Child Poverty
in Cambodia

Ministry of Planning

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Foreword

Cambodia has made significant progress in reducing monetary poverty in the past decade, which declined from 53.2 per cent of the population in 2004 to 13.5 per cent in 2014. In most countries, poverty disproportionally affects the young, and Cambodia is no exception: monetary poverty is even higher among children than the total population, affecting 16 per cent, or four in 25 children. Considering the importance of monitoring child poverty, the Government of Cambodia included monetary child poverty in its National Strategic Development Plan 2014-2018 to ensure that the needs of young people are being better met.

At the same time, it has also been recognized worldwide that measuring monetary poverty alone does not present the full picture of a population's overall well-being. Responding to this, the Sustainable Development Goals (SDGs) adopted by the United Nations General Assembly in 2015 included multidimensional poverty as Goal 1: "End poverty in all its forms everywhere".

The Child Poverty in Cambodia looks at deprivation in terms of key dimensions like health, nutrition, water, education and housing. The information complements monetary poverty since there are those who are not monetarily poor but are deprived in multiple dimensions that prevent them from realizing their rights and achieving full development. Multidimensional poverty is particularly important for children as fulfilment of these dimensions not only determines their well-being at that moment, but also impacts their future.

The Ministry of Planning was mandated by the Cambodian Government to adopt the SDGs relevant to the Cambodian context and formulate the accompanying goals based on the country's current baseline. During this process, UNICEF provided technical assistance to analyze multidimensional child poverty in Cambodia and to build the Cambodian National Working Group on Poverty Measurement's capacity to assess child poverty both from monetary and multidimensional approaches.

Findings presented in this report provide information as baselines for the related Cambodian SDG indicators under Goal 1 and help the Government set targets for monetary and multidimensional child poverty reduction for 2030.

We would like to encourage all relevant stakeholders at national and sub-national levels, development partners and civil society to take full advantage of this analysis/evidence to inform formulation, design and implementation of policies, programmes and projects that aim to reduce child poverty and contribute to human development in Cambodia.

Phnom Penh, June 2018

UNICEF Country Representative

Debora Comini

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Executive Summary

Executive Summary

Cambodia is among the nations that have ratified the Convention on the Rights of the Child (CRC) and has consistently stood by its commitment to realize the rights of Cambodian children's rights through effective policymaking (United Nations). Cambodia recognizes and commits to ensuring the rights of its child population to survival, development, protection and participation. With the adoption of the Sustainable Development Goals (SDGs) in 2015, Cambodia joins a global development agenda that recognizes child poverty as a universal issue worthy of a unique and separate position in the poverty alleviation debate, but which is rarely properly addressed in practice.

Child poverty analysis is an important tool to evaluate the impact of the Government's poverty agenda. Assessing the remaining challenges through a child lens offers important insight to the nature of poverty in Cambodia – who the poor are, why their poverty persists, and how poverty is intergenerationally transmitted. Understanding the current context of child poverty and establishing baselines to assess progress is indispensable to achieving the 2030 targets.

The methodology

Two main concepts can be used to measure child poverty: monetary poverty and multidimensional poverty. A child is considered to be monetarily poor when the child lives in a household where total household consumption per adult equivalent is below the national monetary poverty line. On the other hand, a child is defined as multidimensionally poor if he/she is deprived in several dimensions of his/her well-being according to a defined threshold of poverty severity.

The monetary poverty analysis uses the Foster-Greer-Thorbecke class of poverty measures to calculate and deconstruct the poverty headcount rate, poverty gap and poverty severity index for children in Cambodia.

The multidimensional approach to poverty used in this study is based on the Multiple Overlapping Deprivation Analysis (MODA) methodology. UNICEF developed this methodology to provide a framework in which child poverty and deprivation can be measured, quantified and identified. It concentrates on the measurement of child deprivation and is comprised of the following key elements:

1. It takes the child rather than the household as unit of analysis;
2. It emphasizes the use of individual-level data when possible so that any differences across gender, ages or within households may be observed;
3. It makes use of the life-cycle approach, changing indicators according to the changing needs of children at different life stages;
4. It broadens the scope of sector-based approaches through overlapping deprivation analysis;
5. It includes the prevalence and depth of deprivation for each child, revealing the most vulnerable children with a higher number of deprivations at the same time; and
6. It generates profiles in terms of the geographical and socio-economic characteristics of the (multiply) deprived, allowing for better-targeted, more effective policy responses and interventions.

The Cambodia Demographic and Health Survey (CDHS) 2014 is used to study multidimensional child poverty and the Cambodia Socio-Economic Survey (CSES) 2014 for monetary poverty. After discussions with Cambodian partners and consideration of internationally agreed definitions of the essential rights and needs of the child, the dimensions and indicators reflecting the well-being of the Cambodian child were decided (see Chapter 2.2.3). Given that children's needs vary different stages of life, different dimensions are used for different age groups of children. For children aged 0-4 years, the dimensions are nutrition, health, early childhood development (ECD), water, sanitation and housing, while for children aged 5-17 years, education, water, sanitation, housing and information are used to proxy well-being.

Purpose of the study and Sustainable Development Goals

Measuring and studying who the poor children are, according to both monetary and multidimensional definitions of poverty, is inherently useful in order to make the poorest and most vulnerable populations statistically visible. Such a study helps policymakers and country experts better understand the situation of overall well-being for children, and thus for the greater society as a whole, by highlighting where past policies have succeeded in reaching the most vulnerable and where progress remains to be made. Investing in understanding who the poor children are, and what the nature of their poverty is, will inform policies and programming to sustainably alleviate poverty on the path towards generating human capital development and economic growth.

Cambodia has ratified both the CRC and committed to achieving the SDGs by 2030. The SDGs are a set of goals that aim to transform the world while leaving no one behind. The post-2015 development agenda as defined by the SDGs broadly aims to eradicate poverty, reduce inequalities and extend the benefits of sustainable economic development to all, particularly the poorest and most vulnerable populations, including children. There are 17 SDGs elaborated into 169 targets and 230 indicators. One of the main objectives of this study is to set the baseline figure for child poverty as of 2015 in order to track progress in Target 1.2 of the SDG 1 (Figure 1) over the next 15 years, with the ultimate aim of reducing it by at least half. This study focuses on child poverty alone, where a child is defined as an individual aged 0 to 17 years.

Figure 1: Subtargets of Sustainable Development Goal 1

Goal 1. End poverty in all its forms everywhere

Target 1.1: By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than US$1.25 a day

Target 1.2: By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions

Indicators:

1.2.1: Proportion of population living below the national poverty line, by sex and age

1.2.2: Proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions

As summarized in Table 1, the first objective of Target 1.2.1 is to reduce the number of children living below the national poverty line in Cambodia from 16 per cent to 8 per cent. Using 2014 CSES data to calculate the rate of child poverty, this study shows that, taking the observation year (the year where SDGs are officially published) as 2015, 16 per cent of Cambodian children are living under the national monetary poverty line.

Using 2014 CDHS data to measure multidimensional poverty in this study, 48.7 per cent of children aged 0-17 years in Cambodia are considered multidimensionally poor, meaning they are deprived in at least three dimensions of their well-being.[1] Achieving SDG 1.2.2 would mean that effort is being made to progressively reduce this proportion of multidimensionally poor children by at least half to 24.4 per cent by the year 2030. Over the next 15 years, progress in the multidimensional poverty rate should be monitored to ensure that advancement is being made in the right direction.

Table 1: Baseline and SDG Target 1.1 and 1.2 for children in Cambodia

SDG	Category	SDG indicator	Poverty line	2015	2030
				Poverty rate	
				Baseline	Target
1.2.1	Monetary poverty (national definition)	% of children living below the national poverty line	National Cambodia poverty line = KHR 4,984/day	16.0%	8.0%
1.2.2	Multidimensional poverty (national definition)	% of children who are multidimensionally deprived according to national definitions	Deprivation in at least 3 dimensions of child well-being	48.7%	24.4%

Results

Monetary poverty analysis

Using CSES 2014 data and looking at children aged 0-17 years, 16 per cent of children in Cambodia live below the nationally defined poverty line. The mean proportionate poverty gap in the child population indicates poverty intensity. It suggests that, on average, individual poor children fall below the monetary poverty line at a proportion of 0.03 of the poverty line.

At the zone level, 18.7 per cent of children living in Plateau and Mountainous zones live below the poverty line. This is only slightly higher than the on average 15.6 per cent of children living in the Plains, Tonle Sap Lake, and Coastal zones who live below the poverty line. Children living in the Plains zone make up the largest share of the poor – 42.8 per cent of poor children live in Plains, followed by 34.4 per cent in the Tonle Sap Lake zone, 15.7 per cent in Plateau and Mountainous zones, and 7.2 per cent living in the Coastal zone.

1 It was decided together with UNICEF and the National Institute of Statistics that a child will be considered to be multidimensionally poor if he/she is deprived in at least three dimensions of his/her well-being. In Chapter 4, the percentage of poor children for different thresholds of deprivations is shown.

Male and female children do not show strong differences between their poverty headcount and rank equally in terms of overall poverty severity. In terms of age group corresponding to those used in the multidimensional child poverty analysis, the youngest children are the worst off in terms of overall poverty. Of children aged 0-4 years, 17.0 per cent live under the poverty line, making up 30.9 per cent of the total poor children. This is followed closely by 16.2 per cent of children aged 5-14 living in monetary poverty, making up 53.6 per cent of the total poor, and 13.9 per cent of children aged 15-17 making up 15.5 per cent of the share of child poverty.

Multidimensional poverty analysis

The multidimensional poverty analysis using the MODA approach provides both broad and specific insights into the situation of children in Cambodia. The study therefore goes beyond measuring whether children have access to the financial resources necessary to access essential goods and services – as the monetary poverty analysis revealed, 16.0 per cent of children do not. The multidimensional poverty study measures whether children have actual access to essential goods and services, irrespective of their financial resources, and whether all their needs are met and rights are fulfilled simultaneously. The study not only reveals the dimensions of well-being children are deprived of, but also how these deprivations might be interrelated (overlap), and how to identify the deprived children. The analysis focuses on results by age group – 0-4 years (0-59 months), 5-14 years and 15-17 years – to be sensitive to the heterogeneous needs of children over their life course. The main results that stood out for children of all age groups during the study are summarized in this section.

Single sector analysis by each age group

Children aged 0-4 years

The primary areas of concern for children aged 0-4 in Cambodia are in the ECD and nutrition dimensions. Eight of 10 children do not attend an early childhood education or preschool programme, whereas 54.8 per cent of children are not being fed according to appropriate infant and young child feeding practices.

Children aged 5-14 years

Around half of the children aged 5-14 in Cambodia do not have access to improved toilet facilities, while 47 per cent are living in overcrowded households with more than four people per sleeping room. Additionally, primary school attainment needs attention, with 44.7 per cent of children beyond primary school age (12-14 years) not completing the six grades of primary school education.

Children aged 15-17 years

Deprivation headcount rates for children aged 15-17 in Cambodia are the highest in the education and housing dimensions. Close to 60 per cent of children in this age group are two or more years behind at school, while approximately 43 per cent of 15-year-olds are not attending school at all. Moreover, more than 4 of 10 children are living in overcrowded households with more than four people per sleeping room.

Children in Cambodia suffer from multidimensional poverty

The majority of all children in Cambodia suffer from multiple deprivations. Of those aged 0-17, 71.8 per cent suffer from at least two deprivations, while 48.7 per cent suffer from at least three. There is thus the need to concentrate on the most vulnerable children, especially those simultaneously deprived in several dimensions, because facing numerous deprivations at a time during childhood and even adolescence can have irreversible effects on the productivity and social inclusion of those children. Alleviating the intensity and severity of deprivation among these children today will contribute enormously towards the economic growth and overall productivity level of the country for a better and more prosperous Cambodia.

