0.071	0.064	0.079
k value=4	H (%)	1.3	0.9	1.7	17.8	16.1	19.5
	A (%)	38.1	35.9	40.3	40.2	39.4	41.0

Table 3.3 Multidimensional Poverty by *Dzongkhag*

Dzongkhag	MPI		H (%)		A (%)		*Distribution of Poor*
	Value	Standard error	Value	Standard error	Value	Standard error	
Bumthang	0.006	0.004	1.6	0.9	37.8	1.9	*0.3*
Chhukha	0.075	0.014	17.6	3.2	42.7	1.4	*13.1*
Dagana	0.071	0.012	17.6	3.2	40.1	2.1	*4.6*
Gasa	0.149	0.053	37.6	13.2	39.6	1.1	*1.6*
Haa	0.040	0.021	10.2	5.1	39.0	1.1	*1.2*
Lhuentse	0.043	0.014	10.4	3.3	41.2	1.2	*2.0*
Monggar	0.083	0.014	20.9	3.2	39.8	1.1	*10.8*
Paro	0.018	0.005	4.7	1.5	37.9	1.4	*2.0*
Pema Gatshel	0.044	0.013	11.6	3.4	38.2	1.3	*3.5*
Punakha	0.056	0.012	13.0	2.8	42.9	2.1	*3.9*
Samdrup Jongkhar	0.061	0.011	16.4	3.1	37.0	0.8	*6.8*
Samtse	0.074	0.011	18.7	2.7	39.3	1.1	*14.0*
Sarpang	0.022	0.006	5.9	1.7	38.0	0.8	*2.8*
Thimphu	0.007	0.003	1.6	0.6	41.6	1.3	*1.9*
Trashigang	0.056	0.008	14.0	1.9	40.1	0.9	*8.3*
Trashi Yangtse	0.062	0.015	16.5	4.1	37.5	1.4	*3.6*
Trongsa	0.075	0.022	18.2	4.9	41.3	2.3	*3.3*
Tsirang	0.061	0.016	15.2	4.0	40.2	1.3	*3.9*
Wangdue Phodrang	0.079	0.014	18.5	3.0	42.7	1.4	*8.5*
Zhemgang	0.056	0.015	15.0	3.8	36.9	1.3	*3.9*
Bhutan	*0.051*	*0.003*	*12.7*	*0.6*	*40.1*	*0.4*	*100.0*

overlapping confidence intervals, it is difficult to determine the ranks for *Dzongkhags* in terms of poverty. However, it shows that the poverty rates (H) are highest in Gasa, Monggar, Samtse and Wangdue Phodrang. Meanwhile, Bumthang and Thimphu have the lowest poverty rates. Since the population size varies between *Dzongkhags*, it is important to see the distribution of the poor. Among the *Dzongkhags*, 14 percent of the poor reside in Samtse, followed by Chhukha (13%) and Monggar (11%). Considering the MPI, the poorest *Dzongkhags* are Gasa, Monggar and Wangdue Phodrang.

Figure 3.1 shows the distribution of the poor

and general population by area. Although only 66 percent of the population reside in rural areas, almost all of the multidimensionally poor live in rural areas (97%). Only about three percent of the country's multidimensionally poor people reside in urban areas.[10]

The censored headcount ratio (the percentage of people who are MPI poor and are deprived in each indicator) in Figure 3.2 represents the proportion of the population residing in households

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[10] Note that both BLSS 2007 and BLSS 2012 are based on a sampling frame taken from the Population and Housing Census of Bhutan 2005, so comparisons across them will not reflect any demographic shifts such as rural-urban migration or migration across *Dzongkhags* that have taken place.

Figure 3.1 Distribution of Poor and Population
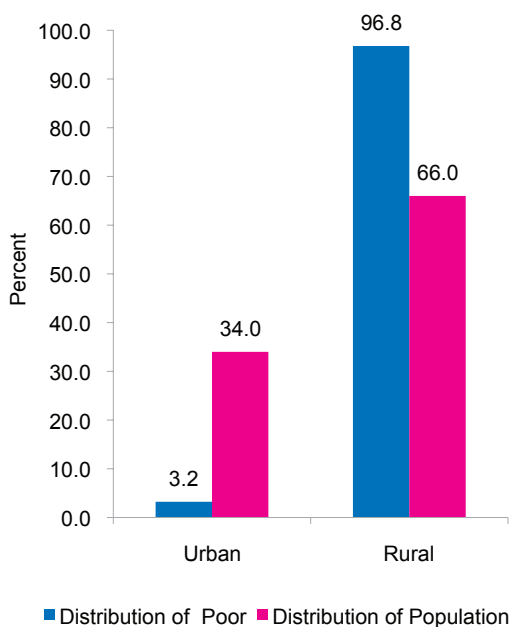
that are multidimensionally poor and who are also deprived in that indicator. It shows that 10 percent of the population are multidimensionally poor and are also deprived in cooking fuel (they live in households that cook with dung, wood or charcoal). Over nine percent of households do not have anyone who has completed five years of

schooling, and seven percent of households are poor and do not have adequate sanitation. Note that deprivation in road access is the fourth highest deprivation among the poor.

It is useful to see the percentage contribution of each of the 13 indicators to overall multidimensional poverty across Bhutan. The graphic of percentage contribution applies the weights on each indicator in order to show the composition of poverty in Bhutan. Recall the weights on health and education indicators are much higher than those on the standard of living indicators, so the deprivations in those indicators contribute relatively more to overall poverty. Figure 3.3 shows that the largest contribution to national poverty is deprivations in years of education (30%) followed by child mortality (14%) and school attendance (13%). If aggregated by dimensions, the largest contribution is due to education (43%). The living standard and health dimensions contribute 32 percent and 25 percent, respectively.

Figure 3.4 provides a graphical illustration of the level of MPI in each *Dzongkhag*. Recall that because of the properties of decomposability afforded by the Alkire Foster method, we are able to explore the dimensional composition of the MPI not only

Figure 3.2 National Censored Headcount
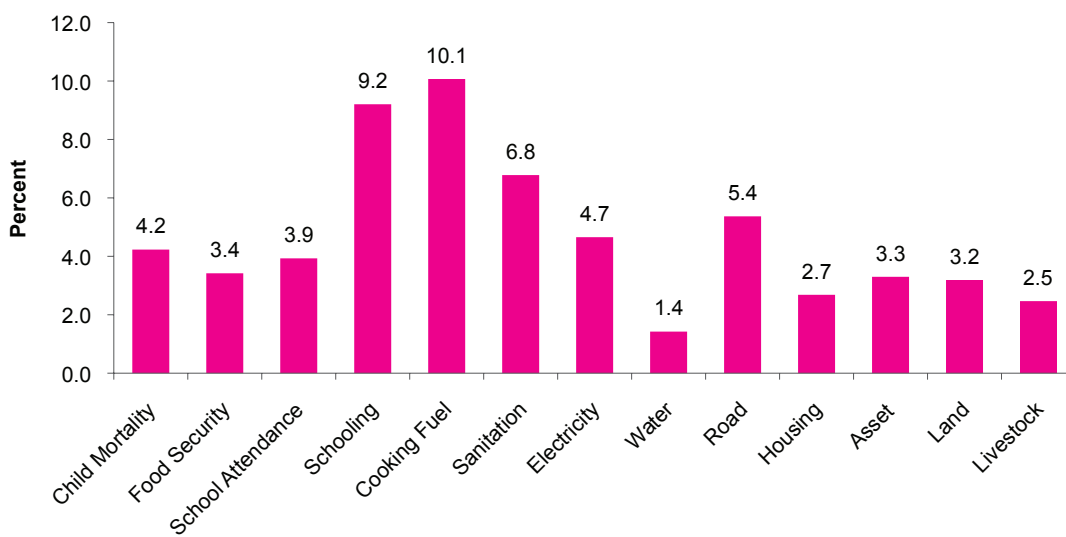
Figure 3.3 Percentage Contribution to National MPI by Indicator

the compositions of regions having relatively low poverty levels. To remind readers of the varying levels of poverty across *Dzongkhags*, we have ordered the graphic from those with the lowest levels of poverty on the left, to the highest on the right.

Let us compare, for example, Zhemgang, Punakha and Trashigang (Figure 3.5). They each have the same point estimate of MPI overall, at 0.056 – just slightly above the national MPI level. However their composition of poverty varies a great deal. Deprivations in food security are lowest in Zhemgang, and child mortality is lowest in Trashigang. The educational deprivations overall are highest in Punakha, whereas Zhemgang has more deprivations in cooking fuel and electricity. Thus we can see that the policy response to multidimensional poverty as suggested by the MPI in these three *Dzongkhags* would be distinct. Naturally because of the small weights assigned to livestock and land, the contributions of these deprivations these are less visible, but deprivations in these are lowest in Zhemgang. The tables at the end of this report provide detailed information on the raw and censored headcounts as well as the percentage contributions of dimensions for each *Dzongkhag*.

at the national level but also by *Dzongkhag*. In the case of Bhutan, the decomposition by *Dzongkhag* is particularly important as the composition of poverty varies quite significantly across regions.

Figure 3.5 illustrates the percentage contribution of each dimension to poverty for each *Dzongkhag*. We do this so that it is easier to read

Figure 3.4 MPI Level by *Dzongkhag*

Figure 3.5 Percentage Contribution by Indicator

Figure 3.5 Percentage Contribution by Indicator

Legend:
- Livestock
- Land
- Asset
- Housing
- Road
- Water
- Electricity
- Sanitation
- Cooking Fuel
- Schooling
- School Attendance
- Food Security
- Child Mortality

Chapter 3: Results
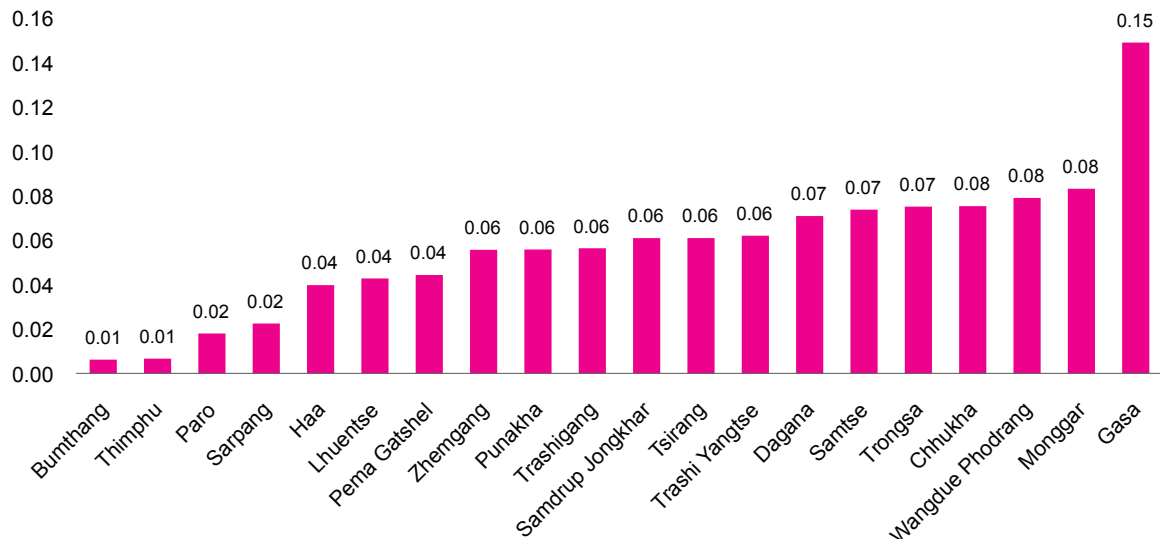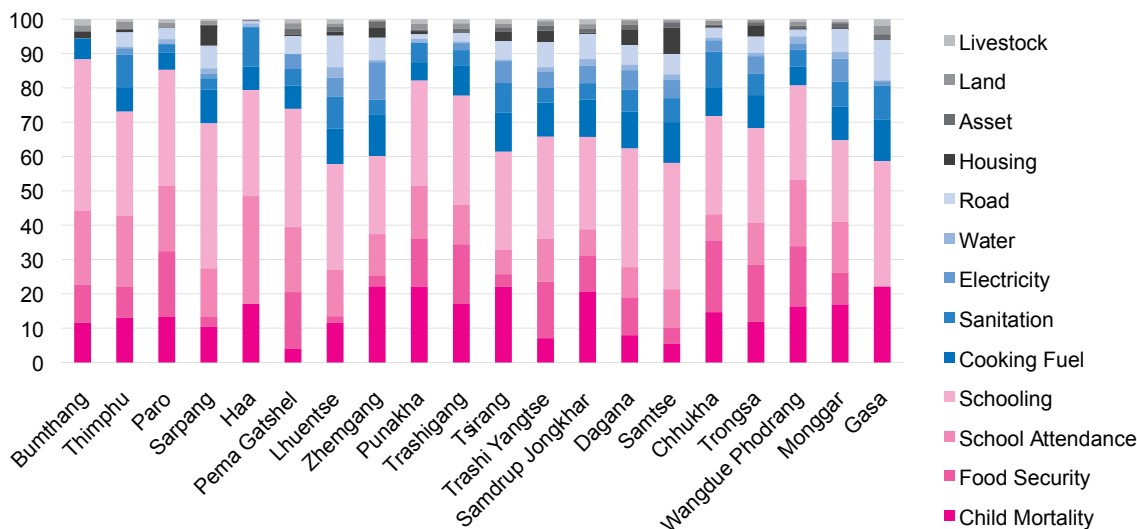
3.2. Raw headcounts

We take a moment next to describe all of the people who are deprived in each of the 13 indicators, including those that are deprived in a given indicator but non-poor overall. The deprivations are highest in cooking fuel, followed by sanitation, years of schooling, livestock, and land ownership, then road access. Figure 3.6 is important because it suggests that attention to cooking fuel (or to

good ventilation systems) and to sanitation will be required more widely than just among the poor – which is a common situation in South Asia with respect to these two indicators in particular.