Children aged 0-4 years

In this group, 57 per cent are multidimensionally poor, facing on average 3.9 deprivations of a total of six dimensions. The combination of nutrition, child development and housing shows the highest overlap, with 18 per cent of children aged 0-4 deprived in all three areas.

Children aged 5-14 years

Around 44 per cent of children in this age group are multidimensionally poor, facing on average 3.6 out of five deprivations. One in 10 children is deprived in the education, water and housing dimensions at the same time.

Children aged 15-17 years

Half of the children in this age group are multidimensionally poor, experiencing on average 3.7 deprivations out of five dimensions. The combination of education, sanitation and housing has the largest overlap (32 per cent) of all possible combinations of three dimensions for children aged 15-17.

Profile of multidimensionally poor children

The main characteristics of multidimensionally poor children in Cambodia have been investigated to help design appropriate interventions to effectively target the most vulnerable groups. Striking disparities between deprivation rates are observed based on geographical location. Children from rural areas are worse off than those in urban areas, a concerning phenomenon considering nearly 90 per cent of Cambodia's population is located in rural areas. Although fewer children (lower headcount) are considered multidimensionally poor in urban areas, the severity of their poverty (the number of deprivations they experience) is not vastly different to that of children in rural areas. Children living in the north-east of Cambodia, including in the Plateau and Mountainous zones, experience higher deprivation rates than other regions/zones. No significant difference by gender and disability status is observed for children of all ages in terms of multidimensional poverty. Furthermore, higher education levels of the mother and a mother's working status were associated with considerable increase in the well-being of the child. A considerable decrease in deprivation for children is observed when the mother achieved secondary or higher education, while children with continuously working and

paid mothers are significantly less likely to be deprived. Promoting at least secondary education for everyone in Cambodia would help break the intergenerational transmission of poverty.

In addition, children younger than 5 years without a birth certificate or registration are doing worse than those with these documents. Moreover, children this age living in a household where there has been an instance of under-five mortality are more likely to be deprived in all dimensions except sanitation, compared to children living in households without such an incident.

Stunting is a well-established risk marker of multidimensional poverty

Stunting is a major issue in Cambodia. Nationally, nearly 32 per cent of children aged 0-4 are stunted, with high levels present across all geographic regions. Stunted children face higher deprivation rates than non-stunted children in all indicators and dimensions analyzed. They are more likely to experience multiple deprivations at a time and a higher rate of overlapping deprivations. In Cambodia, 55 per cent of non-stunted children aged 0-4 are multidimensionally poor compared to 72.2 per cent of stunted children. Reducing stunting will rely on more than just nutrition-focused interventions; combined and simultaneous activities in nutrition, sanitation, water and housing dimensions, coupled with sensitivity to urban-rural differences, are needed to reduce the number of deprivations stunted children experience.

Policy recommendations

Reducing child poverty in all its forms

This research considers both monetary and multidimensional aspects of child poverty. Building an understanding of the nature of child poverty and children's deprivations is essential to addressing the needs of children through suitable programmes and policies. Where the majority of historical methods of poverty analysis have focused on a household's or individual's monetary well-being, income, or expenditures, these measures are less appropriate for measuring child poverty or well-being. As children are not typically decision-makers or primary income earners in a household, their access to household-level income does not always lead to proportional improvements in their well-being. In addition, children's needs are unique and specific at different stages of childhood development, and these needs are not necessarily met solely by increased access to income. Multidimensional poverty analyses help to complement existing studies on monetary-based poverty, and therefore the recommendation is for the Cambodian Government to carry out both monetary and multidimensional child poverty assessments on a regular basis.

Investing in the most relevant dimensions of a child's well-being in Cambodia

- Enhancing the provision of improved water supply and sanitation facilities, especially in rural areas, followed by the northeastern region and the Plateau and Mountainous zone
- Investing in housing infrastructure, as overcrowding remains problematic for many children in Cambodia
- Improving access to early childhood education or preschool programmes in rural areas for children under 5 years old and improving the sophistication of early childhood education programmes as an investment in higher-quality integrated early childhood education systems

- Encouraging early initiation of nutrition-focused and nutrition-sensitive interventions to improve nutrition and physical development indicators for the youngest children, at the earliest possible stage of life. Interventions should target both the mother and the child and include those focused exclusively on nutrition indicators, such as improving exclusive breastfeeding rates in urban areas and educating caretakers and improving their access to goods and services that improve meal frequency and food diversity for infants and young children, as well as interventions that are nutrition-sensitive, such as baby-WASH improvement activities
- Implementing school programmes to promote timely enrolment and reduce early drop-outs, support gender equality and improve the quality of education to improve both access to schools and the experience of learning, allowing children to advance to higher levels of education at the correct rate

Improving the effectiveness of policies by adopting a multisectoral approach

The majority of children in Cambodia experience multiple deprivations at a time. Tackling various issues through combined policies will minimize the programme costs (administration, targeting, etc.) and reduce child poverty more efficiently. In Cambodia, coordinated policy packages need to be installed. An example of potential combinations of deprivations:

- Children aged 0-4: Nutrition, ECD, sanitation and housing
- Children aged 5-14: Education, water and housing
- Children aged 15-17: Education, sanitation and housing

Targeting the most vulnerable children in Cambodia

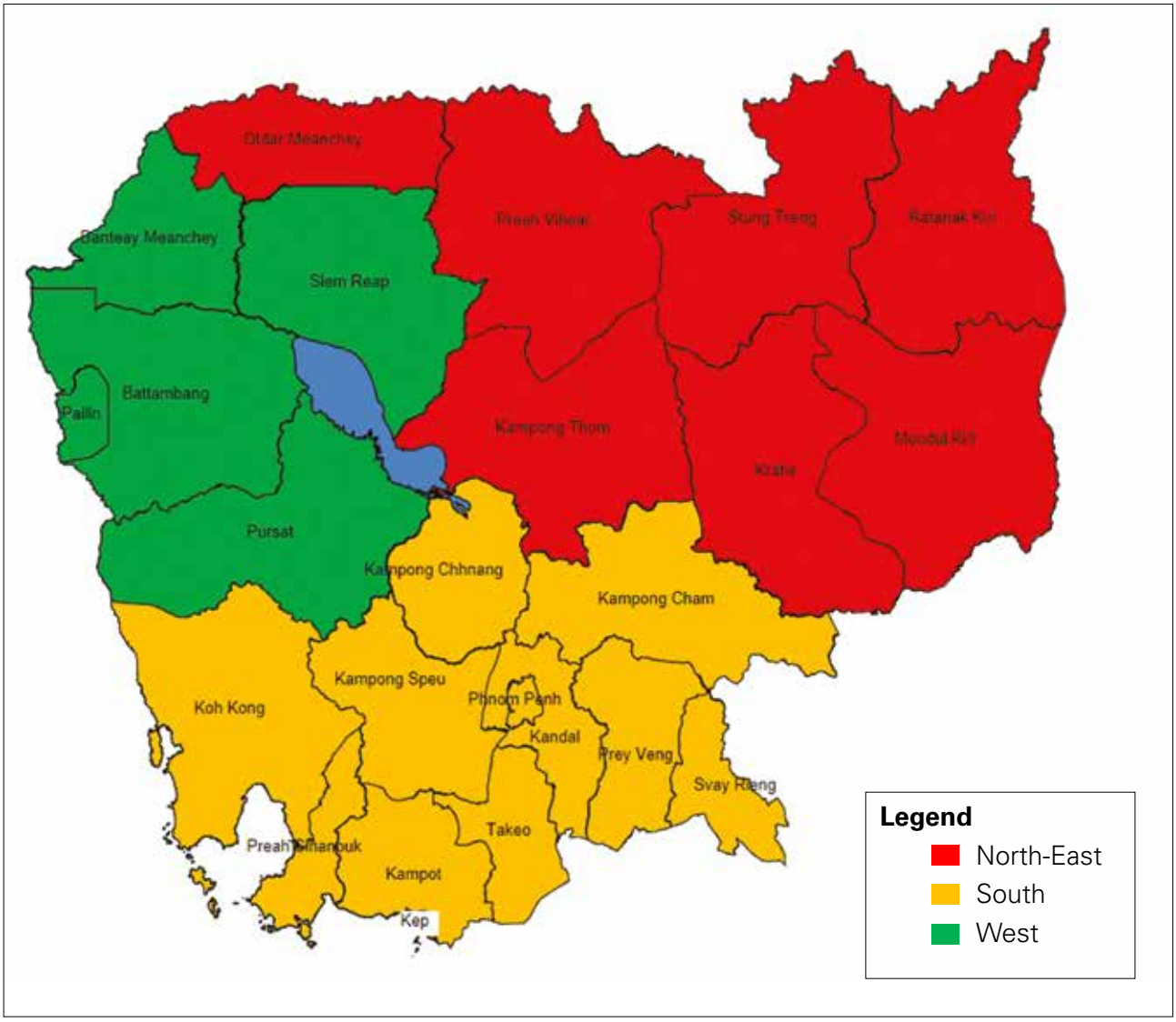
This study also helps identify the poorest among all children to guide policies towards those most in need. Implementation of social protection systems demands a focus and prioritization of the most vulnerable children in Cambodia. Universal programmes need to be installed to tackle extreme poverty.

- Appropriate attention is needed for children living in rural areas, northeastern Cambodia and the Plateau and Mountainous zone, since they are doing worst in all dimensions of non-monetary poverty and are most likely to experience multidimensional deprivation.
- Children living with lower-educated parents need extra stimulation and support to mitigate the higher chance of falling into poverty. Education is a vital aspect to breaking the intergenerational transmission of poverty.
- Lack of birth registration is a key issue in rural Cambodia, as many families are not aware of the importance of getting a birth certificate for their children. Policies need to implement programmes highlighting the value of a birth certificate and facilitating birth registration.
- The existing focus on supporting stunted children needs to be further strengthened given that non-stunted children are better off. Considering the joint effects of the probability of deprivation in all dimensions, reducing deprivation in nutrition and sanitation will have the largest impact on reducing the probability of stunting in rural areas. In urban areas, the highest impact on reducing the probability of stunting would be through reducing the likelihood of being deprived in nutrition and housing.

Definitions of Geographical Terms

This study refers to three geographical categories of Cambodia: 'area'; 'region'; and 'zone'. 'Area' refers to the urban or rural residence of survey respondents. 'Region' categorizes the location of survey respondents into the northeastern, western and southern parts of Cambodia, based on the province in which they live. The map below, provided by the UNICEF Cambodia nutrition unit, explains how these regions are defined for children aged 0-59 months only.

Map of Cambodia's provinces and three geographical regions



'Zone' refers to the four geographical regions defined by the National Institute of Statistics: 'plains', 'Tonle Sap Lake', 'coastal' and 'plateau and mountainous'. The table below describes how the province of residence of survey respondents were categorized into these four zones.

Definition of Cambodia geographical zones, by province of residence

Zone	Province
Plains	Kampong Cham Tbong Khmum* Kandal Phnom Penh Prey Veng Svay Rieng Takeo
Tonle Sap Lake	Banteay Meanchey Battambang Kampong Chhnang Kampong Thom Pursat Siem Reap Otdar Meanchey Pailin
Coastal	Kampot Koh Kong Preah Sihanouk Kep
Plateau and Mountainous	Kampong Speu Kratie Mondul Kiri Preah Vihear Ratanak Kiri Stung Treng

Source: National Institute of Statistics-agriculture census 2013

* Note: This province is separated from Kampong Cham Province and is designated as a new province in the TS-agriculture census of 2013, but is not represented separately in the CDHS 2014 dataset.

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1

Introduction

1. Introduction

Cambodia has ratified the CRC and consistently stood by its commitment to realize the rights of Cambodian children's rights through effective policymaking (United Nations). Cambodia thus recognizes and commits to ensuring the rights of its child population to survival, development, protection and participation. In 2015, Cambodia became part of an international commitment to eradicate child poverty as part of the first goal of the SDGs, which aims to sustainably eradicate poverty and hunger and achieve food security, appropriate nutrition and physical development, alongside environmental sustainability.

Child poverty has been recognized as a field of study that is unique from traditional concepts of general or adult poverty, and that is decidedly multidimensional in nature. Prior approaches to define poverty for children have included the child rights-based approach (United Nations), and the capability approach (Sen). Where most of the traditional methods of poverty analysis have focused on a household's or individual's monetary well-being, income, or expenditures (Foster, Greer and Thorbecke; Ravallion), these measures are less appropriate for measuring child poverty or well-being. Children are not typically decision-makers in a household, and their access to household-level income may not directly lead to proportional improvements in their well-being. In addition, children's needs are unique and multidimensional at different stages of childhood development, and these needs are not necessarily met solely by increased access to income. Multidimensional poverty analyses complement existing studies on income-based poverty and move beyond sector-based approaches by capturing the simultaneous experience of multiple deprivations. Multidimensional measures for understanding child poverty have been widely researched in recent years (Roelen and Gassmann; Alkire and Roche; Alkire and Foster; Gordon, Nandy and Pantazis; de Neubourg, de Milliano and Plavgo; de Neubourg, Chai and de Milliano).

UNICEF's MODA methodology is one such method for analyzing multidimensional child poverty, which builds on existing and validated measures of child poverty (de Neubourg, Chai and de Milliano). The tool aims to holistically identify and quantify the nature of children's deprivations – defined as the unfulfillment of the child's rights according to the CRC – to contribute to the design of services and interventions that more accurately meet the needs of children. It allows for the measurement of life-cycle sensitive deprivations that children may experience at the individual (child) level rather than at the household level as is common in the majority of other poverty studies for Cambodia.

The study further seeks to provide baseline measures for SDG 1.1[2] – "By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day", and SDG 1.2 – "By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions".[3] The desired outcome of

2 At this stage, the outcome measure of the child poverty analysis for children in Cambodia for SDG 1.1 is limited to subtarget SDG 1.2.1, which measures poor children as the "proportion of population living below the national poverty line" (United Nations), rather than SDG 1.1.1, which measures the proportion of populations living below the international poverty line, defined as those living below US$1.25 a day at the time of the declaration.

3 (United Nations).

the study is therefore to provide a baseline for SDG indicator monitoring and mobilize the resources necessary to support Cambodia in becoming a global leader in poverty reduction and progress on children by achieving the SDG targets by 2030.

The Social Policy Research Institute, Economic Policy Research Institute and UNICEF have been supporting the Cambodian Ministry of Planning, National Institute of Statistics and General Department of Planning in a Ministry of Planning led-study of monetary and multidimensional poverty among Cambodian children. Using 2014 CSES[4] and CDHS data[5], the study incorporates both a monetary poverty analysis for children under the national poverty line and a comprehensive, multidimensional deprivation analysis using the MODA method developed by UNICEF Innocenti Office of Research.[6] The study aims to provide a comprehensive understanding of the state of children's poverty in Cambodia so as to develop strategies and programming to better target children's deprivations. This would support long-term economic and human capital development in Cambodia with sensitivity to equity, cultural values and context-specific specificities and vulnerabilities.

Approaching the study of child poverty in Cambodia through both the multidimensional and monetary perspective supports a more precise measurement and a better understanding of the situation of children in Cambodia. Where the monetary poverty measurement focuses on assessing the average financial means children's households have available, multidimensional poverty measurement determines whether children's basic needs are met independent of income. The separate analysis of these two concepts of poverty allow for a more complete picture of the reality of Cambodian children, and for the identification of the most vulnerable subgroups of children that require specialized policy and programming depending on the nature and intensity of their poverty experience.

4 (National Institute of Statistics).
5 (National Institute of Statistics, Directorate General for Health and ICF International).
6 (de Neubourg, Chai and de Milliano, Step-By-Step Guidelines to the Multiple Overlapping Deprivation Analysis (MODA).).

2

Methodology

2. Methodology

This study analyzes child poverty in Cambodia through two main concepts of poverty: monetary poverty and multidimensional poverty. The distinction between the two concepts of poverty determines two different approaches to measurement explained in this chapter. Monetary child poverty is analyzed using the CSES 2014, while multidimensional child poverty rates were estimated using CDHS 2014 and UNICEF's MODA methodology. Comparability between the results of either analysis is limited because the samples of either survey are not the same and because a standard requirement of the MODA methodology is the application of a single dataset in a comparative and overlap analysis of monetary and multidimensional poverty in a child population.

2.1 Monetary Poverty Analysis

2.1.1 Approach: Foster-Greer-Thorbecke

The monetary poverty analysis uses the Foster-Greer-Thorbecke (FGT) class of poverty measures to calculate and decompose the poverty headcount rate, poverty gap and poverty severity index for children in Cambodia.

- **Poverty headcount index** (FGT0 or P0) measures the proportion of the population that lives below a defined poverty line.
- **Poverty gap index** (FGT1 or P1) estimates the average sum distances of poor individuals from the poverty line as a proportion of the poverty line. This measure is a first indication of the intensity of poverty and suggests what may be the minimum cost necessary for eradicating poverty by bringing the poor up to the poverty line, assuming perfectly targeted transfers.
- **Poverty severity index** (FGT2 or P2) is the summed average of the square of poverty gaps, relative to the poverty line. By squaring the poverty gaps, this measure places more weight on the poorest individuals and therefore considers inequalities among the poor, although the resulting index does not provide an intuitive interpretation.

2.1.2 Selection of dataset and poverty lines

The rate of monetary poverty among children in Cambodia was measured using CSES 2014 data and the national poverty lines for 2014, as provided by the Ministry of Planning (Table 2). The analysis is done using a national sample of all children aged 0-17 years in the CSES 2014 dataset. The national poverty rate is calculated by adding the poverty headcount rates in Phnom Penh, other urban areas and other rural areas according to their respective poverty lines, weighted by the share of the population in each of these regions.

Table 2: Monthly poverty lines in Cambodian riels, using 2009 prices, adjusted for 2014

Phnom Penh	Other urban areas	Other rural areas	National
240,891	165,192	132,966	149,524

2.2 Multidimensional Poverty Analysis

2.2.1 Multiple Overlapping Deprivation Analysis (MODA)

MODA provides a comprehensive approach to the multidimensional aspects of (child) poverty and deprivation. It was developed by the UNICEF Office of Research, with support from the Division of Policy and Strategy, to facilitate the analysis of inequities and to provide instruments to identify deprived children. Building on earlier studies and contributions,[7] it encompasses a large set of tools used in multidimensional poverty and deprivation analyses, ranging from deprivation headcounts in single dimensions via multiple overlap analysis to multidimensional deprivation ratios (in the literature often referred to as 'indices') and their decomposition.

MODA adopts a holistic definition of child well-being, concentrating on access to various goods and services crucial to survival and development. Along with monetary/consumption-based approaches, it recognizes that a child's experience of deprivations is multifaceted and interrelated, and that such multiple, overlapping deprivations are more likely to occur, and with greater adverse effects, in socio-economically disadvantaged groups. The "whole-child approach" emphasizes that children's well-being cannot be compartmentalized into sectors (e.g., health, nutrition and education) and that the multiple aspects of children's lives needs to be placed simultaneously at the centre of any deprivation analysis.

MODA has four main characteristics:

1. MODA concentrates on the child as the unit of analysis, rather than the household. Children experience deprivations and poverty differently from adults, especially with regards to developmental needs. Not fulfilling these child-specific needs can lead to lasting effects in the long term (UNICEF, 2000).
2. MODA acknowledges that children's needs are not homogenous across their childhood. For this reason, MODA adopts a life-cycle approach analyzing separate age groups to reflect the different needs of early childhood, primary childhood and adolescence.
3. MODA enhances knowledge of compartmentalized or sector-by-sector approaches (e.g., nutrition, health and education) with an overlapping deprivation analysis. This analysis indicates which of the multiple facets of child poverty are experienced simultaneously and gives insight into the various levels of severity of deprivation.
4. MODA's whole-child oriented view supports a focus on equity because it allows interventions to concentrate on highly deprived groups in society and to create profiles that assist in determining their geographical and social position. The deprivation overlaps and profiles reveal specific characteristics of deprived children and can help point towards mechanisms for effective policy design.

MODA identifies deprived children from a multidimensional perspective. The national MODA methodology is designed to be used in a specific country setting using recent and high-quality survey

7 UNICEF's Global Study (e.g., Gordon et al, 2003), the OPHI's Multidimensional Poverty Index (Alkire and Foster, 2007; Alkire and Santos, 2010), and other research carried out in the field of multidimensional poverty. For further references and a comprehensive literature survey on multidimensional poverty and deprivation analysis, see De Neubourg, C., de Miliano, M., Plavgo, I. (2014), Lost in Dimensions, Office of Research Working Paper-forthcoming, UNICEF Office of Research, Florence.

data and making country-specific choices on age groups, dimensions, indicators and thresholds. Its aim is to: i) capture national values and objectives concerning child development; ii) explore the profile of deprived children, to locate them both geographically and socially;[8] iii) improve understanding of how the different deprivations by sector overlap to inform which deprivations may need to be addressed simultaneously; iv) inform equity-based public policy responses to child deprivation; and v) indicate deprivation coincidences that need further theoretical and empirical elaboration.

2.2.2 Selection of dataset

The MODA analysis for children in Cambodia uses the 2014 CDHS dataset as it is the most recent dataset with nationally representative, child-level data that can be used in a multidimensional poverty analysis for children. In comparison with the CSES 2014 dataset, CDHS has the advantage of including several variables crucial to more accurately representing children's well-being, including those relating to the nutrition and health status of the youngest children. Although using different datasets for the monetary and multidimensional analysis make it not possible to study the overlap or lack of overlap between children who are monetarily and multidimensionally poor, the separate analyses still yield meaningful results with added value.

2.2.3 Analysis parameters

The analysis of multiple and overlapping deprivations is based on indicators, dimensions, deprivation thresholds and age groups, which were selected following data-driven feasibility assessments, discourse with national partners, and consideration of internationally agreed definitions of the essential rights and needs of the child. The final selection reflects the opinions of the key country stakeholders, national standards, research interests and data availability.

Indicators are measurement tools that, independently or as a set, report on the well-being of a child for each of the selected dimensions. In each dimension, a combination of indicators with their respective thresholds determines the level of deprivation of a child in that dimension. By applying the union approach, children are determined to be deprived in a dimension if they are deprived in at least one of the dimensions' indicators.

Examples of indicators include adequate feeding practices as part of a nutrition dimension or school attainment as part of the education dimension. The choice of indicators should be conceptually sound with the definition of the dimension. These choices tend to be driven by data availability and data quality. MODA exercises are mostly data-driven unless one has the time and resources to design a survey specifically to produce a child deprivation analysis. The choice of indicators is subject to various considerations – see Annex I for the seven main technical criteria used to select indicators.

Some dimensions may not apply to the entire child population for reasons including empirical consistency and data constraints. For instance, the education dimension only covers school-age children (ages 5-17), while the sanitation dimension covers children of all age groups. In fact, the water,

8 Profiling is the basis for the equity analysis, showing differences between genders, geographical regions, urban and rural areas, parents' socio-economic situation, wealth quintiles and other variables.

sanitation and housing dimensions are based on household-unit data and therefore apply to all age groups.