The term 'raw' headcounts refers to the fact that this preliminary chart displays all deprivations and not just those among the poor. Recall that to be multidimensionally poor, a household has to experience deprivations in 30.7 percent (4/13) of

Figure 3.6 National Raw Headcount

Figure 3.6 National Raw Headcount

Indicator	Value
Child Mortality	10.3
Food Security	5.3
School Attendance	6.6
Schooling	22.6
Cooking Fuel	36.3
Sanitation	29.0
Electricity	9.2
Water	3.8
Road	13.0
Housing	6.4
Asset	7.8
Land	22.4
Livestock	23.3
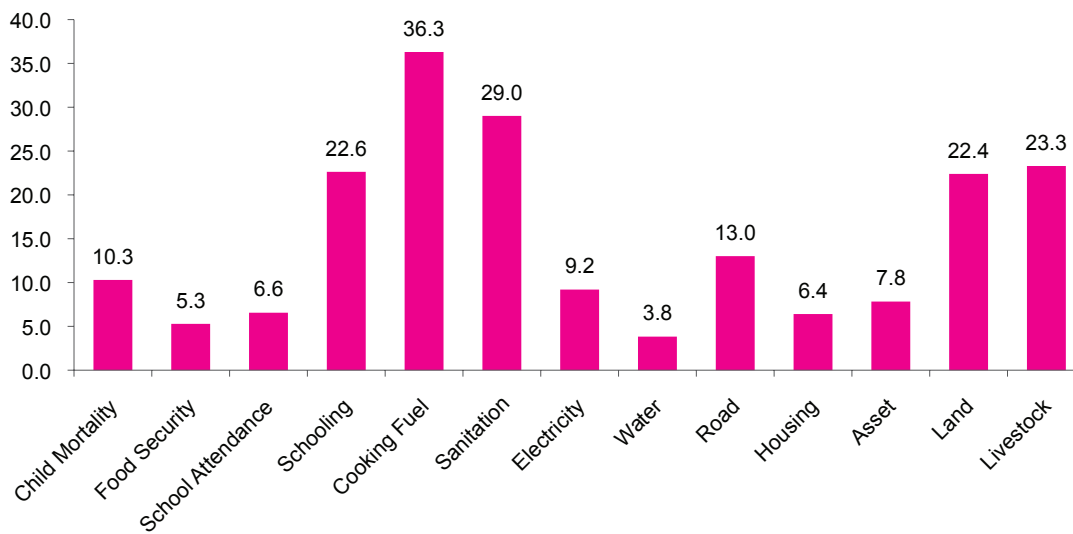
dimensions. In a number of cases, people may be deprived in one or two indicators but not multidimensionally poor. For example, we see that over 35 percent of Bhutanese cook with solid cooking fuel (weighted at 4.8%), but this does not mean that each of them is poor. In the case of deprivations in land and livestock, we expect the raw headcounts to appear artificially high because people living in urban areas will be assessed as deprived in the raw headcounts. This is not a problem when computing multidimensional poverty as we restrict our attention to people experiencing multiple deprivations and thus the issue resolves itself.

3.3. MPI and H at alternative values of the poverty cutoff

Table 3.4 illustrates the MPI and its incidence at various levels of the poverty cutoff. It shows that when k=1 the incidence (H) is 50 percent, indicating that half of the population is deprived in at least one of the poverty indicators. When k>=10, the incidence is zero, signifying that none of the population is deprived of 10 or more indicators. Further, even when k=7, the incidence is barely

Table 3.4 MPI and Poverty Headcount Ratio by different k values (or poverty cutoffs)

k cutoff	MPI	Headcount Ratio
1	0.120	50.1
2	0.108	39.4
3	0.072	20.4
4	0.051	12.7
5	0.026	5.4
6	0.014	2.5
7	0.008	1.3
8	0.003	0.5
9	0.000	0.1
10	0.000	0.0
11	0.000	0.0
12	0.000	0.0
13	0.000	0.0

one percent. The impact of changes in k on incidence is more pronounced in the range 1-7.

3.4. Intensity gradient among the poor

The pie diagram (Figure 3.7) depicts the percentage of the poor who experience different gradients of intensity. More than half (58%) of all poor people in Bhutan experience deprivations in the lowest intensity band, which is between 4/13 and just under 5/13 or between 30.7 percent and 38.4 percent of all weighted deprivations. About a quarter of the poor experience the next higher gradient of intensity. About 20 percent of the poor experiences higher intensities of poverty, although no person is deprived in more than 75 percent of the indicators at the same time.

Figure 3.7 Intensity Gradient among the Poor

■ k=30.7-38.4% ■ k=38.5-46.0% ■ k=46.1-53.8%
■ k=53.9-61.4% ■ k=61.5-69.1% ■ k=69.2%
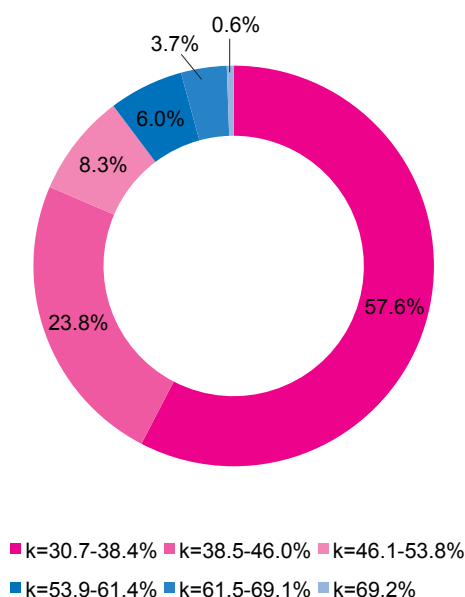
Who are the poorest of the poor in Bhutan? If we look at those who are deprived in more than 46 percent of deprivations (6/13 indicators), we find that they are distributed across *Dzongkhags* as depicted in the table below. Most high-intensity poverty is found in Gasa, Chhukha, and Wangdue

Table 3.5 High Intensity Poverty by *Dzongkhag* (k=6)

Dzongkhag	MPI	H (%)	A (%)
Bumthang	0.000	0.0	0.0
Haa	0.000	0.0	0.0
Sarpang	0.001	0.3	49.2
Paro	0.002	0.3	56.0
Thimphu	0.003	0.4	56.8
Trashi Yangtse	0.007	1.5	50.1
Pema Gatshel	0.009	1.8	51.8
Samdrup Jongkhar	0.009	1.6	54.7
Trashigang	0.009	1.5	55.5
Zhemgang	0.010	2.1	48.2
Lhuentse	0.011	2.3	50.5
Tsirang	0.016	3.1	52.8
Punakha	0.017	2.8	59.7
Monggar	0.020	3.7	55.5
Dagana	0.021	3.7	57.1
Trongsa	0.021	3.8	56.6
Samtse	0.022	4.1	53.9
Wangdue Phodrang	0.028	5.1	55.7
Chhukha	0.032	5.7	56.5
Gasa	0.058	11.3	51.5

Phodrang, followed by Samtse, Trongsa, Dagana and Monggar (Table 3.5).

3.5. Multidimensional poverty and income poverty

Table 3.6 presents the magnitudes of matches and mismatches of the poverty headcount between multidimensional and income poverty. Although overall poverty is not significantly different between the two measures, there are striking – indeed sobering – differences within the poor and non-poor headcount ratio. Among the 12 percent of income poor, nine percent are not multidimensionally non-poor. Similarly, from the 12.7 percent of the multidimensionally poor, 10 percent are not income poor. Indeed only 3.2 percent of the Bhutanese population are both multidimensionally

poor and consumption poor at the same time. Therefore, there is a huge mismatch between the two measures, which illustrates the vital importance of using both measures to inform policy and planning, as they reflect different policy interventions, and convey information about differently poor people.

Figure 3.8 compares income poverty and multidimensional poverty by *Dzongkhag*. It shows that in the majority of the *Dzongkhags* the two measures are quite different from each other. This is especially prominent in *Dzongkhags* like Gasa

Table 3.6 Income and Multidimensional Poverty: Who is poor in both?

Income	Multidimensionally		
	Poor	**Non-poor**	**Total**
Poor	3.2	8.9	12.0
Non-poor	9.5	78.5	88.0
Total	12.7	87.3	100.0

(where income poverty is the lowest while multidimensional poverty is the highest). More than half of the *Dzongkhags* have multidimensional poverty rates that are higher than the income poverty rate. This again suggests a value in having both measures available to policy makers for planning and allocation purposes.

It is also important to compare the multidimensional poverty by income quintiles. In other words, of those people who are multidimensionally poor, is their income in the bottom 20 percent of all households, in the next quintile, or indeed in the richest quintile? Figure 3.9 shows that two-thirds of the multidimensionally poor people have income in the bottom two quintiles, and nearly 40 percent are in the bottom quintile. When compared between urban and rural areas, a higher proportion of urban areas in the bottom quintile are multidimensionally poor compared to their counterparts in rural areas. We also notice that a small

Figure 3.8 Comparison between Multidimensional Poverty and Income Poverty by *Dzongkhag*

■ Multidimensional Poverty   ■ Income Poverty
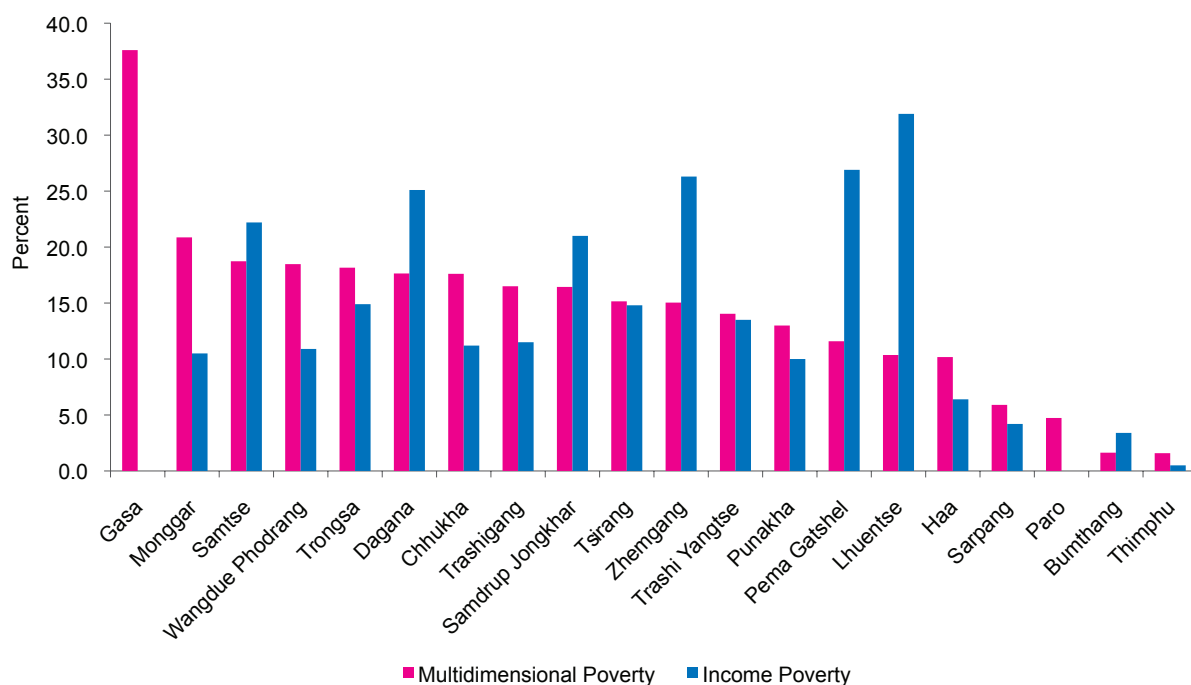
Figure 3.9 Distribution of Multidimensional Poverty by Income Quintile

	Poorest	Second	Third	Fourth	Richest
Urban	53.2	26.1	7.4	8.4	5.0
Rural	38.2	27.5	17.1	11.3	5.9
Bhutan	38.9	28.8	16.5	1.0	5.8

■ Poorest ■ Second ■ Third ■ Fourth ■ Richest
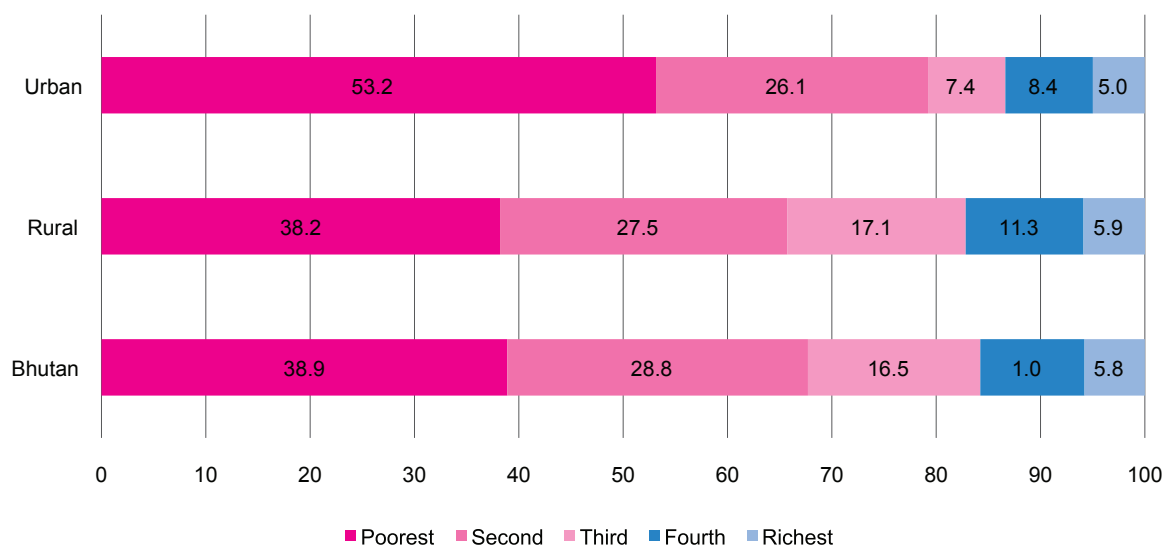
percentage of the multidimensionally poor in both rural and urban areas have consumption in the top quintile. This surprising finding has been noted in other countries. In part, this appears to reflect the fact that the short recall of income data may mean that poor families occasionally will be identified as non-poor if in the immediately preceding period consumption was very high (for example because

of a family festival) and vice versa. Non-sampling measurement errors may also be a factor. The indicators used in Bhutan's MPI will be more accurate at the individual level for a longer period.

3.6. Performance across household characteristics

We now explore if poverty varies across household characteristics. We classify the population in different ways: by household head's sex, household head's education, economic activity of the household head, and by household size. Although the female-headed households in both urban and rural areas have a slightly higher proportion of multidimensionally poor people, on average the male-headed households have a higher proportion of poor people (Table 3.7). However, the difference between the two is not statistically significantly different.

The multidimensional poverty rate is three times lower among those whose household head is literate compared to those whose household head is illiterate. In the rural areas, the chance that a person is multidimensionally poor is twice more if the person belongs to a household whose household is illiterate, while in urban areas, the

Table 3.7 Poverty Rate by Sex of Household Head and Area

Sex	Urban	Rural	Bhutan
Male	1.3	12.2	18.3
Female	1.6	13.9	16.8
Total	1.3	12.7	17.8

chance is more than three times, although the rates in urban areas are significantly lower than rural areas (Figure 3.10).

Figure 3.11 shows that higher the level of educational attainment of the household head, the lower the poverty rate. When comparing urban and rural areas, there is marked difference between the poverty rates when the household's educational attainment is up to grade VIII. However, there is no person who is multidimensionally poor among those households whose head has attended beyond grade VIII.