Children in a particular age group are assessed on the basis of a deprivation threshold in a set of indicators, which make up a set of dimensions. In each dimension, a combination of indicators and respective thresholds determines the level of deprivation of the child in that dimension. By the union approach, children are determined to be deprived in a dimension if they are deprived in at least one of the dimension's indicators. For example, a child aged 0-4 years has been considered deprived in the sanitation dimension if the child is deprived in the handwashing indicator or in the toilet type indicator. In this case, the depth of deprivation has not been taken into account but all indicators have been chosen on the basis that they all partly explain the realization (or not) of a child's rights. Since each of the selected dimensions reflects a basic right, they have been considered with the same importance (equal weight) in the analysis.

Table 3 lists the indicators and dimensions used in carrying out the MODA analysis for children in Cambodia. Differences between the dimensions used are based on the life-cycle approach, which states that a child has different needs at different age. The choice of dimensions is also driven by the data available in the CDHS 2014. Additional information regarding deprivation thresholds and how the choices of indicators were made is detailed in Table 4.

It is important to note that the definition of vulnerable children in Cambodia, as analyzed by the indicators and dimensions making up the analysis parameters, is highly limited by the boundaries of the methodology and data availability. While other areas of children's well-being were considered as priorities during stakeholder discussions, they could not be included in the analysis due largely to data limitations. These areas include the dimensions on child protection, touching upon children involved in child labour and exposed to violence (domestic or in school). While the issues of child protection is not made explicitly visible in this analysis, the study makes several recommendations to ensure that future studies on child poverty in Cambodia draw attention to the number of children who experience protection violations.

Table 3: Selection of analysis parameters: Age groups, dimensions, and indicators*

Dimension	Indicator	0-4 years	5-14 years	15-17 years
Nutrition	Infant and young child feeding: Exclusive breastfeeding Infant and young child feeding: Minimum acceptable diet Wasting Underweight	x (0-5 months) x (6-23 months) x (0-59 months) x (0-59 months)		
Health	Skilled birth attendance Vaccinations (DPT, Hep B, Polio, etc.)	x x		
ECD	Early childhood education attendance Books or toys (Support for learning)	x x		
Education	Basic school attendance Grade-for-age Primary school attainment		x (6+) x (8+) x (12+)	x x x
Water	Drinking water source	x	x	x
Sanitation	Toilet type Handwashing	x x	x x	x x
Housing	Overcrowding Floor, roof, walls Indoor pollution from solid cooking fuel	x x x	x x x	x x x
Information	Media exposure		x	x

* 'x' marks the age group for whom the indicator or dimension is applicable

Table 4: Dimensions, indicators, deprivation thresholds and justifications for the multidimensional poverty analysis of children aged 0-17 in Cambodia

Dimension	Indicator	Deprivation threshold	Justification
Nutrition	Exclusive breastfeeding	0-6 months: Child not exclusively breastfed	Infant and young child feeding practices directly affect the nutritional status of children under 2 years of age and, ultimately, impact child survival (WHO). Exclusive breastfeeding, minimum meal frequency and minimum dietary diversity are, among others, considered core indicators (WHO, 2008). See also CRC Article 24.
	Infant and young child feeding: Minimum acceptable diet	6-23 months: Child not meeting standards for timely introduction of complementary feeding, minimum meal frequency, and/or minimum meal diversity	
	Wasting	0-59 months: Child's weight-for-height Z-score is below minus two standard deviations (-2 SD) from the median of the WHO reference population, considered thin (wasted) and acutely malnourished	The weight-for-height index measures body mass in relation to body height or length and describes current nutritional status. Low weight for height or wasting indicates a recent and severe process of weight loss, often associated with acute starvation or severe disease (UN MDG, 2003). Wasting represents the failure to receive adequate nutrition in the period immediately preceding the survey and may be the result of inadequate food intake or a recent episode of illness causing loss of weight and the onset of malnutrition. See also CRC Article 24.
	Underweight	0-59 months: Child's weight-for-age Z-score is below minus two standard deviations (-2 SD) from the median of the WHO reference population, considered underweight	Weight-for-age is a composite index of height-for-age and weight-for-height. It considers both chronic and acute malnutrition. Underweight remains the leading cause of disease burden among hundreds of millions of the world's poorest people and a major cause of death, especially among young children. All ages are at risk, but underweight is most prevalent among children under 5 years of age (WHO). See also CRC Article 24.
Health	Skilled birth attendance	0-59 months: Youngest child's birth assisted by nobody or by an unskilled birth attendant (traditional birth attendant; community health worker; relative or friend; no one; other)	Skilled personnel should be capable of handling normal deliveries safely and recognize the onset of complications beyond their capacities, and to refer the mother for emergency care when necessary (UNICEF). Skilled attendance is often used as a proxy for access to adequate health care. It can be delivered by doctors, midwifes, nurses, health personnel. Therefore, other birth attendants are considered as unskilled (WHO 2004). See CRC Article 24.

Dimension	Indicator	Deprivation threshold	Justification
ECD	Vaccinations (DPT, Hep B, Polio, etc.)	0-59 months: Child has not received all basic vaccinations by the recommended date	Coverage levels for the diphtheria and tetanus toxoid with pertussis vaccine (DTP) are considered to be a good indicator of health system performance (UNICEF & WHO 2011). See also CRC Article 24.
	Early childhood education attendance	36-59 months: Child is not attending an early childhood education or preschool programme	Efforts to improve ECD are an investment, returns can be on average four to five times the amount invested, and in some cases, much higher (UNICEF). Brain development is most rapid in the early years of life. When the quality of stimulation, support and nurturance is deficient, child development is seriously affected. Children who receive assistance in their early years achieve more success at school. As adults they have higher employment and earnings, better health, and lower levels of welfare dependence and crime rates than those who do not have these early opportunities (UNICEF). See also CRC Article 28.
	Books or toys (Support for learning)	0-59 months: Child does not have access to any books or homemade or manufactured toys	Play and early exposure to learning materials is essential to development because it contributes to the cognitive, physical, social and emotional well-being of children and youth. Children will play longer when suitable play objects are available and stand to gain the greatest benefits that play has to offer (Goldstein, 2012). See CRC Articles 24, 28.
Education	Basic school attendance	6-15 years: Child of basic school-age is not attending school	To build human capital and increase long-term child well-being, build skills to meet the demands of the labour market, and fulfill their right to education, every child of basic school-age should be attending school. School attendance is used as a measure of access to education. See also CRC Article 28.
	Grade-for-age	8-17 years: Grade-for-age: deprived if at school but two or more years behind	Children who are behind in school may face limited long-term opportunities in education and the labour market. Grade-for-age is a measure of achievement and may also be among several indicators used as a proxy for measuring educational quality and uptake. See also CRC Article 28.

Dimension	Indicator	Deprivation threshold	Justification
	Primary school attainment	12-17 years: Child is beyond primary school age and has no or incomplete primary education (completed less than six grades)	"State Parties recognize the right of a child to education, and with a view to achieving this right progressively and on the basis of equal opportunity, they shall, in particular (a) make primary education compulsory and available free to all" (CRC, 1989). Birth effect for the first year after primary school age is applied, identifying children who are at the same age as the official entrance age for lower secondary education as non-deprived if they are still at school as they may be in their final year of primary school. See also CRC Article 28.
Water	Drinking water source and treatment	0-17 years: Household main source of drinking water is unimproved (WHO)	Unimproved water sources contribute to the spread of disease and illness and are especially dangerous for consumption in children's earliest years of life. Improved water sources include household connections, public standpipes, boreholes, protected dug wells, protected springs and rainwater collections. Unimproved water sources are unprotected wells, unprotected springs, vendor-provided water, bottled water (unless water for other uses is available from an improved water source) and tanker truck-provided water (WHO, 2008). See CRC Articles 27, 24.
	Handwashing	0-17 years: Soap and water are not observed at an observed place of handwashing, or there is no observed place of handwashing	The simple act of handwashing with soap is one of the most effective ways to save children's lives. Washing hands before eating and after defecation drastically reduces the spread of diarrhoeal disease and has far-reaching effects on the health and welfare of children and communities (UNICEF). See CRC Articles 27, 24.
Sanitation	Toilet type	0-17 years: Household usually uses unimproved toilet facility	Using improved sanitation contains the spread of disease and other safety hazards for children. Improved sanitation includes connection to public sewers, connection to sceptic systems, pour-flush latrines, simple pit latrines and ventilated improved pit latrines. Not considered as improved sanitation are: Service or bucket latrines (where excreta are manually removed), public latrines and open latrines (WHO, 2008). See CRC Articles 27, 24.

Dimension	Indicator	Deprivation threshold	Justification
Housing	Overcrowding	0-17 years: Household has on average more than four people per sleeping room. For Cambodia, the UN-HABITAT threshold is adjusted to "more than four" people per room, since the available indicator in the CDHS data refers to sleeping rooms only	Crowding, or housing density, is a key indicator measuring the adequacy of the basic human need for shelter, defined as more than three persons per room, although locally accepted standards for sufficient living area vary greatly. Living with four or more people in one room increases the risk of loss of dignity, infectious diseases and domestic violence. Children's development may suffer through being unable to do homework in a quiet space, poor sleep, illness, abuse and violence (UN-HABITAT, 2007). Overcrowded housing increases the opportunities for violence and other protection violations against children. A wide body of literature links household size and overcrowding as push factors for family separation, institutionalization, and neglect among other protection violations. See CRC Articles 27, 19, 37.
	Floor, roof, walls	0-17 years: Roof, floor or exterior walls made of natural materials not considered rudimentary or permanent	Both floor and roof can be considered as crucial in the housing domain since they serve as climate protection function: Home is a shelter to protect from weather extremes such as heat and cold, but also wind and rain. Generally, a housing structure is considered durable when certain building materials are used for roof, walls and floor. The definition of housing considered as "durable" is that built on a non-hazardous location and having a structure permanent and adequate enough to protect its inhabitants from extremes of climate conditions (WHO 2010). See CRC Article 27.
	Indoor pollution from solid cooking fuel	0-17 years: Household uses solid cooking fuel and cooks inside the house. No indoor pollution if food cooked in a separate building or outdoors	Exposure to household air pollution increases the risk of several health diseases such as pneumonia, strokes, heart diseases and lung cancer, especially for children under 5 years old (UNICEF). Solid fuels include coal, lignite, charcoal, wood, straw, shrubs, grass, agricultural crop, animal dung. See CRC Article 24.

Dimension	Indicator	Deprivation threshold	Justification
Information	Media exposure	5-17 years: Child lives in household where no household member aged 15-49 in the household reads a newspaper, listens to the radio or watches TV at least once a week	State Parties recognize the important function performed by the mass media (CRC, 1989). Mass media has the potential to inform, educate, nurture, entertain and encourage children and young people, which is enhanced by its diversity (Jempson, n.d). See CRC Articles 13, 17.

2.2.4 Approach

This paper follows the MODA methodology as set out in the MODA guidelines (de Neubourg, et al., 2012) and uses similar stages of analysis. The study commences with a single deprivation analysis, measuring the headcount rates for indicators and dimensions. It follows with a multiple deprivation analysis containing (1) the distribution of the number of dimensional deprivations children experience, (2) the multidimensional deprivation ratios, and (3) the deprivation overlap analysis. These elements of the deprivation analysis are complemented by further analysis using multivariate techniques, giving more details to the characteristics of underlying deprivations.

For the multidimensional deprivation analysis, the number of dimensional deprivations are accumulated per child using implicit equal weighting. Since each of the dimensions represent particular aspects of children's rights, it is decided to give each dimension the same value as each of them are of essential importance. Children are identified as multidimensionally deprived if the number of deprivations they experience is higher or equal than the selected cut-off point. The cut-off point can in theory vary depending on the context of the study and the focus on more or less severely deprived children.