About a quarter of people whose household head is employed in the agriculture sector are multidimensionally poor. However, the multidimensional poverty rate is lowest among those whose household head is employed in the industrial and service sectors (about 4% each). In terms of contribution to the national poverty, persons whose household

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Figure 3.10 Poverty Rate by Literacy Status of Household Head
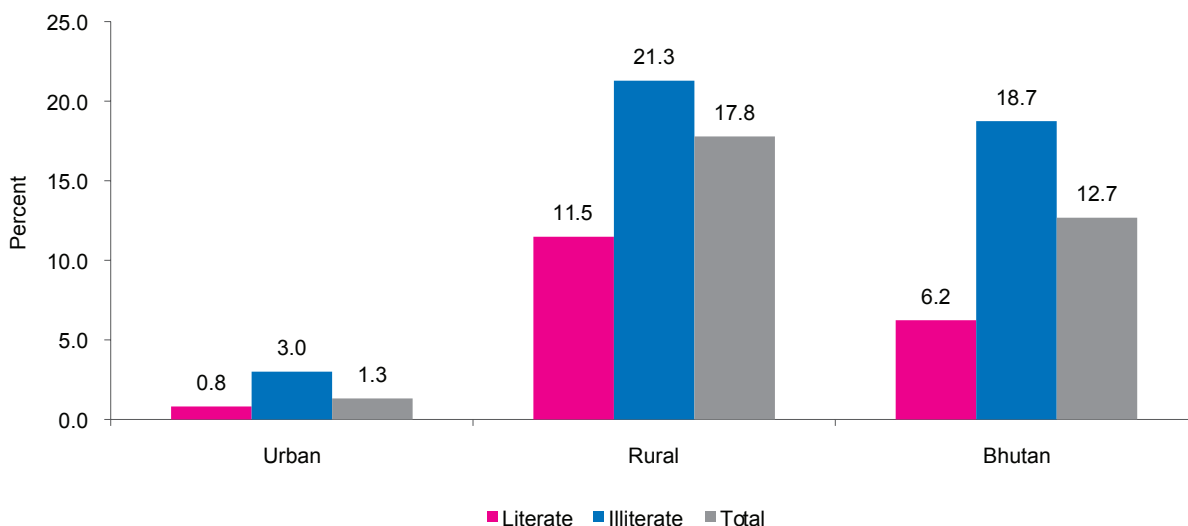
Figure 3.11 **Poverty Rate by Educational Attainment of Household Head**
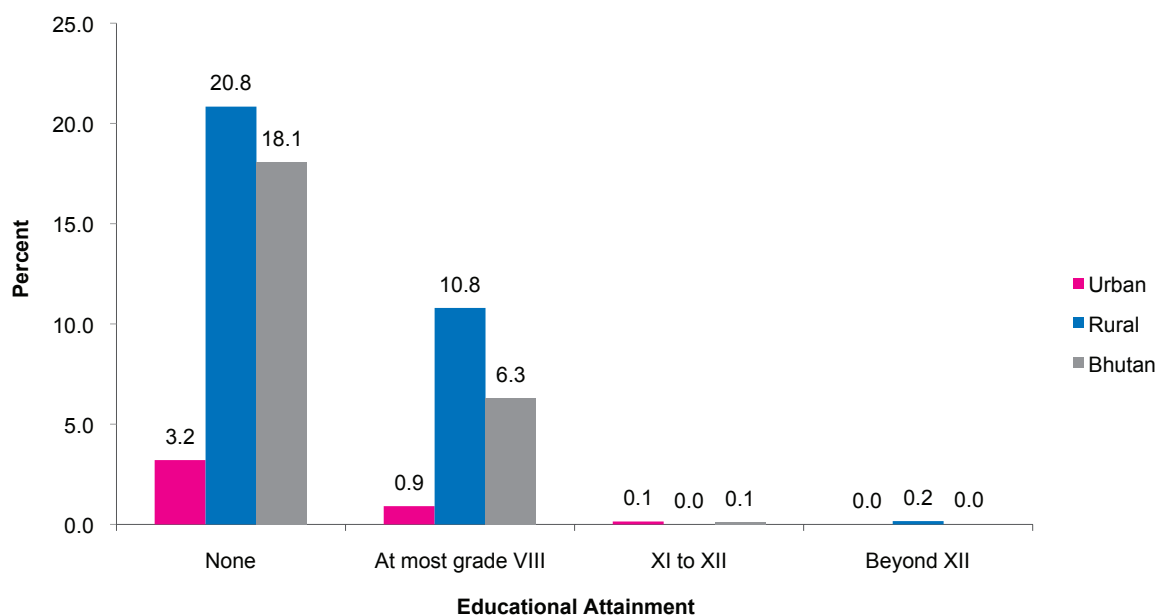
head is economically inactive constitutes nearly 40 percent followed by those in agriculture sector at 35 percent (Figure 3.12).

Figure 3.13 shows the poverty rate by household size. There is not much variation in the proportion of poor across different sized households. However, the poverty rate increases dramatically for the population whose household size is nine or more people. It is important to see the contribution or share of total population for the different household sizes. The share of total population is more for household size 4-5 and 6-8 with 40 percent and 36 percent respectively. The share of population for households of nine or more people is only about nine percent.

Figure 3.12 Poverty Rate by Economic Activity of the Household Head

Legend:
- ■ Contribution to National Poverty Rate
- ■ Poverty Headcount

Bhutan: 100.0 (Contribution), 12.7 (Headcount)
Economically Inactive: 39.3 (Contribution), 9.2 (Headcount)
Unemployed: 1.5 (Contribution), 1.8 (Headcount)
Services: 16.2 (Contribution), 4.0 (Headcount)
Industry: 7.9 (Contribution), 4.2 (Headcount)
Agriculture: 35.0 (Contribution), 23.0 (Headcount)
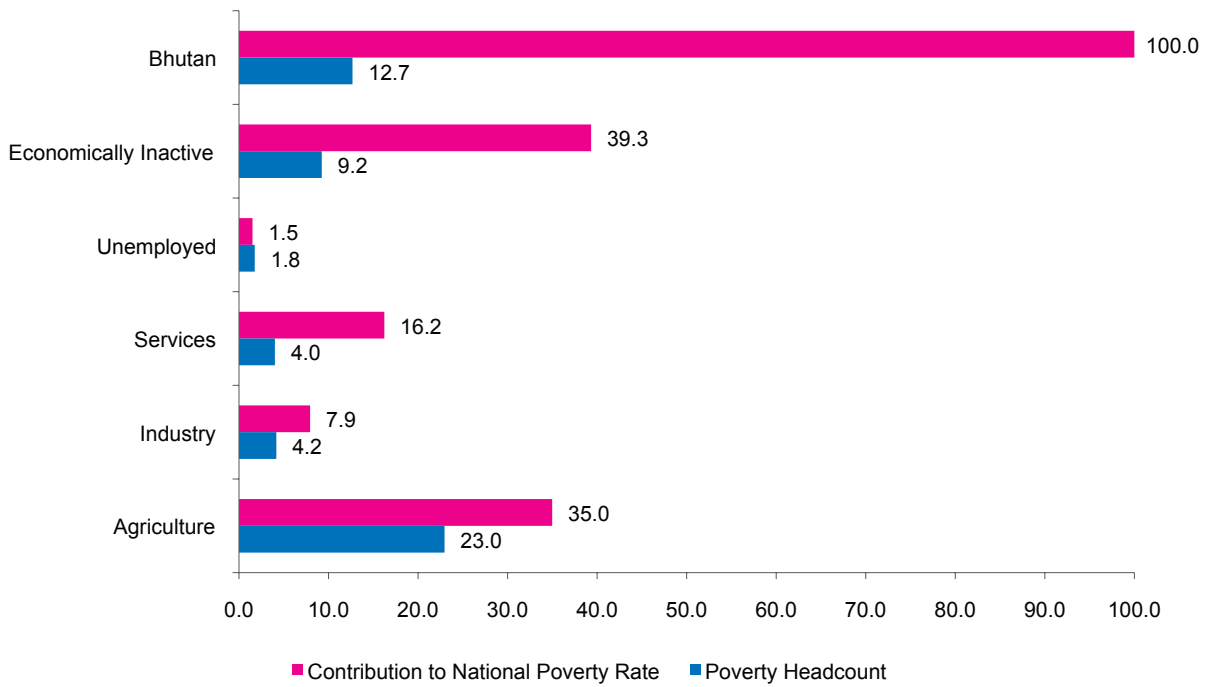
Figure 3.13 Poverty Rate by Household Size

Poverty Rate: 1 → 12.7, 2-3 → 13.2, 4-5 → 10.5, 6-8 → 13.3, 9+ → 19.6
Share of Total Population: 1 → 1.1, 2-3 → 15.2, 4-5 → 39.5, 6-8 → 35.6, 9+ → 8.5

Legend:
— Poverty Rate
— Share of Total Population
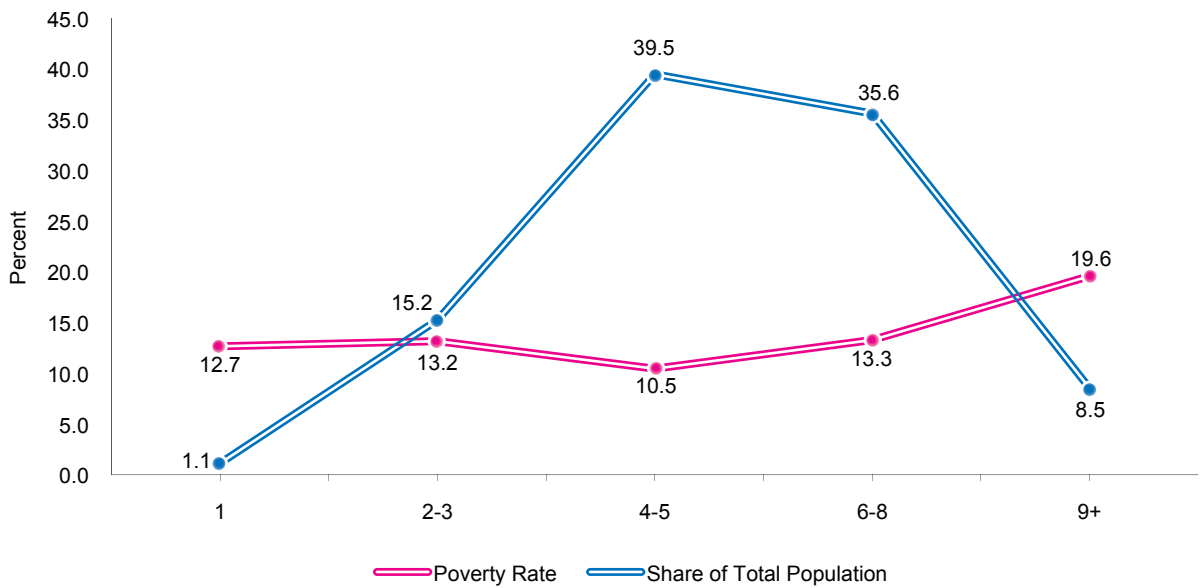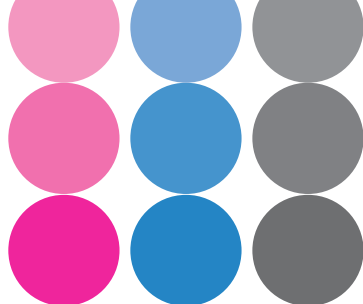
Chapter 4.
Multidimensional poverty reduction

This chapter supplements the previous chapter with analyses over time for subsets of indicators for which comparable data are available in BLSS 2007 and BMIS 2010 datasets.

It is very useful to study how MPI has changed over time. In the case of Bhutan, we are able to utilize two past datasets in order to study MPI reductions: the BLSS 2007 dataset, and the BMIS 2010 dataset. In this section we outline these comparisons. The chapter contains the following sections:

4.1   Data comparison
4.2   BLSS 2007 – BLSS 2012
4.3   BMIS 2010 – BLSS 2012

4.1. Data comparison

It is to be noted that neither of the previous datasets contain the same indicators and indicator definitions as the BLSS 2012 MPI, which is being used in the national MPI. Therefore, in order to assure strict comparability across time, we have used the BLSS 2012 dataset to create two additional poverty measures that *are* strictly comparable to the BLSS 2007 and BMIS 2010 datasets. This enables us to study changes over time rigorously for a strict subset of indicators with strictly comparable definitions, and to do so both at the national level and at the district levels. However **the indicator definitions, weights, and poverty cutoffs used in these time series**

comparisons differ from the national MPI. Furthermore, the sampling frame of the BMIS 2010 also differs from that of the BLSS. At this stage confidence intervals have not been calculated with the 2010 dataset[11]. Hence these results are reported for academic completeness, but must be interpreted with due caution. The real value-added of this section is to see how different indicators and their joint distribution evolved across Bhutan over the past five years. And the good news is that that multidimensional poverty has indeed reduced strongly over the period 2007-12.

4.2. BLSS 2007 – BLSS 2012

The BLSS 2007 dataset lacks information on child mortality; it also has some differences in indicator definition. The annex Table A-1 provides a comprehensive overview of the indicator differences between this section of the report and the 2012 National MPI. Because of the different definitions we use the underscript $_c$ in this section to remind readers that these are *differently defined* and not the same as the national MPI using BLSS 2012.

First let us compare MPI_c and H_c across time, for the chosen poverty cutoff k=4. At this level, there was a statistically significant reduction of MPI_c, H_c and A_c and of each of the censored headcounts. To assess the robustness of this result,

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[11]   For future research, hypothesis tests of statistical significance should be performed, and it may also be seen whether the confidence intervals overlap.

Figure 4.1 MPI$_c$ by Different Values of K Poverty Cutoff in 2007 and 2012
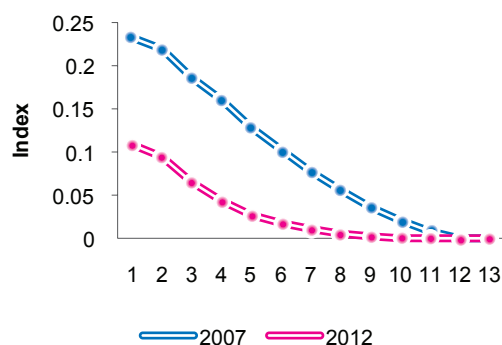
Figure 4.2 National Headcount Ratio by Different Values of K Poverty Cutoff in 2007$_c$ and 2012$_c$

Figure 4.3 Change in Censored Headcount, 2007-2012$_c$
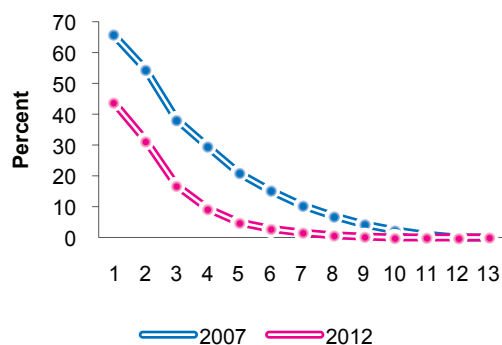
we might consider all values of k – the poverty cutoff. What is evident at once is that poverty has probably decreased nationally for all values of the poverty cutoff across these two time periods. Next, let us see how poverty was reduced. It was reduced both by reducing the headcount (Figure 4.1), and by reducing the intensity of those who remain poor (Figure 4.2).