The number of deprivations experienced by each child can be used when calculating various child deprivation indices. The first is the multidimensional deprivation headcount (H) specifying the proportion of children multiply deprived with regards to a specified cut-off point. Since the headcount rate does not account for the depth of children's deprivation the average deprivation intensity (A) is used. This index can be presented as the average number of deprivations multidimensionally deprived children experience, or as the proportion of deprivations the multiply deprived hold out of the total possible number of deprivations. The last index used is the adjusted deprivation headcount (M0), applying the Alkire and Foster (2011) methodology in which the above-mentioned indices are combined to create one single deprivation measure, which simultaneously captures the incidence and depth of deprivation (M0 =H*A).

2.2.5 Analysis structure

For each age group, the following analyses have been carried out:

a) *Single deprivation analysis:* The percentage of children deprived in each dimension (and for each indicator) has been estimated from a single-sector perspective. It gives a first insight in which deprivations are particularly relevant for children of the three different age groups in Cambodia.

b) *Distribution of the number of dimensions children are deprived in:* The number of deprivations per child have been counted to give an overview of the distribution of all deprivations among the different age groups and according to different background characteristics (profiling variables). The deprivation count has also enabled analysis of the depth of multidimensional deprivation.

c) *Multidimensional deprivation overlaps:* The analysis has looked at the different deprivations that are usually experienced simultaneously. Combinations of deprivations have been highlighted and estimations of the number of children suffering from one to six deprivations at the same time has been given.

d) *Multidimensional deprivation indices:* Several multidimensional deprivation indices have been calculated to provide summary statistics: (i) the headcount ratio (H) to look at the incidence of multi-deprivation in the several dimensions; (ii) the average intensity (A) to look at the number of deprivations a deprived child experiences as a percentage of all possible deprivations; (iii) the adjusted deprivation headcount (M0) to capture both the incidence and depth of deprivation.

This paper captures only the most striking results of the analysis of the multiple overlapping deprivations among children in Cambodia. A deprivation profile of the children in the sample is also provided. All tabulations and figures for the full analysis are available in the annex.

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3

Results for All Children (aged 0-17 years)

3. Results for All Children (aged 0-17 years)

Monetary Child Poverty

Complementing the analysis of children's multidimensional poverty, a monetary poverty analysis of child poverty in Cambodia presents the results of another major contributor to children's well-being. As explained in Chapter 2.1, the monetary analysis of child poverty for Cambodia uses a different dataset and population sample from that of the multidimensional child poverty analysis. Since the CDHS 2014 survey used in the multidimensional study does not collect information on households' spending or income, monetary child poverty cannot be calculated from the same dataset. This monetary poverty analysis uses the 2014 CSES. This means that although results from this analysis are nationally representative and from the same year as the multidimensional poverty analysis, they are not directly comparable as they do not necessarily describe the same individual children. For example, it is not possible to analyze whether the same children who are considered to be multidimensionally poor in the MODA analysis will also be monetarily poor in the analysis detailed in this chapter.

Although analyzing the extent to which multidimensional poverty and monetary poverty overlap for children in Cambodia would assist in identifying the type of intervention that would most benefit targeted households, this is not possible here. Instead, this chapter serves to complement the study of children's multidimensional poverty in Cambodia to help provide a more complete picture of child poverty. Comparisons between the two surveys will be done on the level of geographic zones and area. The new poverty lines produced by the Ministry of Planning for 2014 are distinguished at the Phnom Penh, Other Urban and Other Rural levels.[9] Unless otherwise stated, headings and tables referring to poverty in this chapter will refer exclusively to monetary child poverty as calculated using the 2014 CSES.

Additional tables and figures can be found in Annex III.

3.1 Poverty Headcount, Gap and Severity at National and Sub-national Levels

For a review of the definitions of the FGT indices presenting the poverty headcount ratio, poverty gap and poverty severity indices, please see Chapter 2.1.1.

Table 5 shows the results of the monetary poverty analysis for Cambodian children at the national level. According to these preliminary figures, 16 per cent of children in Cambodia live below the nationally defined poverty line. The mean proportionate poverty gap in the child population indicates poverty intensity. It suggests that, on average, individual poor children fall below the monetary poverty line at a proportion of 0.03 of the poverty line. The poverty severity index, as a weighted sum of the poverty gaps weighted by the proportionate value of the poverty gaps, takes into account inequality among the poor children but has no immediate intuitive interpretation presented on its own. Table 6 shows the same calculations, decomposed by geographic zones.

9 See Chapter 2.1.2 for explanation of the per capita monthly consumption poverty lines.

Table 5: FGT indices of monetary poverty for children aged 0-17 in Cambodia, at the national level

FGT0	FGT1	FGT2
Poverty headcount ratio (Proportion of the poor)	Average normalized poverty gap (Poverty gap)	Average squared normalized poverty gap (Poverty severity)
16.0%	3.0	0.9

Geographic comparisons of monetary child poverty help identify priority geographic zones for targeting development programmes to poor areas. Table 6 shows that at the zone level, 18.7 per cent of children living in the Plateau and Mountainous zone live below the poverty line. This is only slightly higher than the on average 15.6 per cent of children living in the Plains, Tonle Sap Lake, and Coastal zones who live below the poverty line. Children living in the Plains zone make up the largest share of the poor – 42.8 per cent of poor children – followed by 34.4 per cent of poor children who live in the Tonle Sap Lake zone, 15.7 per cent in Plateau and Mountainous zone, and 7.2 per cent living in the Coastal zone.

Table 6: Overall monetary poverty for children aged 0-17 in Cambodia, by zone

Sub-national level	FGT0	FGT1	FGT2		
	Poverty headcount ratio (% proportion of the poor)	Poverty gap	Squared poverty gap (Poverty severity)	Distribution of the poor children across zones (% poverty 'share' of headcount index)	Distribution of the population (%)
Zone					
Plains	15.5	2.9	0.9	42.8	44.1
Tonle Sap Lake	15.7	3.0	0.9	34.4	35.1
Coastal	15.5	2.6	0.6	7.2	7.4
Plateau and Mountainous	18.7	3.7	1.1	15.7	13.4
Total	16.0	3.0	0.9	100.0	100.0

Figure 2: Headcount child poverty by zones

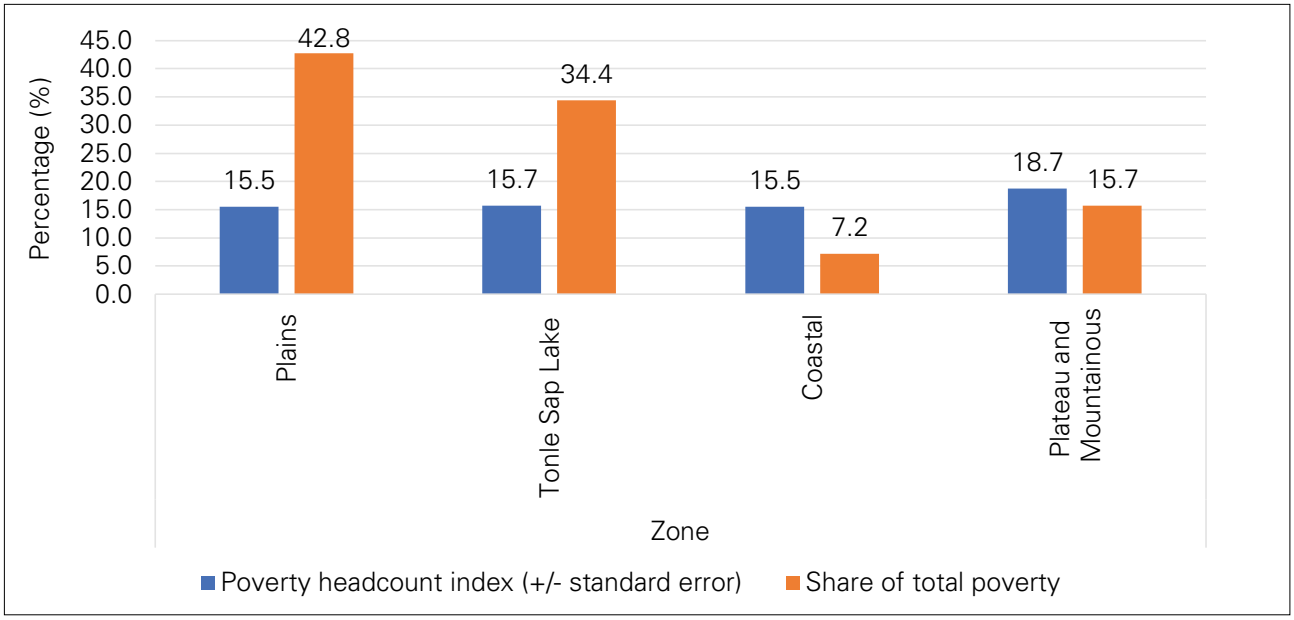


Table 7 presents the overall poverty indices for children aged 0-17 in Cambodia by sex and age group. Male and female children do not show strong differences between their poverty headcount and rank equally in terms of overall poverty severity (0.9). Similar to the results of the multidimensional poverty analysis for children aged 0-17, both monetary and multidimensional poverty appear to affect children equally regardless of gender. In terms of age group corresponding to those used in the multidimensional child poverty analysis, the youngest children are the worst off in terms of overall poverty. Of children aged 0-4 years, 17.0 per cent live under the poverty line, making up 30.9 per cent of the total poor children. This is followed closely by 16.2 per cent of children aged 5-14 living in monetary poverty, making up 53.6 per cent of the total poor, and 13.9 per cent of children aged 15-17, making up 15.5 per cent of the share of child poverty.

Table 8 presents information on the poverty measures by household composition characteristics for Cambodia in 2014. It clearly shows that the larger the household size, the more likely it is that the child in the household is poor. Furthermore, as the number of children in the household increases, the more likely it is that the child is poor.

Table 7: Overall monetary poverty for children aged 0-17 in Cambodia, by sex and age group

Sub-national level	FGT0	FGT1	FGT2		
	Poverty head-count ratio (% proportion of the poor)	Poverty gap	Squared poverty gap (poverty severity)	Distribution of the poor children by sex and age group (% poverty 'share' of headcount index)	Distribution of the popu-lation (%)
Sex					
Male	16.3	3.1	0.9	52.2	51.2
Female	15.7	3.0	0.9	47.8	48.8
Age group					
0-4 years	17.0	3.2	0.9	30.9	29.1
5-14 years	16.2	3.1	0.9	53.6	53.0
15-17 years	13.9	2.6	0.8	15.5	17.9
Total	16.0	3.0	0.9	100.0	100.0

Table 8: Poverty headcount ratio of children aged 0-17 by demographic composition

	Poverty headcount rate of children aged 0-17 years	Distribution of the poor children aged 0-17 years	Distribution of the child population aged 0-17 years
Number of children aged 0-4 years in the household			
0 children	12.5	38.0	48.7
1	16.8	41.3	39.3
2	26.0	17.4	10.8
3 or more children	41.7	3.2	1.2
Household size			
1	0.0	0.0	0.0
2	3.4	0.2	1.0
3	4.3	2.3	8.6
4	8.2	11.8	23.0
5	12.7	19.9	25.1
6	19.3	23.1	19.2
7 or more	29.8	42.7	23.0
Total	16.0	100.0	100.0

3.2 Inequality

Table 9 shows information on the distribution of the child population over the wealth aggregate quintiles at the national and sub-national region levels. It clearly shows that wealth (measured as per capita monthly consumption in Cambodian riels) is concentrated among the top quintile of children living in Phnom Penh – 52.7 per cent of children in Phnom Penh live in households in the top richest quintile. Only 5.1 per cent of children living in Phnom Penh fall into the first (poorest) quintile, compared to 11.1 per cent in other urban regions and 22.7 per cent in other rural areas. Compared to Phnom Penh, children in rural areas are far poorer: only 14.8 per cent fall into the top (richest quintile), while nearly half (44.9 per cent) fall into the two poorest quintiles. Wealth appears to be concentrated in Phnom Penh and other urban areas, whereas average consumption is more evenly distributed across quintiles in other rural areas.