We examine the change in the censored headcounts: the percentage of people who are both poor and deprived in each indicator. At the national level, reductions in each indicator are statistically significant. Figure 4.3 shows that the largest absolute reductions in the censored headcount occurred in sanitation, cooking fuel, electricity and road access. For example, in five years, the percentage of Bhutanese who were poor and were deprived in sanitation was reduced by 20 percent;

those without access to electricity decreased by 17 percent; and those lacking road access decreased by 15 percent. This is salutary, and mirrors the Royal government of Bhutan's commitment to providing electricity and road access during this period. It can be useful to 'interpret' the changes in censored headcounts together with the actual levels of headcounts, which are presented in the Figure 4.4. This is because deprivations in some indicators were relatively low, so further reduction in these indicators cannot by definition be as high as in some other cases.

Another question we might have is how intensity among the poor changed, and in particular whether the situation of the poorest of the poor – those having the highest intensity of poverty – improved. Here we examine the intensity gradients among the poor in the two periods. Happily, we do indeed see a visible and strong reduction of intensity among the poor. In 2007, at least 70 percent of poor people had an intensity that was greater than 38 percent, and over half had an intensity that was over 46 percent (Figure 4.5). By 2012, that had sharply reduced, with nearly half of the poor having an intensity less than 38 percent. Thus changes have been pro-poor even among the poorest of the poor, and no one had an intensity above 70

Figure 4.4 National Censored Headcount in 2007$_c$ and 2012$_c$

Figure 4.5 Intensity among the Poor, 2007$_c$

- k=30.7-38.4%
- k=38.5-46%
- k=46.1-53.8%
- k=53.9-61.4%
- k=61.5-69.1%
- k=69.2%
- k=77%
- k=84.6%
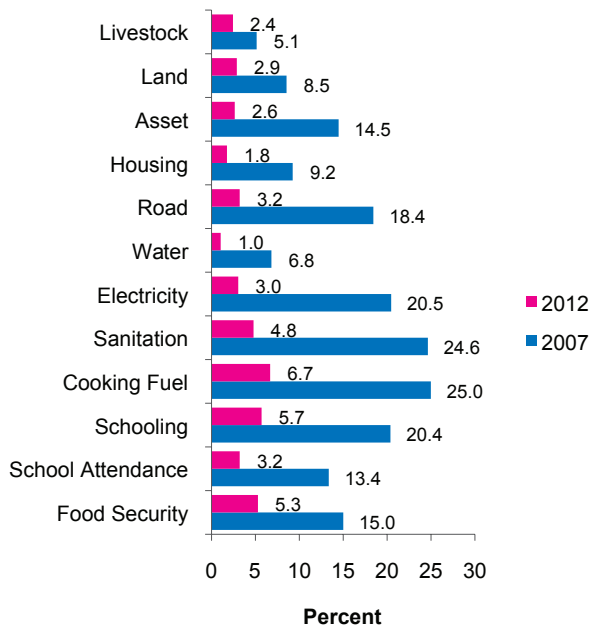
percent whereas eight percent of people suffered poverty of this intensity in 2007. That being said, there remain smaller groups of people experiencing a high intensity of poverty (Figure 4.5).

Now, when we combine changes in the rate of poverty and changes in the censored headcount with the weights that provide the structure of our measure, we are able to provide an overview of the dimensional composition of poverty in the two periods (Figure 4.7). We present this in two forms: the percentage contribution, and a relative contribution (which is harder to see but absolutely comparable). What is likely, once again, is that there have been strong reductions in multidimensional poverty at a national level across indicators.

We now report the changes in raw headcounts (Figure 4.9). This indicates that there remain some deprivations among non-poor people which might remain of policy interest, particularly deprivations in cooking fuel and sanitation. Recall, however, that deprivations in land and livestock will be reported among urban dwellers, for whom these

Figure 4.6 Intensity among the Poor, 2012$_c$
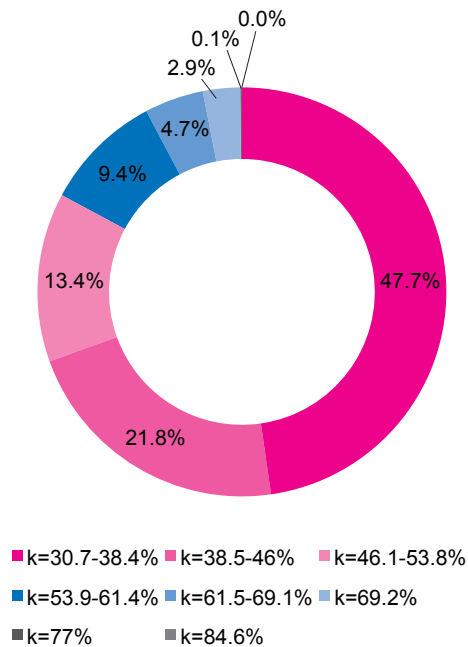
- k=30.7-38.4%
- k=38.5-46%
- k=46.1-53.8%
- k=53.9-61.4%
- k=61.5-69.1%
- k=69.2%
- k=77%
- k=84.6%

deprivations may not represent poverty in any meaningful way, thus it is more informative to consider the censored headcounts for these variables.

Figure 4.7 Percentage Contribution to MPI_c in 2007 and 2012

Livestock
Land
Asset
Housing
Road
Water
Electricity
Sanitation
Cooking Fuel
Schooling
School Attendance
Food Security
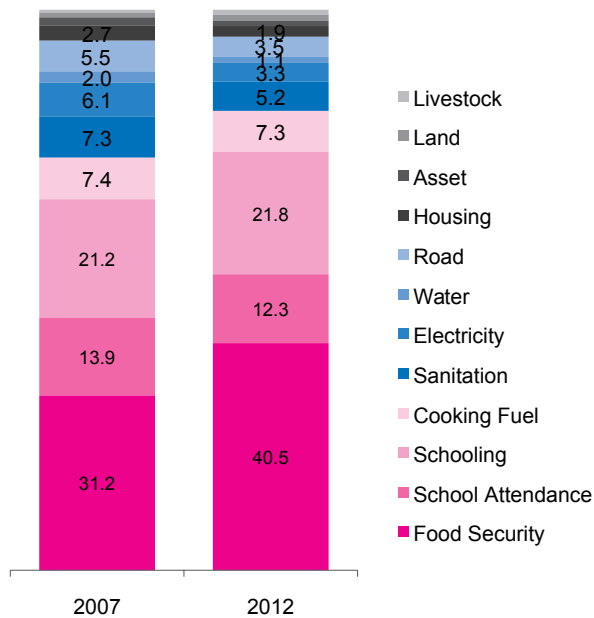
Figure 4.9 National Raw Headcount in 2007_c and 2012_c

Figure 4.8 Relative Contributions to MPI_c in 2007 and 2012

Livestock
Land
Asset
Housing
Road
Water
Electricity
Sanitation
Cooking Fuel
Schooling
School Attendance
Food Security
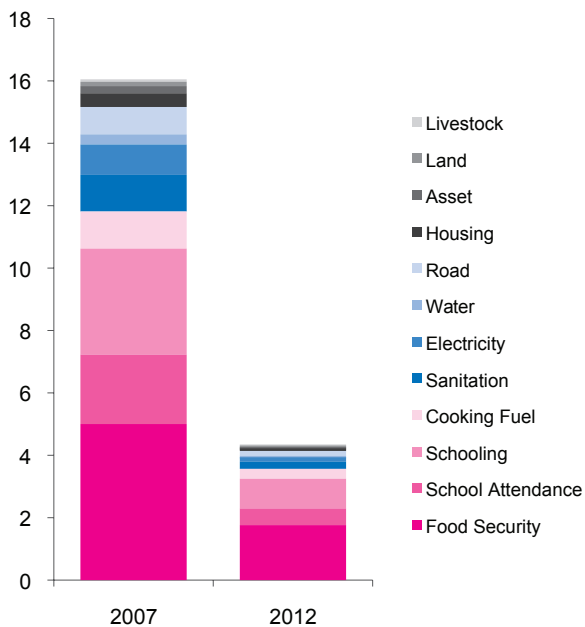
Figure 4.10 Absolute Change in MPI_c, 2007-2012
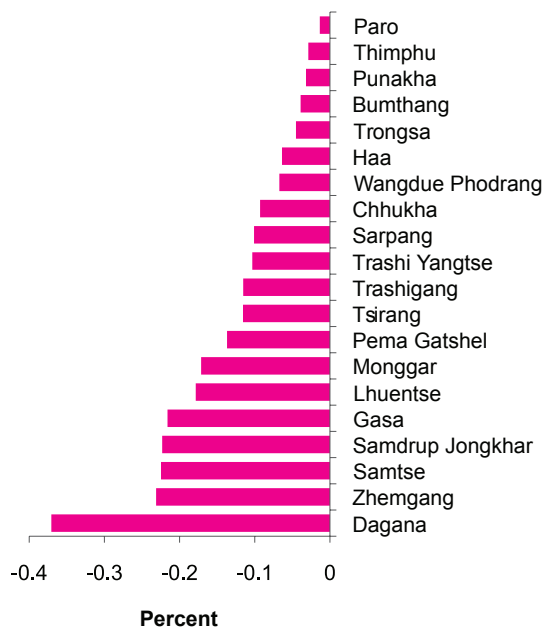
How did poverty change by *Dzongkhag*? First, we look at the absolute changes in MPI_c over the five year period. We also look at the percentage of total poverty reduction relative to the starting

year (2007). There were significant reductions in MPI_c and H_c in 18 *Dzongkhags* (all except Paro and Trongsa), and in A_c in 16 Dzonkhags, not including Bumthang, Thimphu, Punakha, and

Figure 4.11 Relative Change in MPI$_C$, 2007-2012

Figure 4.12A Change in Censored Headcount - Low MPI$_C$ *Dzongkhag*, 2007-2012
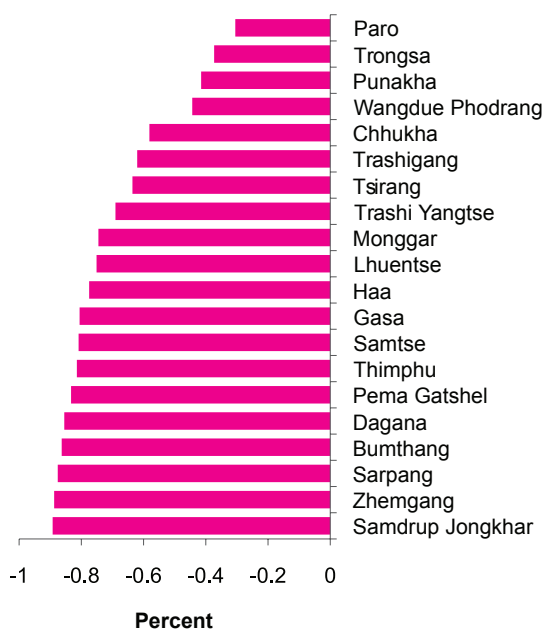
Trongsa where there was no significant change in intensity. In absolute terms, Dagana, Zhemgang, Samtse, and Samdrup Jongkar reduced MPI$_C$ the most in this period (Figure 4.10). In relative terms, Samdrup Jongkar, Zhemgang, and Sarpang are joined by Bumthang (Figure 4.11).

Finally, we report changes in censored head-count by *Dzongkhag* in Figures 4.12A and 4.12B. We group *Dzongkhags* into low MPI$_C$ and high MPI$_C$ groupings, and they are ranked from the lowest MPI$_C$ value in 2012 (Bumthang) by this comparable measure, to the highest. What we see is that some 'low MPI$_C$' *Dzongkhags* had tremendous reduction in MPI$_C$, such as Sarpang, Pema Gatshel, or Punakha whereas others had rather meagre reductions in comparison. A similar diversity of change patterns is evident in high MPI$_C$ *Dzongkhags*.

4.3. BMIS 2010 – BLSS 2012

The BMIS 2010 dataset has a larger sample and includes all indicators except for access to road. The annex Table A-2 provides a comprehensive

Figure 4.12B Change in Censored Headcount - High MPI$_c$
Dzongkhag, **2007-2012**
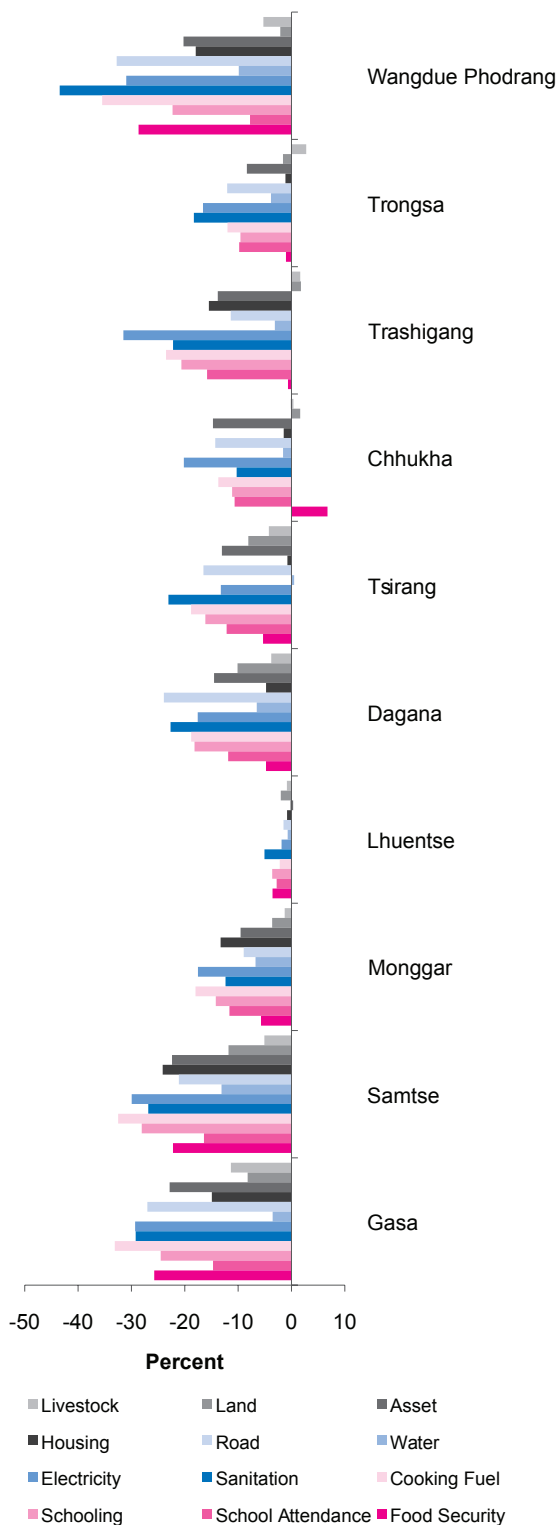
overview of the indicator differences between 2010 and 2012. Because of the different definitions we use the underscript $_c$ as in the previous section to remind readers that these are *differently defined* and not the same as the national MPI using BLSS 2012.