Table 9: Distribution of population across quintiles, by sub-national regions

	Quintiles of welfare aggregate				
	Q1	Q2	Q3	Q4	Q5
Region					
Phnom Penh	5.1	6.2	13.0	23.1	52.7
Other Urban	11.1	13.8	17.0	24.0	34.1
Other Rural	22.7	22.2	21.1	19.2	14.8
Total	20.0	20.0	20.0	20.0	20.0

Table 10 and Table 11 detail the Gini coefficient at the national, area and regional level for Cambodian children aged 0-17. Figure 78 in Annex III presents the corresponding Lorenz curves that compare the distribution of consumption with the uniform distribution representing equality (the diagonal line). Where perfect equality in the Gini coefficient is 0, and 1 is perfect inequality, it can be observed that inequality is higher in urban areas compared to rural areas, and slightly higher in Phnom Penh and Other Urban regions, compared to Other Rural regions. The level of inequality is fairly similar between regions, with Phnom Penh displaying a slightly higher level of inequality. Within-group inequality is much greater than between-group inequality at both the area and regional level, which is worthy of note. If most inequality is due to disparities within groups, rather than across groups, then the policy focus should be on development within groups with greater need to identify the poorest subgroups within these groups, such as those with certain levels of education or access to certain services. The multidimensional child poverty analysis in this study provides additional insight in this area.

Table 10: Mean and median per capita consumption expenditure, growth, and the Gini coefficient

	Mean	Median	Gini coefficient
Area			
Urban	337,597.3	289,630.1	29.0
Rural	227,882.6	199,027.2	25.8
Region			
Phnom Penh	382,088.7	325,931.9	28.8
Other Urban	296,448.0	259,531.0	27.6
Other Rural	227,550.2	198,585.7	25.8
Total	247,611.8	210,016.9	27.9

Table 11: Breakdown of Gini coefficient by geography

	Gini co efficient
Total	27.9
Urban/rural	
Within-group inequality	17.3
Between-group inequality	6.5
Overlap	4.1
Phnom Penh/Other Urban/Other Rural	
Within-group inequality	16.2
Between-group inequality	6.9
Overlap	4.8

3.3 Sensitivity to Changes in the Poverty Line

Table 12 shows the poverty rates for Cambodian children aged 0-17 in 2014, based on the official poverty lines by Ministry of Planning as detailed in Chapter 2.1.2 and for alternative poverty line(s) that are up to 20 per cent above and 20 per cent below the official (original) line(s) at the national level. It shows that a 5 per cent increase in the poverty line results in a higher poverty headcount rate of 19.5 per cent from the original 16.0 per cent. A 5 per cent decrease in the poverty line results in a lower poverty headcount rate of 13.3 per cent of children living below the poverty line.

This shows that monetary child poverty in Cambodia is highly sensitive to the choice of the poverty line. It is likely that a large portion of the population is concentrated around the poverty line and highly vulnerable to falling in and out of poverty. This is also important to consider in terms of policies and means-based targeting, as many children may live in households that do not qualify for certain means-based benefits or services if they are just above the poverty line, but remain vulnerable throughout various dimensions of their well-being to being nevertheless deprived, or vulnerable to falling into poverty. This provides more justification to a more in-depth analysis of children's deprivations using MODA in the following chapter on multidimensional poverty for children in Cambodia.

Table 12: Sensitivity of poverty measures to the choice of poverty line

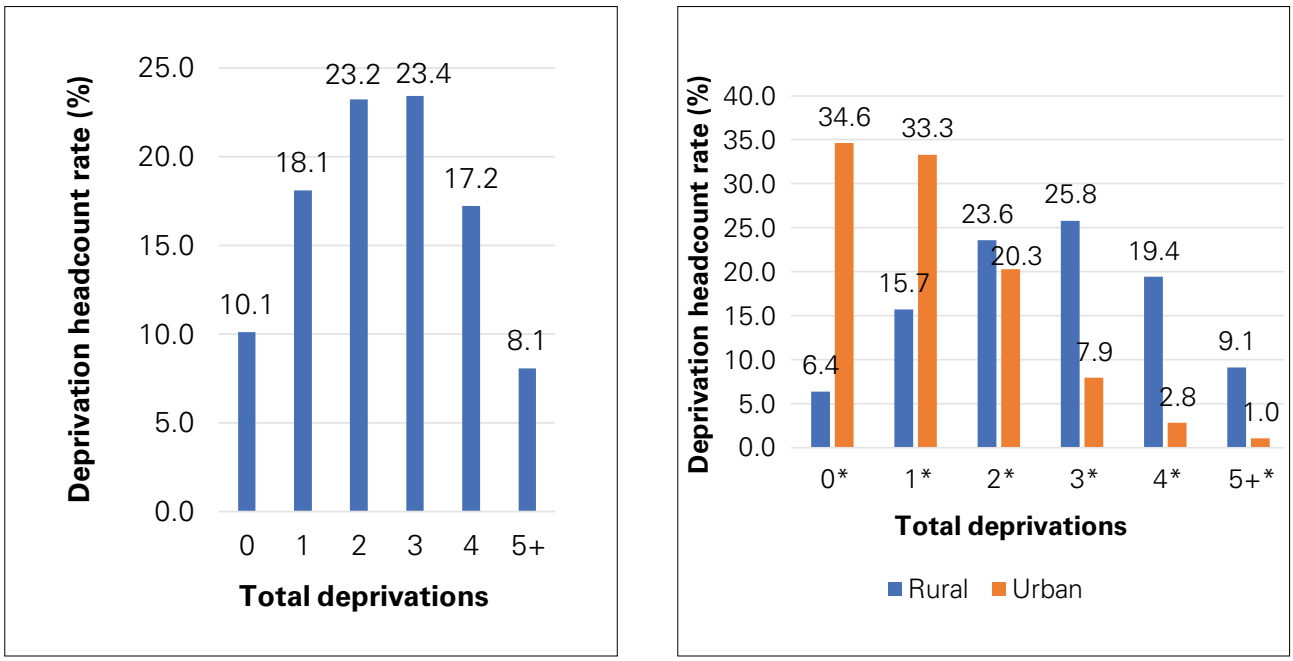
	Poverty headcount rate	Change from actual (%)	Poverty gap	Change from actual (%)	Squared poverty gap	Change from actual (%)
Actual poverty line	16.0	0.0	3.0	0.0	0.9	0.0
+5%	19.5	21.5	3.7	23.0	1.1	25.7
+10%	22.7	41.6	4.5	49.0	1.4	55.4
+20%	30.1	87.5	6.4	108.8	2.0	127.1
-5%	13.3	-17.2	2.4	-20.0	0.7	-22.1
-10%	10.9	-31.8	1.9	-37.4	0.5	-40.7
-20%	6.4	-59.9	1.1	-64.6	0.3	-68.5

Multidimensional Poverty

3.4 Multidimensional Poverty Headcount Distribution

The majority of children in Cambodia face multiple deprivations, with most children experiencing two or three deprivations at a time (Figure 3). Additionally, significant differences can be observed between rural and urban areas. Around 68 per cent of children living in urban areas are deprived in zero or one dimension compared to 22.1 per cent of rural children. Moreover, most rural children face three simultaneous deprivations (25.8 per cent).

Figure 3: Deprivation distribution at the national level and by area of residence for children aged 0-17 years



3.5 Multidimensional Poverty Headcount, Intensity and Severity Index

The multidimensional deprivation indices complement the analysis on the distribution and overlap of deprivations, by indicating the overall incidence and intensity of deprivation among children. Table 13 shows the indices H, A and M0[10] for all children aged 0-17 years. For example, when using the deprivation cut-off point k=3, 48.7 per cent of all children are defined as multidimensionally deprived. On average, these children are deprived in 3.7 deprivations at a time, or 69.8 per cent of all possible deprivations.

10 The multidimensional deprivation headcount (H) specifies the proportion of children multiply deprived with regards to a specified cut-off point. Since the headcount rate does not account for the depth of children's deprivation the average deprivation intensity (A) is used. This index can be presented

Table 13: Multidimensional deprivation indices at the national level for children aged 0-17

Deprivation threshold (k)	Multidimensional deprivation headcount (H), %	Average no. of deprivations among the deprived (A)	Average intensity among the deprived (A); %	Adjusted multidimensional deprivation headcount (M0)
At least 1 deprivation	89.9	2.7	51.5	0.46
At least 2 deprivations	71.8	3.2	59.7	0.43
At least 3 deprivations	48.7	3.7	69.8	0.34
At least 4 deprivations	25.2	4.4	81.4	0.21
At least 5 deprivations	8.1	5.1	93.5	0.08

Figure 4: Multidimensional deprivation headcount (k=3) by national level, area of residence, geographic zone and sex of the child for children aged 0-17 years

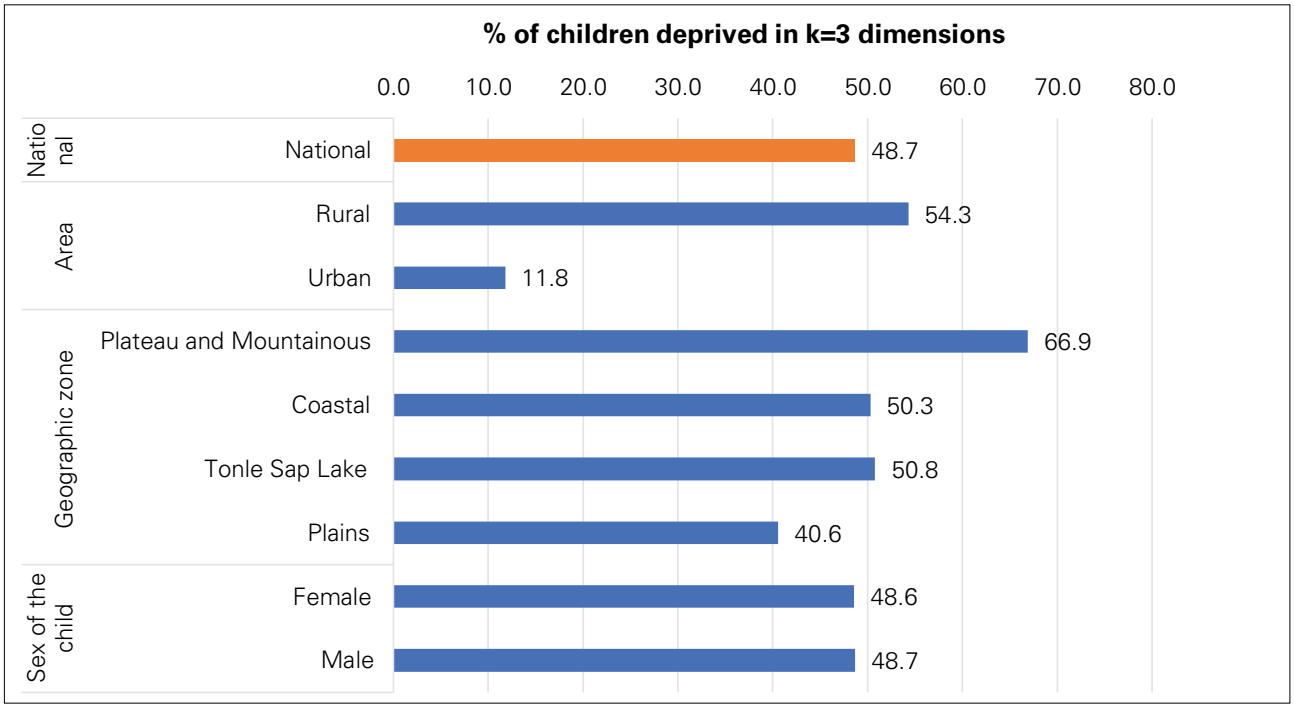


Figure 4 and Table 13 confirm that most children in Cambodia experience multiple deprivations. Deprivation severity is mainly concentrated around two to three simultaneous deprivations experienced at a time, with less than 10 per cent of children deprived in more than five dimensions.

According to Figure 5, the adjusted deprivation headcount, M0, shows that children in rural areas are worst off in terms of both incidence and intensity of deprivations (though the adjusted headcount is mostly driven by the high incidence of deprived children).

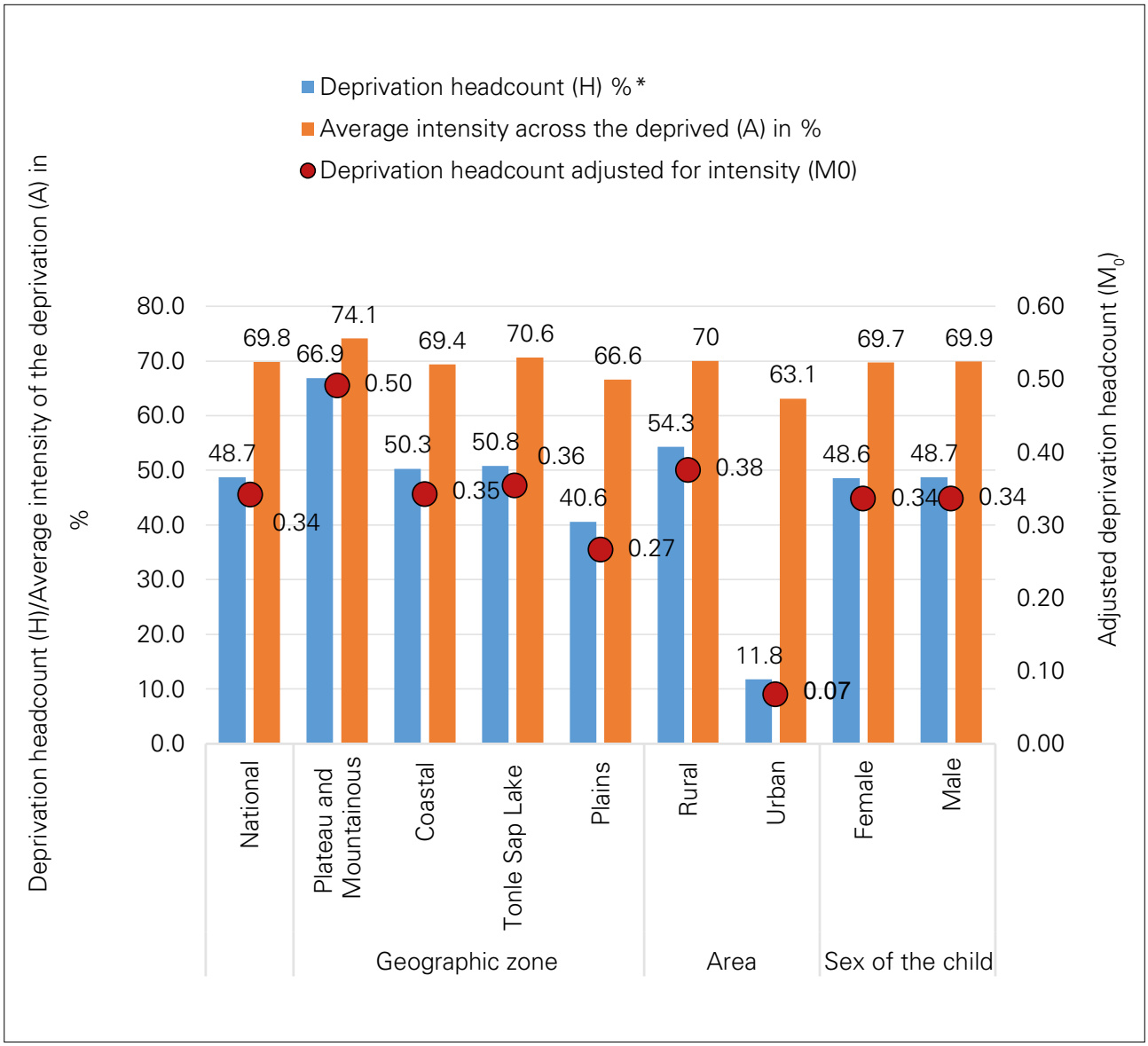
Furthermore, children living in the Plateau and Mountainous zone are more likely to be multidimensionally deprived compared to other geographic zones in Cambodia. Children living in Plains, on

as the average number of deprivations multi-dimensionally deprived children experience, or as the proportion of deprivations the multiply deprived hold out of the total possible number of deprivations. The last index used is the adjusted deprivation headcount (M0), in which the indices are combined into one single deprivation measure capturing both the incidence and depth of deprivation (M0 =H*A) (Alkire and Foster, 2011).

the other hand, are best off. However, the intensity of multidimensional poverty is similar across all geographic zones.

The adjusted deprivation headcount does not change according to the sex of the child in Cambodia. Both boys and girls face similar deprivation levels in terms of incidence and intensity (M0=0.34).

Figure 5: Multidimensional deprivation headcount (k=3) by national level, area of residence, geographic zone and sex of the child for children aged 0-17 years



Comparing Multidimensional And Monetary Poverty: Children Aged 0-17 years

It is important to note that although the results of the MODA multidimensional poverty analysis for Cambodian children aged 0-17 is not directly comparable to the results of the monetary poverty analysis for the same age group, shared characteristics of the summary poverty measures of both

analyses allow for some general comparison that helps paint a more complete picture of poverty among Cambodian children. The MODA-poverty indices, H, A and M0, based on the multidimensional poverty measures by Alkire-Foster, share all the properties of the family of Foster-Greer-Thorbecke indices (FGT0, FGT1, FGT2) (Alkire and Foster; Foster, Greer and Thorbecke; de Neubourg, Chai and de Milliano). As such, the overall poverty measures are broadly comparable at the level of depicting the poverty headcount rate, the poverty gap and the adjusted poverty gap (an index depicting the poverty headcount rate adjusted for the poverty gap). The same geographical levels are used as decomposition profiles in both the monetary and multidimensional poverty analyses, allowing or further comparison. Table 14 explains these comparisons in further detail. The multidimensional poverty line uses a threshold of suffering from at least three deprivations (k=3) at a time.

The comparison shows that the total national-level poverty headcount rate is much higher using the multidimensional poverty study than the monetary poverty study, with nearly half (48.7 per cent) of children aged 0-17 considered multidimensionally poor compared to only 16.0 per cent of children considered monetarily poor.

Although not directly comparable, these measures clearly point to the need to study both forms of poverty for children in Cambodia, as neither story of poverty is complete without the other. It is highly likely that even though many children may not be considered monetarily poor, they will be considered multidimensionally deprived, and it is important to understand those deprivations that are not necessarily correlated to their level of per capita consumption. This justifies further the need for a multidimensional poverty analysis, as elaborated on in the following chapters.

Table 14: Comparisons of multidimensional and monetary child poverty estimates from Cambodian surveys for children aged 0-17 years

	Poverty indicesa		
	Poverty headcount rate (%) [b]	Poverty gap (%)[c]	Adjusted poverty gap (x 100)[d]
Monetary poverty line = See Chapter 2.1.2 for definition of multiple poverty lines			
CSES 2014			
Total	16.0	19.0	3.0
Multidimensional poverty line = At least 3 deprivations (k=3)			
CDHS 2014			
Total	48.7	69.8	3.4

a The poverty indices here aim to compare the headcount ratio, average intensity/poverty gap, and adjusted poverty gap measures in the monetary poverty FGT-class of poverty measures, to the adapted Alkire-Foster multidimensional poverty indices that are also based on the FGT class of poverty measures (Alkire and Foster; Foster, Greer and Thorbecke) . However, these measures are not directly comparable and do not share direct equivalence given important differences in what they measure and technicalities of their construction.
b For the monetary poverty measure, the poverty headcount ratio refers to FGT0, and the multidimensional poverty measure refers to H.
c For the monetary poverty measure, the poverty headcount ratio refers to FGT1, and the multidimensional poverty measure refers to A.
d For the monetary poverty measure, the poverty headcount ratio refers to FGT2 – the square of . The multidimensional poverty measure refers to M0, the product of H and A, which is the deprivation headcount ratio adjusted for intensity of poverty. Both measures are an index between 0 and 1 where the higher the measure, the worse the situation of poverty.

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4

Results: Multidimensional Child Poverty for Children aged 0-4 years

4. Results: Multidimensional Child Poverty for Children aged 0-4 years

Highlights

- In this group, 57 per cent of children are multidimensionally poor, facing on average 3.9 deprivations of a total six dimensions.
- Children living in rural areas and across northeastern Cambodia tend to have the highest deprivation headcount rates in all dimensions and are more likely to experience multiple deprivations at a time.
- The primary areas of concern for Cambodian children in this age category are in the ECD and nutrition dimensions. Eight of 10 children do not attend an early childhood education or preschool programme, whereas 47.4 per cent of children are not fed according to the requirements for infant and young child feeding practices.
- The combination of nutrition, ECD and housing shows the highest overlap for children aged 0-4. Around 18 per cent of children are deprived in all three dimensions, while only 13 per cent do not experience deprivation in any of the three dimensions analyzed.
- At the national level, the sanitation and housing dimensions contribute the most, by 21.7 per cent and 21.3 per cent, respectively, to the multidimensional headcount ratio adjusted for intensity of deprivation (M0). In rural areas, similar results can be observed, whereas in urban areas the housing and child development dimensions play the most important roles.

4.1 Single Deprivation Analysis

The following sections show the analysis results by single sector. The deprivation headcount ratio represents the proportion of children deprived in each indicator or dimension as a percentage of total children in the age group in question for whom data was available, otherwise referred to as the reference population.

To aggregate the indicators into dimensions, MODA uses the union approach ($0<k\leq1$) to determine if a child experiences deprivation in a certain dimension or not. This means that a child who is deprived in at least one of the indicators will be defined as deprived in the whole dimension.

4.1.1 National-level results

The results show high rates of deprivation in nearly all indicators for children aged 0-4 years in Cambodia (Figure 6). Notably, eight of 10 children in this age group are not attending an early childhood education or preschool programme (81.8 per cent). At the dimension level, the highest rates of deprivation tend to be observed for children aged 0-4 years compared to other age groups, especially in the ECD dimension, with 71.1 per cent of children who are deprived (Figure 7). Furthermore, 47.4 per cent of children of this age are deprived in the nutrition dimension. This could mean severe

consequences for physical and likely cognitive development for a large percentage of the youngest children in Cambodia, which are core requirements for the development of human capital.

Most household-level indicators show similar deprivation headcount rates across all three age groups. Around five in 10 children do not have access to improved toilet facilities and at least one in seven live in households with unimproved floor, roof and/or wall materials. These environmental conditions are the foundations underlying the fulfilment of other dimensions of child well-being and indicate low standards of living for affected households. For example, even if children are adequately fed, the high rates of inadequate handwashing, sanitation facilities and solid cooking fuel use still expose these children to environmental harms that are hazardous to their health and well-being.