First let us compare MPI$_c$ and H$_c$ across time (Figures 4.13 and 4.14), for all values of k – the poverty cutoff. Again, poverty probably decreased nationally for all values of the poverty cutoff across these two time periods; and when we consider the confidence intervals this assessment is likely to be corroborated for all plausible poverty cutoffs.

Next, let us see how poverty was reduced according to these two datasets and time periods

Figure 4.13 MPI$_c$ by Different Values of *K* Poverty Cutoff in 2010 and 2012
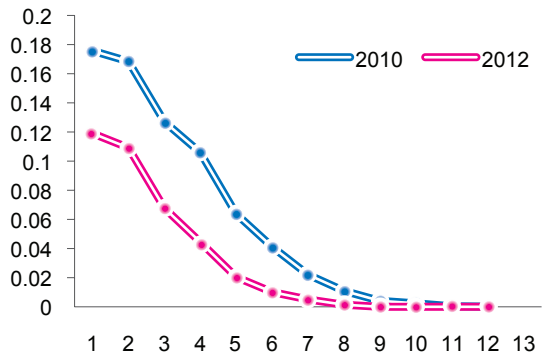
Figure 4.14 National Headcount Ratio by Different Values of *K* Poverty Cutoff in 2010$_c$ and 2012$_c$
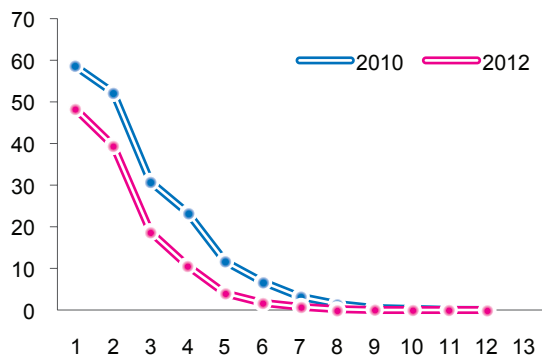
Figure 4.15 Change in Censored Headcount, 2010-2012$_c$

Figure 4.15 Change in Censored Headcount, 2010-2012$_c$

Indicator	Percent
Livestock	-0.2
Land	-4.2
Asset	-2.9
Housing	-4.0
Water	-0.9
Electricity	-11.6
Sanitation	-8.5
Cooking Fuel	-10.5
Schooling	-8.6
School Attendance	-2.5
Food Security	-5.5
Child Mortality	-7.6
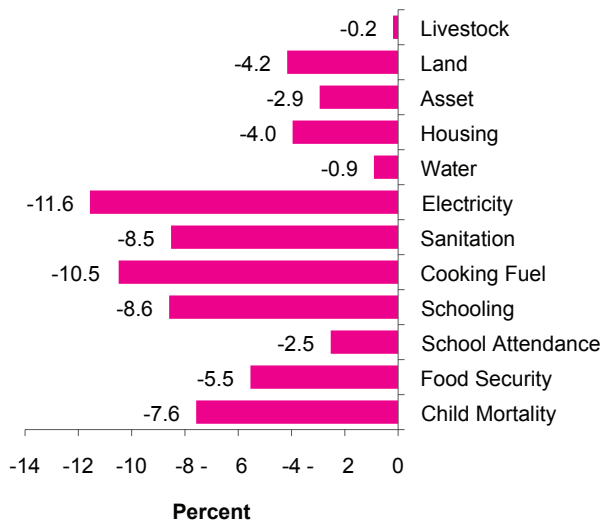
Percent

Figure 4.16 National Censored Headcount, 2010-2012$_c$

Indicator	2012	2010
Livestock	2.3	2.4
Land	2.6	6.8
Asset	2.8	5.8
Housing	2.3	6.3
Water	1.3	2.2
Electricity	3.9	15.5
Sanitation	5.9	14.4
Cooking Fuel	8.0	18.5
Schooling	8.0	16.6
School Attendance	3.7	6.3
Food Security	3.2	8.7
Child Mortality	3.7	11.3

Percent

■ 2012 ■ 2010

Figure 4.17 Intensity among the Poor, 2010$_c$

- 1.0%
- 0.1%
- 0.9%
- 4.1%
- 7.6%
- 15.3%
- 50.1%
- 20.8%

■ k=30.7-38.4% ■ k=38.5-46% ■ k=46.1-53.8%
■ k=53.9-61.4% ■ k=61.5-69.1% ■ k=69.2%
■ k=77% ■ k=84.6%

(Figures 4.15 and 4.16). It was reduced both by reducing the headcount, and by reducing the intensity of those who remain poor. We again examine the change in the censored headcounts: the percentage of people who are both poor and deprived in each indicator. Figure 4.16 shows that the largest absolute reductions in the censored headcount occurred as before in electricity, cooking fuel and sanitation; years of schooling is also a large contributor in this comparison. It can be useful to 'interpret' the changes in censored headcounts together with the actual levels of headcounts, which are presented in the subsequent figure. This is because deprivations in some indicators, such as water, are already quite low, so further reduction in these indicators cannot by definition be as high as in some other cases.

Now we investigate how intensity among the poor changed in the period and in particular whether the situation of the poorest of the poor – those having the highest intensity of poverty – was improved. Again we examine the intensity gradients among the poor in the two periods (Figure 4.17 and 4.18). Happily, we do indeed see a visible and strong reduction of intensity among the poor. In 2010, half of poor people had

Chapter 4: Multidimensional Poverty reduction over time

Figure 4.18 Intensity among the Poor, 2012$_c$

Figure 4.18 Intensity among the Poor, 2012$_c$

- k=30.7-38.4%
- k=38.5-46%
- k=46.1-53.8%
- k=53.9-61.4%
- k=61.5-69.1%
- k=69.2%
- k=77%
- k=84.6%

Figure 4.19 Percentage Contribution to National MPI$_c$ in 2010 and 2012

- Livestock
- Land
- Asset
- Housing
- Water
- Electricity
- Sanitation
- Cooking Fuel
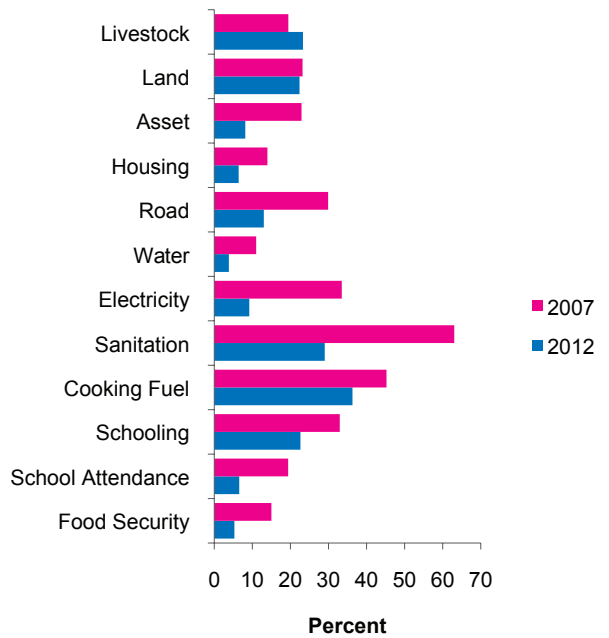- Schooling
- School Attendance
- Food Security
- Child Mortality

Figure 4.20 Relative Contribution to MPI$_c$ in 2010 and 2012

- Livestock
- Land
- Asset
- Housing
- Road
- Water
- Electricity
- Sanitation
- Cooking Fuel
- Schooling
- School Attendance
- Food Security

an intensity that was greater than 38 percent, and nearly 30 percent had an intensity that was over 46 percent. By 2012, that had reduced, with 62 percent of the poor having an intensity less than 38 percent, and again the highest intensity poverty had been eradicated.

Now, when we combine changes in the rate of poverty and changes in the censored headcount with the weights that provide the structure of our measure, we are able to provide an overview of the dimensional composition of poverty in the two periods. We present this in two forms: the percentage contribution, and a relative contribution (which is harder to see but absolutely comparable). What seems likely, once again, is that there have been strong reductions in multidimensional poverty at a national level across indicators as depicted in Figures 4.19 and 4.20.

We now report the changes in raw headcounts (Figure 4.21). This graph indicates that there remain some deprivations among non-poor people which might be of policy interest, such as

Figure 4.21 National Raw Headcount in 2010$_c$ and 2012$_c$

	2010	2012
Livestock	8.9	23.3
Land	17.9	22.4
Asset	8.6	7.8
Housing	8.7	6.4
Water	3.6	3.8
Electricity	26.8	9.2
Sanitation	37.9	29.0
Cooking Fuel	37.4	36.3
Schooling	28.0	22.6
School Attendance	9.2	6.6
Food Security	10.9	5.3
Child Mortality	19.3	10.3
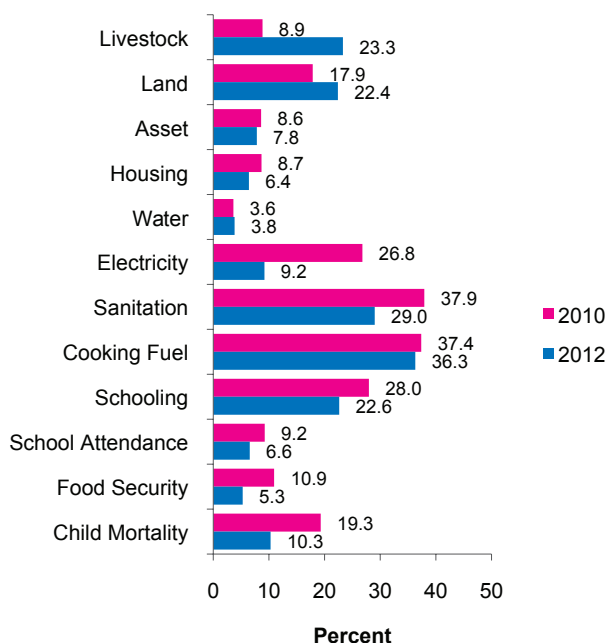
Figure 4.23 Relative Reduction in MPI$_c$, 2010-2012
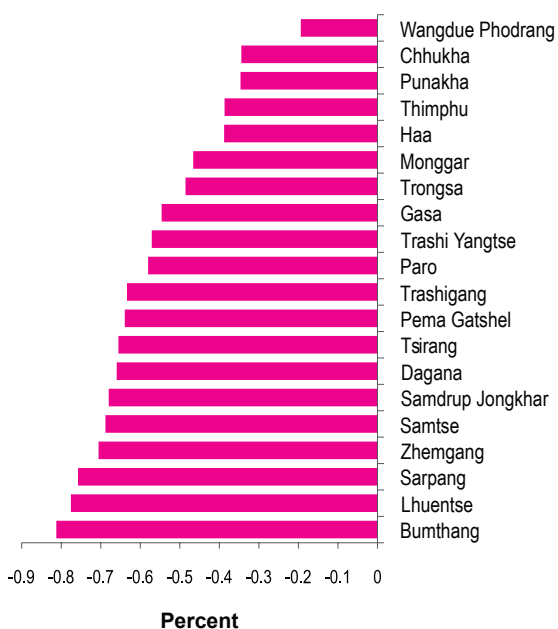
Figure 4.22 Absolute Reduction in MPI$_c$, 2010-2012
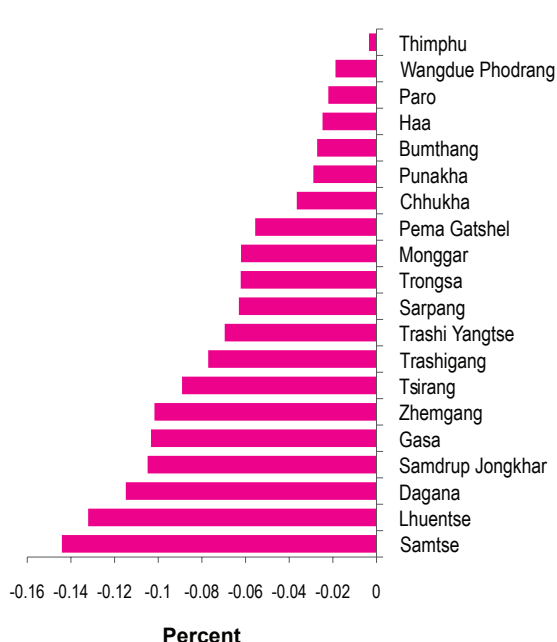
deprivations in cooking fuel and sanitation. Recall, as before, that deprivations in land and livestock will be reported among urban dwellers, for whom these deprivations may not represent poverty in any meaningful way, thus it is more informative to consider the censored headcounts for these variables.

Finally, we report changes in MPI$_c$ and by censored headcount by *Dzongkhag* (Figure 4.22). We see that in absolute terms, the largest reductions in MPI$_c$ occurred in Samtse, Lhuentse and Dagana, whereas if we look at the reduction relative to the 2012c levels of MPI$_c$ poverty, the largest reduction is in Bumthang, Lhuentse, and Sarpang.

To examine the composition of changes in MPI$_c$ by changes in censored headcount, we group *Dzongkhags* by alphabetical grouping (Figures 4.24A and 4.24B). We observe that there are some apparent increases in censored headcounts; however we would need to compute the confidence intervals to ascertain whether these show a statistically significant rise in censored headcounts.

Figure 4.24A Change in Censored Headcount by *Dzongkhag*, 2010-2012$_C$
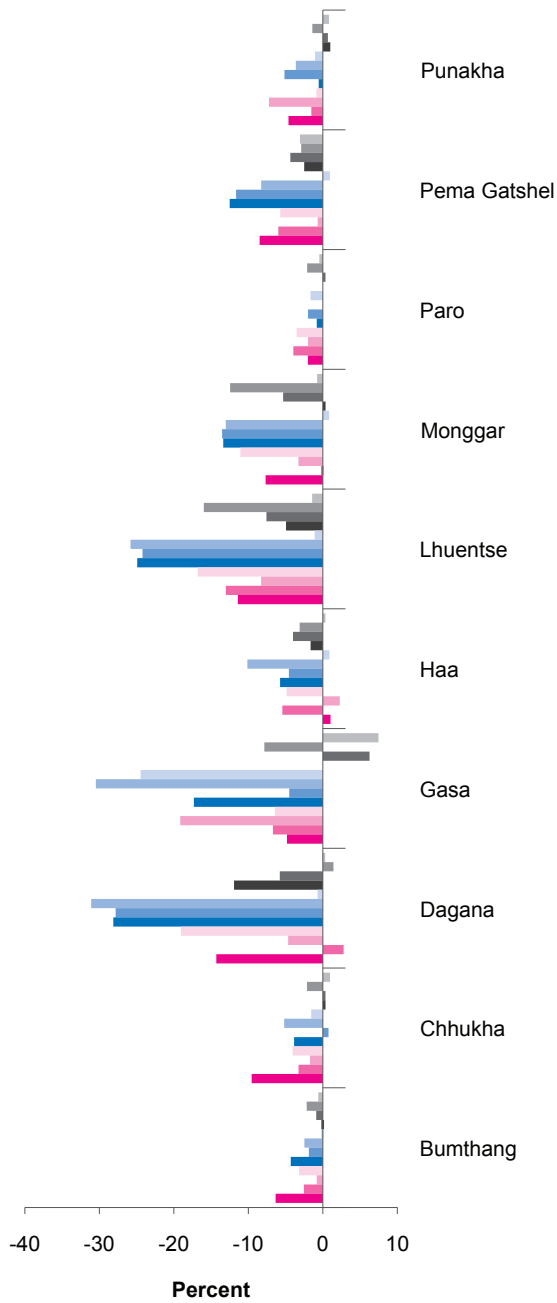
Figure 4.24B Change in Censored Headcount by *Dzongkhag*, 2010-2012$_C$
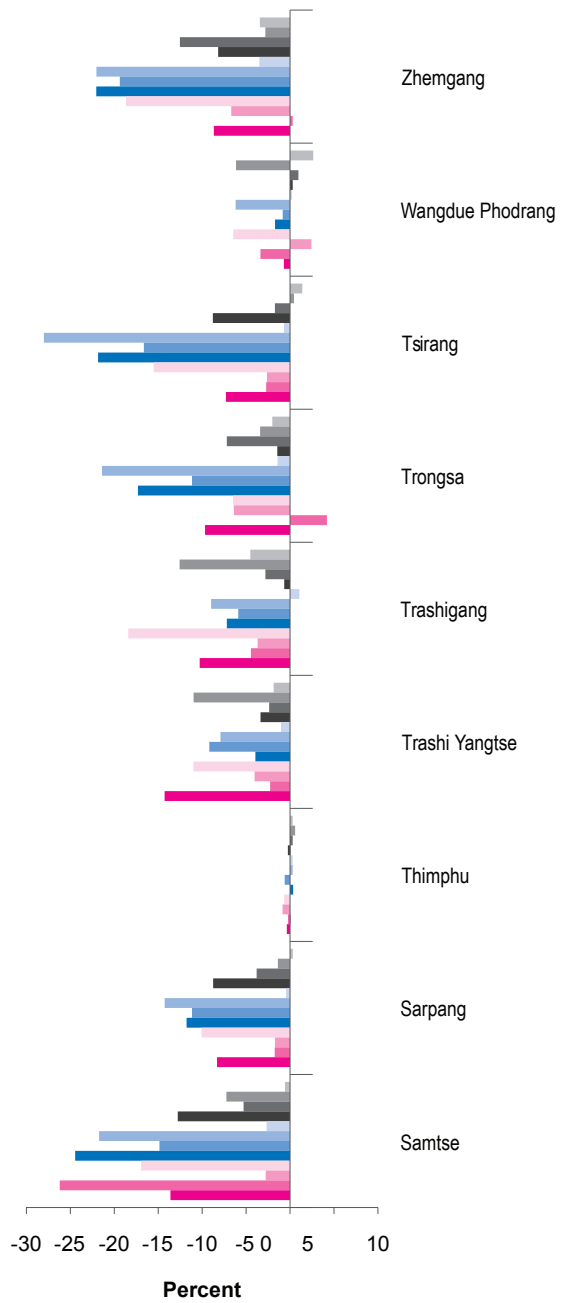
Legend:
- Livestock
- Land
- Asset
- Housing
- Water
- Electricity
- Sanitation
- Cooking Fuel
- Schooling
- School Attendance
- Food Security
- Child Mortality

Chapter 5.
Conclusion

This MPI report marks NSB's endeavours to produce a different approach to measuring poverty in addition to conventional income poverty measures. It is not intended to undermine the usefulness of income poverty. Rather it is intended that both measures be used to complement each other and provide an important source of information for public policy.

The national multidimensional poverty rate in 2012 of 12.7 percent of the population is very similar to the income poverty rate of 12 percent. The poverty rates for both urban and rural areas also similar. However, the analysis presented in this report shows that people who are income poor are not necessarily multidimensionally poor. This can be further supported when disaggregated geographically – those *Dzongkhags* that are income poor are not necessarily multidimensionally poor. Therefore, this suggests that the two measures should be used together, especially for resource allocation.

The MPI of 0.051 indicates that poor people in Bhutan experience $1/20^{th}$ of the deprivations that would be experienced if all people were deprived in all indicators. The largest contribution to national poverty is deprivations in years of education (30%) followed by child mortality (14%) and school attendance (13%). If aggregated by dimensions, the largest contribution is due to education (43%). The living standard and health dimensions contribute 32 percent and 25 percent, respectively.

Finally, this section presents some recommendations based on the outcome of the analysis of this report:

1. **Promote the use of MPI and income poverty for resource allocation**

   Allocation of public sector resources should be informed by MPI as well as income poverty levels – indeed perhaps more by MPI because MPI variables can to a great extent be changed directly by sectoral policies. Although MPI and income poverty measures differ, both should be used as complimentary tools. It is also recommended to use the MPI (the index overview figure which combines the percentage of poor people with the intensity of poverty) in addition to the poverty incidence from both measures and the estimated number of poor people.

2. **Promote the use of MPI for *Dzongkhag-level policies***

   Dzongkag-level policies should be informed by the composition of poverty in each *Dzong-khag*, as well as the overall level of poverty. It is good that poverty has reduced most in the poorest *Dzongkhags*. That commitment has to be sustained. It is also important to conduct further analysis and research on each *Dzongkhag* to better understand the different situations they face.

3. **Include MPI variables in future surveys and censuses**

For strict comparability between different time periods, and to gauge the progress over the years, it is recommended that all MPI variables are included in future surveys, especially in the Bhutan Living Standards Surveys. Although it might be difficult to include a variable on malnutrition, some alternative variables that are more correlated to malnutrition can be considered.

The future Population and Housing Census should also include as many MPI variables as feasible, so as to map poverty at the gewog or chiwog level. This will help in policy intervention at the grassroots.

4. **Promote further research**

To understand what really caused the reductions in poverty observed in this report, it is recommended that further research is undertaken. It is possible that we can learn from the *Dzongkhags* that reduced poverty fastest. There are different ways to approach this. Usually one can look at the demographic characteristics of those who are poor and data that is not in the measure – public expenditure levels, governance and political commitment, institutions, corruption, among others.

5. **Promote parental education**

It is recommended that efforts are continued to promote education and literacy programs for parents. The analysis has revealed that the higher the level of educational attainment of the household head, the lower the chance of people living in that household being multidimensionally poor. Further, the poverty rate is three times lower among those whose household head is literate when compared to those whose household head is illiterate.

6. **Promote diversification of agricultural employment**

Employment of the household head has a bearing on the multidimensional poverty rate. Persons living in households where the head is currently working in the industrial sector or service sector have higher living standards than those whose head is engaged in the agricultural sector. The poverty rate is around four percent for those employed in industry sector or service sector compared to 23 percent for those working in agriculture. Further, promotion of the expansion of the industry and service sectors, and therefore increasing the employment base in these sectors, should be encouraged.

7. **More focus on specific dimensions**

In five years (2007-2012), the highest reduction in the censored headcount (i.e. the percentage of Bhutanese who were poor and were deprived) was made in sanitation (by 20%); solid cooking fuel (by 18%); those without access to electricity (by 17%); and those lacking road access (by 15%). Now more focus should be put on solid cooking fuel, years of schooling and food security where deprivation rates were highest out of the 13 indicators in 2012.

8. **More focus on specific *Dzongkhags***

The reduction in MPI over the past five years across *Dzongkhags* includes Dagana, Zhemgang, Samtse, and Samdrup Jongkar. These *Dzongkhags* were amongst the MPI poor in 2007. The need for MPI to be reduced is recommended particularly in Gasa, Monggar and Wangdue Phodrang where the index is high in 2012.

Annex A: Comparability of Indicators

Table A-1 Comparability of Indicators between BLSS 2007 and BLSS 2012

Dimension	Indicator	BLSS 2007	BLSS 2012	Remarks
Health	Food Security	Question: In the last 12 months, for how many months do you consider that you did not have sufficient food? If the household suffered insufficiency of food during any of the past twelve months prior to the survey, the household is considered deprived in food security.	Question (PR.10): In the last 12 months has a situation been faced when there was not enough food to feed all members of the household? Yes-1 No-2 If the household responded yes then the household is considered deprived in food security indicator.	
	Child Malnutrition wt/age	No data	No data	This indicator is not used in the computation.
	Child Mortality	No data	Question (Block 1.4): F3. How many children did [NAME] give birth? Male____ Female____ F4. How many of them are living? Male____ Female____ The questions were asked to women aged 15-49 years. The difference of children given birth and children living is considered child mortality.	This indicator is not used in the computation.
Education	School Attendance	Education module (ED): Any school-aged child aged 6-14 years in the household is not attending school up to class eight is considered deprived. If the household have no member aged 6-14 years, it is considered non-deprived.	Block 1.2 (education): Any school-aged child aged 6-14 years in the household is not attending school up to class eight is considered deprived. If the household has no member aged 6-14 years, it is considered non-deprived.	
	Schooling	Education module (ED): If no household members have completed five years of formal education it is considered deprived in schooling.	Block 1.2 (education): If no household members have completed five years of formal education it is considered deprived in schooling.	The level of education asked where same in both the surveys.
Living Standard	Cooking Fuel	BLock2 Q. 21: The household is considered deprived if it uses wood, coal and dung cake as cooking fuel.	HS28: The household is considered deprived if it uses wood, coal and dung cake as cooking fuel.	
	Sanitation	Block 2. Q 16: The household is considered deprived if it uses flush toilet, pit latrine + septic tank, pit latrine, no septic tank, no facility and other non improved toilets or shared with other households.	HS21 and HS22: The household is considered deprived if it uses "pit latrine without slab/open lit", "long drop latrine", "composting latrine", "bucket toilet" and "no facility/bush/field" or shared with other households.	Most of the categories of toilet are missing in 2007. But the question for sharing of toilet is same in both the surveys.
	Electricity	Block 2. Q18: If the household has no access to electricity it is considered deprived in this indicator.	HS25: If the household has no access to electricity it is considered deprived in this indicator.	

Dimension	Indicator	BLSS 2007	BLSS 2012	Remarks
	Water	Block 2. Q. 12 and Q13: The household does not have access to safe drinking water or safe water is more than a 30-minute walk (round trip). Non improved drinking water sources are unprotected well, spring water, river/pond/lake and others.	HS 16 and HS 17: The household does not have access to safe drinking water or safe water is more than a 30-minute walk (round trip). In 2012 the non improved sources of drinking water are unprocted well, unprotected spring, tanker truck, cart with small tank/drum, surface water (river, lake, etc) and bottled water.	Missing options in 2007: bottled water, rain water collection, tanker truck and cart with small tank/drum. However those unspecified options are considered in others category.
	Road	Block 4: The household with more than 30 minutes walking distance from the nearest road head.	Block 4: The household with more than 30 minutes walking distance from the nearest road head.	
	Housing			
	Floor	Block 2. Q 9:1. Deprived if the house has clay/earthen floor material.	HS11: Deprived if the house has clay/earthen floor material.	
	Wall	Block 2. Q 7:1. Deprived if the house has mud, wood/branches and others as wall material.	HS 9: Deprived if the house has mud, wood/branches and others as wall material.	
	Roof	Block 2. Q 7: Deprived if the house has thatch and others as roof material.	HS10: Deprived if the house has thatch and others as roof material.	
	Asset			
	Appliances (Asset)	Block 3. Q1: The household does not own more than two of: radio, TV, telephone, mobile phone, rice cooker, sewing machine, sofa, wrist watch and does not own a car, and more than one of: computer, washing machine, power tiller, shesho gho/kire and foreign bow.	AS1: The household does not own more than two of: radio, TV, telephone, mobile phone, rice cooker, sewing machine, sofa, wrist watch and does not own a car, and more than one of: computer, washing machine, power tiller, shesho gho/kire and foreign bow.	
	Land	Block 3. Q3: The household in rural area owning less than or equal to one acre of land	AS3: The household in rural area owning less than or equal to one acre of land	
	Livestock	Block 3. Q2: The rural household not owning more than three of: cattle, horses, sheep, goat, chicken, pigs, buffalo, yaks.	AS2: The rural household not owning more than three of: cattle, horses, sheep, goat, chicken, pigs, buffalo, yaks.	

Annex

Table A-2 Comparability of Indicators between BMIS 2010 and BLSS 2012

Dimension	Indicator	BMIS 2010	BLSS 2012	Remarks
Health	Food Security	Question (HC.16): In the last 12 months has a situation been faced when there was not enough food to feed all members of the household? Yes-1 No-2 If the household responded yes then the household is considered deprived in food security indicator.	Question (PR.10): In the last 12 months has a situation been faced when there was not enough food to feed all members of the household? Yes-1 No-2 If the household responded yes then the household is considered deprived in food security indicator.	
	Child Malnutrition wt/age	No data	No data	This indicator is not used in the computation.
	Child Mortality	Question (CM9): How many boys have died? How many girls have died? If none, record '00'. - Boys died____ Girls died____	Question F3: How many children did [NAME] give birth? Male____ Female____ Question F4. How many of them are living? Male____ Female____ The questions were asked to women aged 15-49 years. The difference of children given birth and children living is considered child mortality.	Same indicator
Education	Schooling	Education module (ED): If no household members have completed five years of formal education it is considered deprived in schooling.	Block 1.2 (education): If no household members have completed five years of formal education it is considered deprived in schooling.	
	School Attendance	Education module (ED): Any school-aged child 6-14 years in the household is not attending school up to class eight is considered deprived. If the household have no member aged 6-14 years, it is considered non-deprived.	Block 1.2 (education): Any school-aged child aged 6-14 years in the household is not attending school up to class eight is considered deprived. If the household have no member aged 6-14 years, it is considered non-deprived.	
Living Standard	Cooking Fuel	The household is considered deprived if it uses. charcoal, wood, straw/shrubs/grass, agricultural crop, animal dung, no food cooked in household & others for cooking.	The household is considered deprived if it uses wood, coal and dung cake as cooking fuel.	In BLSS 2012 no option for charcoal, straw/shrubs/grass, agricultural crops & no food cooked in the household but it is included in others.
	Sanitation	WS 8 and WS 9: The household is considered deprived if it uses "pit latrine without slab/open lit", "long drop latrine", "composting latrine", "bucket toilet", "no facility/bush/field" and others or shared with other households.	HS21 and HS22: The household is considered deprived if it uses "pit latrine without slab/open lit", "long drop latrine", "composting latrine", "bucket toilet" and "no facility/bush/field" or shared with other households.	In BLSS 2012 there is no option for 'other'.
	Electricity	HC 8A: If the household has no access to electricity it is considered deprived in this indicator.	HS25: If the household has no access to electricity it is considered deprived in this indicator.	

Dimension	Indicator	BMIS 2010	BLSS 2012	Remarks
	Water	WS1 and WS4: The household does not have access to safe drinking water or safe water is more than a 15-minute walk (one way). In 2010 the non improved sources of drinking water are unprotected well, unprotected spring, tanker truck, cart with small tank/drum, surface water (river, lake, etc) and bottled water.	HS 16 and HS 17: The household does not have access to safe drinking water or safe water is more than a 30-minute walk (round trip). In 2012 the non improved sources of drinking water are unprotected well, unprotected spring, tanker truck, cart with small tank/drum, surface water (river, lake, etc) and bottled water.	In BLSS distance or time taken to the source of water is asked for 'one way' but in BMIS its for 'round trip'.
	Road	Data not available	The household with more than 30 minutes walking distance from the nearest road head.	This indicator is not used in the computation.
	Housing			
	Floor	HC3: Deprived if the house has clay/earthen and dung as floor material.	HS11: Deprived if the house has clay/earthen floor material.	In BMIS two options (earthen/clay floor and 'dung') used. In BLSS 2012 only earthen/clay used.
	Wall	HC5: Deprived if the house has no walls, cane/palm/ trunks/ bamboo, bamboo with mud , plywood, cardboard and others as wall material	HS 9: Deprived if the house has mud, wood/branches and others as wall material.	
	Roof	HC4: Deprived if the house has no roof, thatch, bamboo, cardboard, tarpaulin and others as roof material.	HS10: Deprived if the house has thatch and others as roof material.	More options in 2010 but most are covered in others in 2012.
	Asset			
	Appliances (Asset)	HC 8 & 9: The household does not own more than two of: radio, TV, telephone, mobile phone, rice cooker, sewing machine, sofa, wrist watch and does not own a car, and more than one of: computer, washing machine, power tiller and foreign bow.	AS1: The household does not own more than two of: radio, TV, telephone, mobile phone, rice cooker, sewing machine, sofa, wrist watch and does not own a car, and more than one of: computer, washing machine, power tiller and foreign bow.	In BLSS question 'vacuum' is not included.
	Land	HC 12: The household in rural area owning less than or equal to one acre of land	AS3: The household in rural area owning less than or equal to one acre of land	
	Livestock	HC 14: The rural household not owning more than three of: cattle, horses, sheep, goat, chicken, pigs, buffalo, yaks	AS2: The rural household not owning more than three of: cattle, horses, sheep, goat, chicken, pigs, buffalo, yaks	

Annex

Annex B: Additional Statistical Tables

Table B-1 Table B-1: Poverty Rate by Economic Activity of Household Head and Area

Economic Activity	Urban	Rural	*Bhutan*
Agriculture	3.3	23.7	*23.0*
Industry	1.8	7.9	*4.2*
Services	1.0	8.6	*4.0*
Unemployed	1.0	2.7	*1.8*
Economically Inactive	1.2	13.8	*9.2*
Total	*1.3*	*0.2*	*12.7*

Table B-2 Poverty Rate by Economic Activity of Household Head and *Dzongkhag*

Dzongkhag	Agriculture	Industry	Services	Unemployed	Economically Inactive	Total	*Population Share*
Bumthang	3.3	0.0	1.3	0.0	0.0	1.6	*2.2*
Chhukha	42.4	3.7	1.4	0.0	10.3	17.6	*9.4*
Dagana	28.0	7.7	6.1	0.0	9.7	17.6	*3.3*
Gasa	59.1	0.0	0.0	0.0	31.4	37.6	*0.5*
Haa	22.0	10.5	0.0	0.0	3.3	10.2	*1.5*
Lhuentse	10.7	22.1	4.8	0.0	11.6	10.4	*2.5*
Monggar	28.1	2.2	13.2	0.0	14.8	20.9	*6.6*
Paro	8.9	2.6	4.6	0.0	2.0	4.7	*5.4*
Pema Gatshel	14.2	12.8	0.0	59.5	9.7	11.6	*3.8*
Punakha	18.2	4.3	0.0	0.0	12.2	13.0	*3.8*
Samdrup Jongkhar	30.3	6.7	9.9	0.0	10.7	16.4	*5.2*
Samtse	30.2	6.6	5.0	0.0	11.9	18.7	*9.5*
Sarpang	7.6	5.7	4.4	0.0	5.6	5.9	*5.9*
Thimphu	12.6	2.2	0.7	0.0	1.2	1.6	*15.4*
Trashigang	19.6	1.2	9.1	0.0	11.4	14.0	*7.5*
Trashi Yangtse	22.0	0.0	14.1	0.0	11.7	16.5	*2.8*
Trongsa	29.3	6.1	11.0	0.0	11.2	18.2	*2.3*
Tsirang	16.0	3.0	0.0	0.0	18.4	15.2	*3.3*
Wangdue Phodrang	23.2	1.1	6.9	0.0	19.3	18.5	*5.8*
Zhemgang	22.7	0.0	6.4	62.5	11.0	15.0	*3.3*
Bhutan	*23.0*	*4.2*	*4.0*	*1.8*	*9.3*	*12.7*	*100.0*

Table B-3 Poverty Rate and MPI by Literacy Status of Household Head and *Dzongkhag*

Dzongkhag	Literate		Illiterate		*Population Share*
	Poverty Rate	**MPI**	**Poverty Rate**	**MPI**	
Bumthang	0.8	0.003	2.6	0.010	*2.2*
Chhukha	9.2	0.036	30.6	0.135	*9.4*
Dagana	16.2	0.063	19.1	0.079	*3.3*
Gasa	16.7	0.052	48.3	0.198	*0.5*
Haa	6.6	0.024	14.5	0.059	*1.5*

Dzongkhag	Literate		Illiterate		Population Share
	Poverty Rate	MPI	Poverty Rate	MPI	
Lhuentse	3.9	0.016	13.2	0.054	2.5
Monggar	11.6	0.048	26.5	0.105	6.6
Paro	1.8	0.007	7.4	0.028	5.4
Pema Gatshel	5.6	0.020	14.8	0.057	3.8
Punakha	1.6	0.006	18.7	0.080	3.8
Samdrup Jongkhar	8.8	0.032	22.9	0.085	5.2
Samtse	11.0	0.043	23.2	0.091	9.5
Sarpang	2.7	0.011	9.6	0.036	5.9
Thimphu	0.7	0.003	4.5	0.019	15.4
Trashigang	8.5	0.036	18.3	0.072	7.5
Trashi Yangtse	7.2	0.029	22.7	0.084	2.8
Trongsa	8.1	0.029	25.6	0.109	2.3
Tsirang	8.2	0.030	22.7	0.094	3.3
Wangdue Phodrang	9.9	0.038	21.8	0.095	5.8
Zhemgang	16.2	0.061	14.4	0.053	3.3
Bhutan	6.2	0.024	18.7	0.076	100.0

Table B-4 Poverty Rate by Educational Status of Household Head and *Dzongkhag*

Dzongkhag	None	At most grade VIII	XI to XII	Beyond XII	Total	Population Share
Bumthang	2.5	0.0	0.0	0.0	1.6	2.2
Chhukha	28.4	12.7	0.8	0.0	17.6	9.4
Dagana	20.4	13.7	0.0	0.0	17.6	3.3
Gasa	48.1	18.1	0.0	0.0	37.6	0.5
Haa	13.3	0.0	0.0	0.0	10.2	1.5
Lhuentse	11.8	17.2	0.0	0.0	10.4	2.5
Monggar	25.1	15.1	0.0	0.0	20.9	6.6
Paro	7.1	1.8	0.0	0.0	4.7	5.4
Pema Gatshel	13.5	4.6	0.0	0.0	11.6	3.8
Punakha	16.8	8.1	0.0	0.0	13.0	3.8
Samdrup Jongkhar	23.4	5.5	0.0	1.6	16.4	5.2
Samtse	24.3	7.6	0.0	0.0	18.7	9.5
Sarpang	8.1	4.2	0.0	0.0	5.9	5.9
Thimphu	4.0	1.0	0.0	0.0	1.6	15.4
Trashi Yangtse	17.8	5.9	0.0	0.0	14.0	7.5
Trashigang	21.3	4.5	0.0	0.0	16.5	2.8
Trongsa	24.4	5.8	0.0	0.0	18.2	2.3
Tsirang	22.0	6.1	0.0	0.0	15.2	3.3
Wangdue Phodrang	21.9	8.9	0.0	0.0	18.5	5.8
Zhemgang	17.4	11.8	0.0	0.0	15.0	3.3
Bhutan	18.1	6.3	0.1	0.0	12.7	100.0

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Table B-5 Censored Headcount by *Dzongkhag* and Indicator

Dzongkhag	Child Mortality	Food Security	School Attendance	Schooling	Cooking Fuel	Sanitation	Electricity	Water	Road	Housing	Asset	Land	Livestock	Population Share
Bumthang	0.4	0.4	0.8	1.6	0.8	0.0	0.0	0.0	0.0	0.3	0.0	0.7	0.7	2.2
Chhukha	6.6	9.4	3.4	12.9	13.3	16.3	5.2	1.2	4.7	0.6	2.0	5.3	2.5	9.4
Dagana	3.4	4.7	3.7	14.7	16.1	9.4	8.4	2.4	8.4	6.8	6.2	5.0	1.9	3.3
Gasa	19.7	0.0	0.0	32.7	37.6	31.2	3.5	1.3	36.3	0.0	16.7	23.0	17.4	0.5
Haa	4.1	0.0	7.5	7.3	5.7	9.6	0.0	0.9	0.6	0.0	0.6	0.0	0.8	1.5
Lhuentse	3.1	0.5	3.6	8.1	9.6	8.7	5.0	2.9	8.5	1.1	4.3	2.4	3.5	2.5
Monggar	8.4	4.6	7.4	11.8	17.2	12.6	11.6	3.5	11.7	0.8	5.7	2.4	4.2	6.6
Paro	1.4	2.0	2.0	3.6	1.9	1.0	0.0	0.5	1.2	0.0	0.2	1.5	1.2	5.4
Pema Gatshel	1.0	4.2	4.8	8.8	6.1	4.3	3.9	0.0	4.7	0.4	4.3	4.5	3.1	3.8
Punakha	7.4	4.7	5.1	10.2	6.0	6.9	0.0	1.3	1.5	1.0	1.7	6.1	4.6	3.8
Samdrup Jongkhar	7.6	4.0	2.8	10.0	14.1	6.2	6.7	2.5	9.5	0.4	4.4	5.3	5.7	5.2
Samtse	2.4	2.1	4.9	16.3	18.4	10.8	8.2	2.6	9.1	11.9	6.3	3.3	1.8	9.5
Sarpang	1.4	0.4	1.9	5.7	4.6	1.5	0.6	0.8	3.1	2.7	0.5	1.4	0.8	5.9
Thimphu	0.5	0.4	0.8	1.2	1.0	1.3	0.2	0.1	0.6	0.1	0.1	0.8	0.3	15.4
Trashi Yangtse	2.6	6.0	4.5	10.9	12.7	5.5	5.9	1.8	9.4	4.2	5.7	4.7	2.4	7.5
Trashigang	5.8	5.9	3.9	10.7	10.5	5.2	2.3	0.6	3.0	0.3	3.5	5.4	4.3	2.8
Trongsa	5.3	7.5	5.6	12.4	15.2	9.8	8.1	1.5	7.5	5.2	3.6	3.2	1.5	2.3
Tsirang	8.0	1.3	2.6	10.4	14.7	10.9	8.0	0.7	6.9	3.6	4.6	4.1	4.9	3.3
Wangdue Phodrang	7.7	8.3	9.2	13.0	9.0	8.2	3.1	3.4	3.3	0.6	3.9	5.2	3.9	5.8
Zhemgang	7.4	1.1	4.0	7.6	14.0	5.2	12.7	0.7	7.6	3.3	6.3	1.3	1.3	3.3
Bhutan	4.2	3.4	3.9	9.2	10.1	6.8	4.7	1.4	5.4	2.7	3.3	3.2	2.5	100.0

Table B-6 Percentage Contribution of the Censored Headcount by *Dzongkhag* and Indicator

Dzongkhag	Child Mortality	Food Security	School Attendance	Schooling	Cooking Fuel	Sanitation	Electricity	Water	Road	Housing	Asset	Land	Livestock	Total	Population Share
Bumthang	11.6	11.2	21.4	44.1	6.1	0.0	0.0	0.0	0.0	2.0	0.0	1.8	1.8	100.0	2.2
Chhukha	14.7	20.9	7.6	28.6	8.4	10.3	3.3	0.8	3.0	0.4	0.4	1.1	0.5	100.0	9.4
Dagana	7.9	11.0	8.8	34.5	10.8	6.4	5.7	1.6	5.7	4.6	1.4	1.1	0.4	100.0	3.3
Gasa	22.1	0.0	0.0	36.6	12.0	10.0	1.1	0.4	11.6	0.0	1.8	2.5	1.9	100.1	0.5
Haa	17.1	0.0	31.4	30.9	6.9	11.5	0.0	1.1	0.7	0.0	0.2	0.0	0.3	100.0	1.5
Lhuentse	11.6	1.9	13.6	30.7	10.3	9.4	5.4	3.1	9.2	1.2	1.5	0.9	1.2	100.0	2.5
Monggar	16.9	9.3	14.8	23.7	9.9	7.2	6.7	2.0	6.7	0.4	1.1	0.5	0.8	100.0	6.6
Paro	13.4	19.0	19.0	33.8	5.0	2.5	0.0	1.5	3.2	0.0	0.2	1.3	1.1	100.0	5.4
Pema Gatshel	4.1	16.5	18.9	34.4	6.8	4.8	4.4	0.0	5.3	0.5	1.6	1.7	1.2	100.0	3.8
Punakha	22.1	14.1	15.4	30.5	5.1	5.9	0.0	1.1	1.3	0.9	0.5	1.7	1.3	100.0	3.8
Samdrup Jongkhar	20.5	10.7	7.6	26.9	10.9	4.8	5.1	1.9	7.3	0.3	1.1	1.4	1.5	100.0	5.2
Samtse	5.5	4.8	11.1	36.8	11.9	7.0	5.3	1.7	5.9	7.7	1.3	0.7	0.4	100.0	9.5
Sarpang	10.5	3.0	14.0	42.2	9.9	3.3	1.3	1.6	6.5	5.8	0.3	1.0	0.6	100.0	5.9
Thimphu	13.0	9.0	20.7	30.4	7.1	9.4	1.8	0.6	4.2	0.7	0.3	2.0	0.8	100.0	15.4
Trashi Yangtse	7.1	16.5	12.4	29.8	10.0	4.3	4.6	1.4	7.3	3.3	1.5	1.2	0.6	100.0	7.5

Dzongkhag	Child Mortality	Food Security	School Attendance	Schooling	Cooking Fuel	Sanitation	Electricity	Water	Road	Housing	Asset	Land	Livestock	Total	Population Share
Trashigang	17.0	17.4	11.6	31.7	8.9	4.4	2.0	0.5	2.6	0.2	1.0	1.5	1.2	100.0	2.8
Trongsa	11.8	16.6	12.4	27.5	9.6	6.2	5.1	0.9	4.7	3.3	0.8	0.7	0.3	100.0	2.3
Tsirang	22.1	3.7	7.0	28.6	11.5	8.6	6.3	0.6	5.4	2.8	1.2	1.1	1.3	100.0	3.3
Wangdue Phodrang	16.3	17.6	19.4	27.4	5.5	5.0	1.9	2.0	2.0	0.4	0.8	1.1	0.8	100.0	5.8
Zhemgang	22.2	3.2	12.0	22.7	12.0	4.4	10.9	0.6	6.5	2.8	1.8	0.4	0.4	100.0	3.3
Bhutan	13.9	11.2	12.9	30.2	9.4	6.4	4.4	1.3	5.0	2.5	1.0	1.0	0.8	100.0	100.0

Table B-7 Raw Headcount by *Dzongkhag* and Indicator

Dzongkhag	Child Mortality	Food Security	School Attendance	Schooling	Cooking Fuel	Sanitation	Electricity	Water	Road	Housing	Asset	Land	Livestock	Population Share
Bumthang	4.7	0.6	1.4	14.7	9.3	28.3	0.6	0.0	0.0	0.9	0.4	23.6	32.1	2.2
Chhukha	9.1	8.4	7.9	22.9	33.3	24.9	13.1	2.6	13.0	9.0	5.7	12.4	15.0	9.4
Dagana	6.6	7.5	6.4	30.6	70.9	24.2	20.1	6.5	18.1	15.7	16.5	14.8	15.1	3.3
Gasa	19.7	0.0	5.6	41.0	67.1	42.4	3.5	1.3	70.1	0.0	17.4	55.3	22.2	0.5
Haa	16.5	0.0	13.5	19.0	13.2	45.2	0.0	2.7	6.4	0.0	3.4	18.7	18.9	1.5
Lhuentse	4.6	7.3	13.8	29.4	36.0	19.4	6.1	1.2	18.7	2.7	12.1	41.2	21.5	2.5
Monggar	16.4	5.6	10.8	24.7	50.3	35.0	18.0	6.3	23.4	1.8	12.2	18.3	18.8	6.6
Paro	4.7	6.1	6.4	14.1	3.5	13.5	0.0	2.4	1.2	0.4	0.3	44.1	55.2	5.4
Pema Gatshel	9.5	1.2	6.4	23.0	60.8	41.8	9.2	8.7	26.1	1.5	9.3	13.5	41.4	3.8
Punakha	18.2	7.1	8.6	22.7	18.5	42.0	0.0	3.7	6.9	3.3	2.8	55.0	27.2	3.8
Samdrup Jongkhar	22.7	1.5	4.9	21.5	51.2	46.1	18.5	2.3	13.3	5.0	15.0	25.1	31.1	5.2
Samtse	6.5	2.6	5.5	34.9	68.2	36.0	15.2	6.0	19.7	29.5	11.9	20.6	15.7	9.5
Sarpang	4.7	0.4	5.1	23.8	32.4	10.6	1.0	3.0	11.3	8.4	4.3	16.1	20.5	5.9
Thimphu	4.6	0.8	2.9	8.2	1.7	22.2	0.2	0.8	0.8	1.8	0.5	8.1	10.1	15.4
Trashi Yangtse	14.7	11.9	5.4	28.4	46.5	23.7	5.0	3.5	13.9	1.2	7.6	36.4	38.3	7.5
Trashigang	20.1	8.0	3.5	24.0	57.2	29.3	11.7	6.2	29.6	0.8	11.2	30.4	42.0	2.8
Trongsa	12.6	13.0	4.4	25.7	39.3	63.2	16.5	2.0	11.4	3.2	7.0	33.0	28.6	2.3
Tsirang	8.9	10.1	8.1	23.5	60.2	17.2	14.8	8.8	16.2	11.3	17.3	23.2	18.1	3.3
Wangdue Phodrang	12.9	12.2	12.6	33.6	24.9	40.0	5.9	6.8	9.4	1.4	5.8	19.7	15.1	5.8
Zhemgang	14.5	3.4	7.5	16.8	58.6	25.7	35.3	3.9	24.8	4.7	25.3	22.8	26.2	3.3
Bhutan	10.3	5.3	6.6	22.6	36.3	29.0	9.2	3.8	13.0	6.4	7.8	22.4	23.3	100.0

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Table B-8 Multidimensional and Income Poverty Rates by *Dzongkhag*

Dzongkhag	**Multidimensional poverty rate**	**Income poverty rate**	*Distribution of Population*
Bumthang	1.6	3.4	2.2
Chhukha	17.6	11.2	9.4
Dagana	17.6	25.1	3.3
Gasa	37.6	0.0	0.5
Haa	10.2	6.4	1.5
Lhuentse	10.4	31.9	2.5
Monggar	20.9	10.5	6.6
Paro	4.7	0.0	5.4
Pema Gatshel	11.6	26.9	3.8
Punakha	13.0	10.0	3.8
Samdrup Jongkhar	16.4	21.0	5.2
Samtse	18.7	22.2	9.5
Sarpang	5.9	4.2	5.9
Thimphu	1.6	0.5	15.4
Trashi Yangtse	14.0	13.5	7.5
Trashigang	16.5	11.5	2.8
Trongsa	18.2	14.9	2.3
Tsirang	15.2	14.8	3.3
Wangdue Phodrang	18.5	10.9	5.8
Zhemgang	15.0	26.3	3.3
Bhutan	*12.7*	*12.0*	*100.0*

Table B-9 Absolute and Relative Reduction in MPI$_c$ by *Dzongkhag*, between 2007 and 2012, and 2010 and 2012

Dzongkhag	**2007 to 2012**		**2010 to 2012**		*Distribution of Population*
	Absolute change in MPI	**Relative Change in MPI**	**Absolute reduction**	**Relative reduction**	
Bumthang	-0.04	-0.86	-0.14	-0.81	2.2
Chhukha	-0.09	-0.58	-0.13	-0.78	9.4
Dagana	-0.37	-0.85	-0.11	-0.76	3.3
Gasa	-0.22	-0.81	-0.10	-0.71	0.5
Haa	-0.06	-0.77	-0.10	-0.69	1.5
Lhuentse	-0.18	-0.75	-0.10	-0.68	2.5
Monggar	-0.17	-0.75	-0.09	-0.66	6.6
Paro	-0.01	-0.31	-0.08	-0.66	5.4
Pema Gatshel	-0.14	-0.83	-0.07	-0.64	3.8
Punakha	-0.03	-0.41	-0.06	-0.63	3.8
Samdrup Jongkhar	-0.22	-0.89	-0.06	-0.58	5.2
Samtse	-0.22	-0.81	-0.06	-0.57	9.5
Sarpang	-0.10	-0.88	-0.06	-0.55	5.9
Thimphu	-0.03	-0.81	-0.04	-0.49	15.4
Trashigang	-0.12	-0.62	-0.03	-0.47	7.5
Trashi Yangtse	-0.10	-0.69	-0.03	-0.39	2.8

| Dzongkhag | 2007 to 2012 | | 2010 to 2012 | | Distribution of Population |
	Absolute change in MPI	Relative Change in MPI	Absolute reduction	Relative reduction	
Trongsa	-0.05	-0.37	-0.02	-0.39	2.3
Tsirang	-0.12	-0.64	-0.02	-0.35	3.3
Wangdue Phodrang	-0.07	-0.44	-0.02	-0.34	5.8
Zhemgang	-0.23	-0.89	-0.00	-0.19	3.3
Bhutan	-0.12	-0.73	-0.06	-0.58	100.0

Table B-10 **Change in Censored Headcount by** *Dzongkhag*, **between 2007 and 2012**

Dzongkhag	Food Security	School Attendance	Schooling	Cooking Fuel	Sanitation	Electricity	Water	Road	Housing	Asset	Land	Livestock	Distribution of Population
Bumthang	-0.0	-5.9	-7.3	-7.9	-10.5	-9.1	-0.4	-3.6	-1.2	-3.3	-2.4	-2.2	2.2
Chhukha	6.8	-10.7	-11.1	-13.7	-10.3	-20.2	-1.6	-14.3	-1.5	-14.7	1.6	-0.1	9.4
Dagana	-4.8	-11.9	-18.2	-18.8	-22.7	-17.6	-6.5	-23.9	-4.8	-14.5	-10.1	-3.8	3.3
Gasa	-25.7	-14.7	-24.5	-33.1	-29.2	-29.3	-3.5	-27.0	-14.9	-22.8	-8.2	-11.4	0.5
Haa	-15.7	-30.0	-21.4	-26.0	-30.8	-37.6	-31.9	-34.2	0.0	0.2	-12.0	2.3	1.5
Lhuentse	-3.6	-2.8	-3.6	-2.2	-5.1	-1.9	-0.7	-1.5	-0.8	-0.2	-2.0	-0.9	2.5
Monggar	-5.7	-11.6	-14.2	-18.0	-12.4	-17.5	-6.7	-9.0	-13.3	-9.5	-3.6	-1.3	6.6
Paro	1.3	-3.4	-2.9	-2.9	-7.0	-1.5	-1.1	-2.0	-0.2	-0.9	-1.1	1.3	5.4
Pema Gatshel	-15.9	-13.9	-20.6	-29.1	-35.9	-30.4	-2.3	-27.8	-4.4	-21.8	-11.6	-5.8	3.8
Punakha	-5.3	-9.4	-22.2	-27.2	-28.1	-25.2	-13.9	-25.1	-6.1	-16.5	-15.3	-11.3	3.8
Samdrup Jongkhar	-4.7	-3.8	-8.0	-10.0	-10.2	-9.7	-5.2	-10.1	-8.2	-6.5	-8.0	-4.2	5.2
Samtse	-22.2	-16.4	-28.1	-32.5	-26.8	-30.0	-13.1	-21.1	-24.1	-22.4	-11.8	-5.1	9.5
Sarpang	-52.4	-17.8	-32.9	-48.4	-57.6	-47.1	-14.4	-30.5	-23.0	-28.8	-9.1	-0.3	5.9
Thimphu	-9.8	-7.9	-7.8	-13.7	-14.3	-11.4	-7.9	-11.9	-6.1	-8.6	-5.5	-2.9	15.4
Trashi Yangtse	-0.7	-6.8	-3.4	-3.1	-10.5	-5.8	-0.7	-5.6	-0.2	-2.9	-0.5	0.9	7.5
Trashigang	-0.7	-15.8	-20.6	-23.5	-22.2	-31.5	-3.1	-11.4	-15.5	-13.8	1.8	1.6	2.8
Trongsa	-1.0	-9.8	-9.6	-12.0	-18.3	-16.6	-3.8	-12.1	-1.1	-8.4	-1.6	2.8	2.3
Tsirang	-5.3	-12.2	-16.1	-18.8	-23.1	-13.2	0.3	-16.5	-0.8	-13.0	-8.1	-4.2	3.3
Wangdue Phodrang	-28.7	-7.8	-22.3	-35.5	-43.4	-31.0	-9.9	-32.8	-17.9	-20.2	-2.1	-5.3	5.8
Zhemgang	-11.9	-16.2	-24.2	-29.8	-32.4	-23.1	-8.2	-28.9	-2.2	-21.2	-7.9	-2.3	3.3
Bhutan	-9.7	-10.1	-14.7	-18.3	-19.9	-17.4	-5.8	-15.2	-7.5	-11.8	-5.7	-2.7	100.0

Table B-11 Change in Censored Headcount by *Dzongkhag*, between 2010 and 2012

Dzongkhag	Child Mortality	Food Security	School Attendance	Schooling	Cooking Fuel	Sanitation	Electricity	Water	Housing	Asset	Land	Livestock	*Distribution of Population*
Bumthang	-6.3	-2.5	-0.8	-3.2	-4.3	-1.9	-2.5	-0.2	-0.2	-0.9	-2.2	-0.6	*2.2*
Chhukha	-9.6	-3.3	-1.7	-4.0	-3.9	0.8	-5.2	-1.6	0.2	0.2	-2.1	1.0	*9.4*
Dagana	-14.3	2.8	-4.7	-19.0	-28.1	-27.8	-31.1	-0.7	-11.9	-5.8	1.4	-0.0	*3.3*
Gasa	-4.8	-6.7	-19.1	-6.4	-17.3	-4.5	-30.5	-24.5	0.0	6.3	-7.9	7.5	*0.5*
Haa	1.0	-5.4	2.3	-4.9	-5.7	-4.6	-10.1	0.9	-1.6	-4.0	-3.1	-0.0	*1.5*
Lhuentse	-11.4	-13.0	-8.3	-16.8	-24.9	-24.2	-25.8	-1.1	-4.9	-7.6	-16.0	-1.4	*2.5*
Monggar	-7.7	-0.2	-3.3	-11.1	-13.4	-13.5	-13.0	0.8	0.4	-5.3	-12.4	-0.8	*6.6*
Paro	-2.0	-4.0	-2.0	-3.5	-0.8	-2.0	0.0	-1.6	0.0	0.0	-2.1	-0.5	*5.4*
Pema Gatshel	-8.5	-6.0	-0.7	-5.7	-12.5	-11.6	-8.3	0.9	-2.5	-4.4	-2.9	-3.1	*3.8*
Punakha	-4.6	-1.5	-7.2	-0.9	-0.6	-5.2	-3.6	-1.1	1.0	0.7	-1.4	0.8	*3.8*
Samdrup Jongkhar	-12.2	-17.2	-3.5	-8.5	-18.0	-13.3	-22.2	-0.7	-6.0	-9.3	-3.1	-0.5	*5.2*
Samtse	-13.6	-26.2	-2.8	-16.9	-24.5	-14.9	-21.7	-2.7	-12.8	-5.3	-7.2	-0.6	*9.5*
Sarpang	-8.3	-1.7	-1.7	-10.1	-11.8	-11.2	-14.3	-0.5	-8.7	-3.8	-1.4	0.3	*5.9*
Thimphu	-0.4	-0.2	-0.8	-0.7	0.4	-0.6	0.2	0.1	-0.2	0.1	0.6	0.3	*15.4*
Trashi Yangtse	-14.3	-2.3	-4.0	-11.0	-3.9	-9.2	-7.9	-1.0	-3.4	-2.4	-11.0	-1.9	*7.5*
Trashigang	-10.3	-4.5	-3.7	-18.4	-7.2	-5.9	-9.0	1.1	-0.7	-2.8	-12.6	-4.5	*2.8*
Trongsa	-9.7	4.2	-6.4	-6.5	-17.3	-11.2	-21.4	-1.4	-1.4	-7.2	-3.4	-2.0	*2.3*
Tsirang	-7.3	-2.7	-2.6	-15.5	-21.8	-16.6	-28.0	-0.7	-8.8	-1.7	0.5	1.4	*3.3*
Wangdue Phodrang	-0.7	-3.4	2.4	-6.5	-1.7	-0.8	-6.2	-0.1	0.1	1.0	-6.1	2.6	*5.8*
Zhemgang	-8.7	0.1	-6.7	-18.7	-22.0	-19.4	-22.0	-3.5	-8.2	-12.5	-2.8	-3.4	*3.3*
Bhutan	*-7.6*	*-5.5*	*-2.5*	*-8.6*	*-10.5*	*-8.5*	*-11.6*	*-0.9*	*-4.0*	*-2.9*	*-4.2*	*-0.2*	*100.0*