Figure 6: Deprivation headcount rate (%) by indicators and dimension, children aged 0-4 years

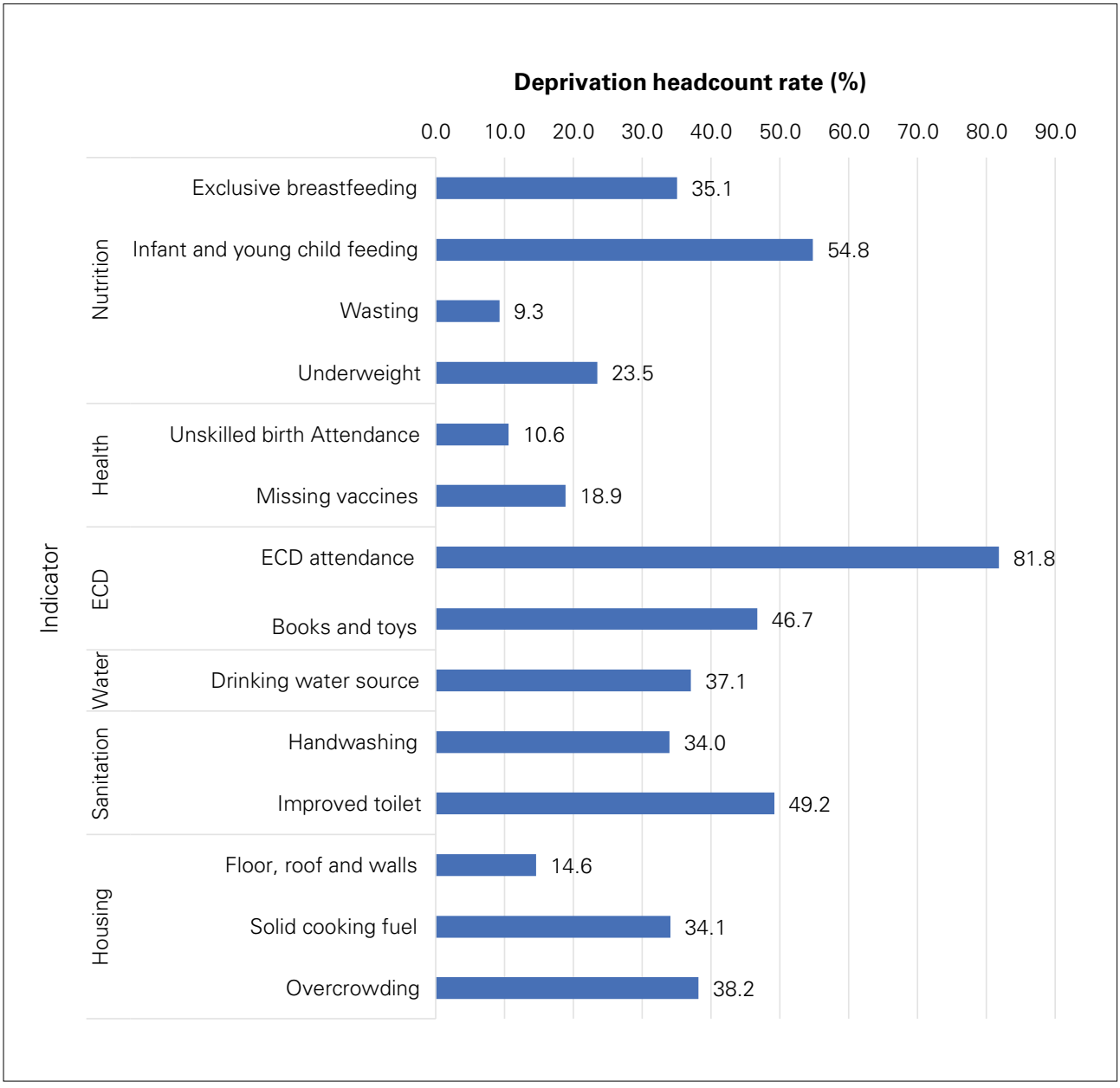
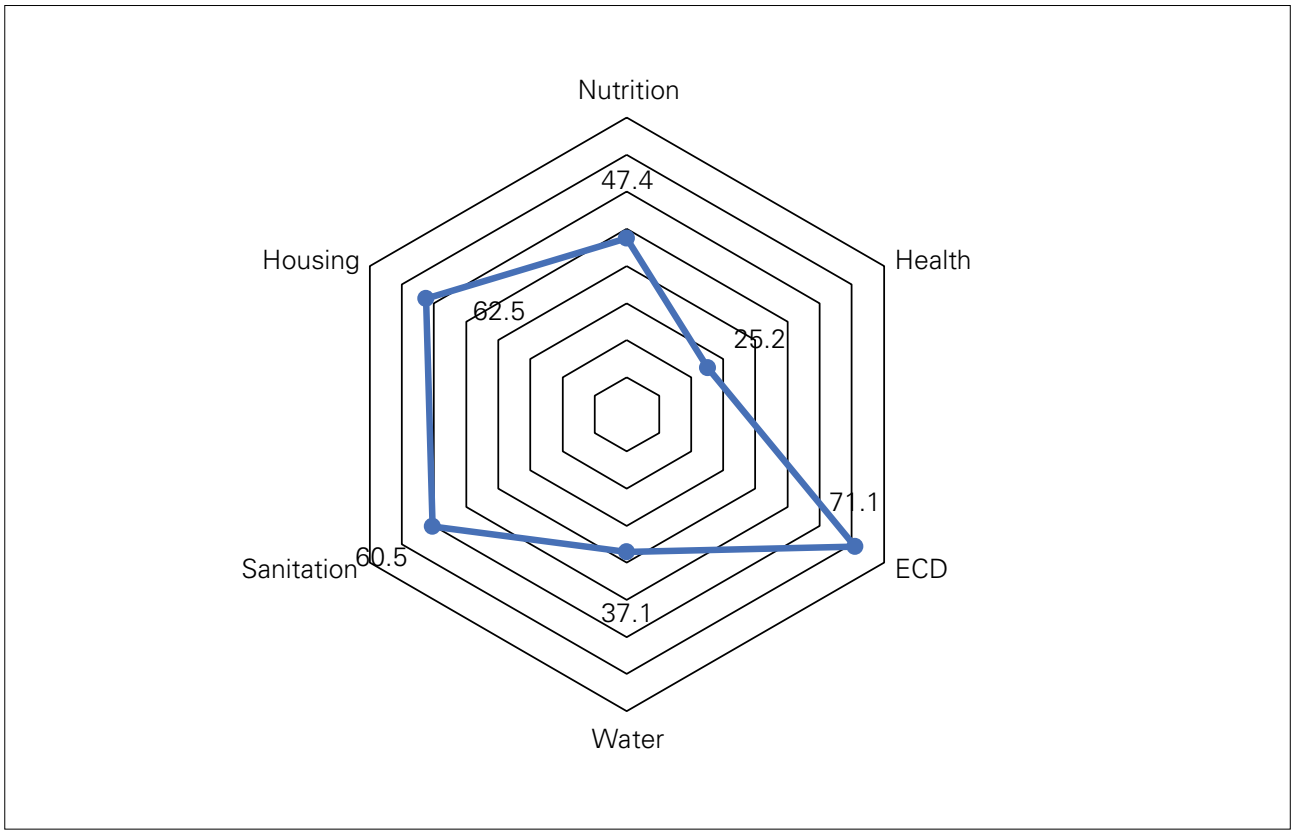


Figure 7: Deprivation headcount rate (%) by dimensions, children aged 0-4 years



4.1.2 Deprivation rates based on geographical location: Where do the deprived children live?

For all children aged 0-4, the results show that those living in rural areas have significantly higher deprivation headcount rates across all dimensions compared to those living in urban areas (Figure 8). The highest discrepancies can be found in the water and sanitation dimensions, followed by ECD, housing and health, which show a significantly higher deprivation headcount rate in rural areas than in urban areas. These results suggest that problems with access to services and infrastructure across WASH, education and health sectors are concentrated in rural areas. In comparison, although differences between urban and rural children are statistically significant in the nutrition dimension, this difference of 5.5 percentage points is very small and suggests that feeding practices are nationally pervasive and not necessarily linked to differences in service provision in urban and rural areas. Children of this age living in the north-east of Cambodia are significantly worse off in all dimensions compared to children living in other regions (south or west),[11] although these differences are smallest in the nutrition, ECD and sanitation dimensions (Figure 9). Children living in the Plateau and Mountainous zone show the highest rates of deprivation in all dimensions except the ECD dimension compared to children in in other geographic zones. Rates of deprivation in all dimensions are fairly similar among children in the remaining geographic zones (Figure 10).

11 See Annex II for an explanation of the regional disaggregation variable.

Figure 8: Deprivation headcount rate (%) by dimension and area, children aged 0-4 years

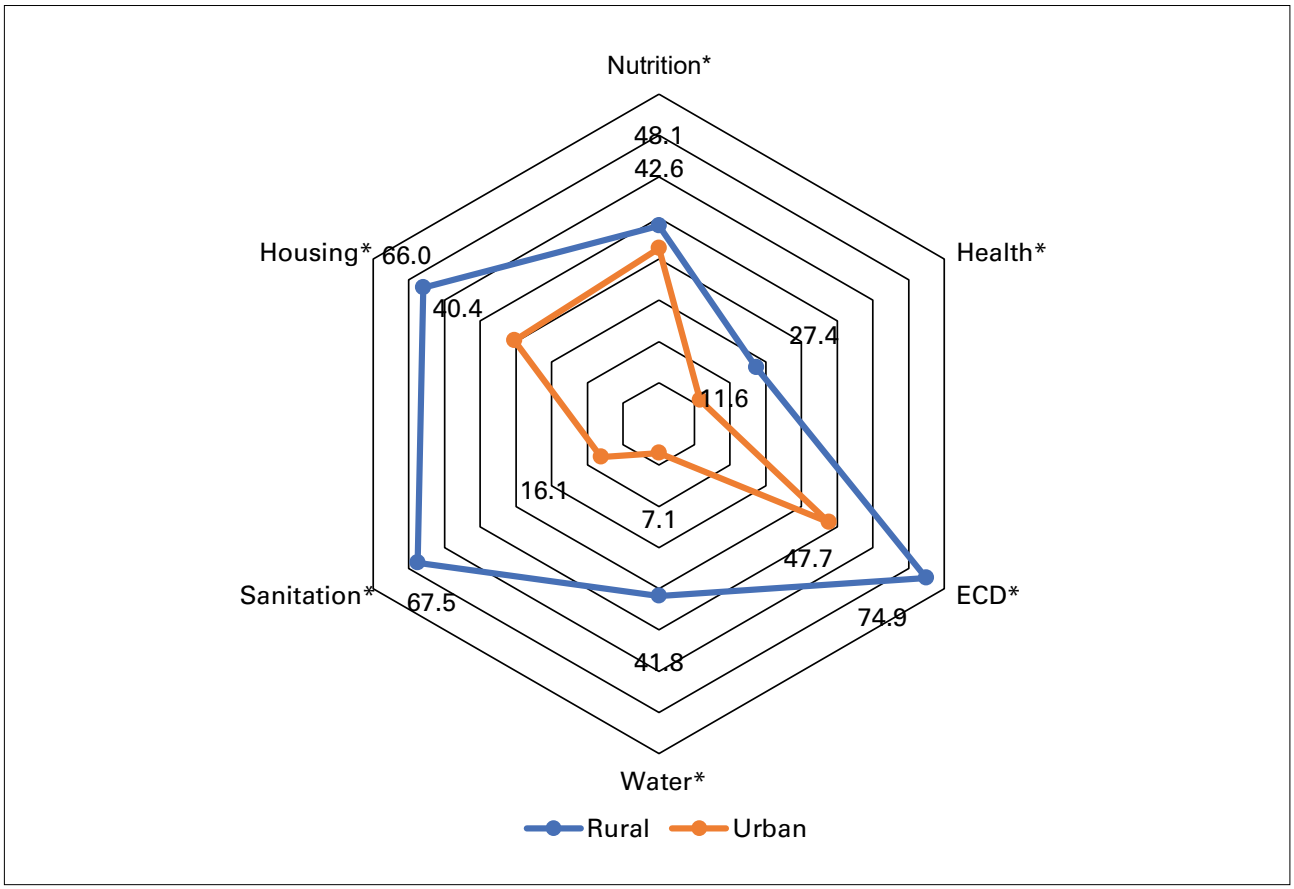


Figure 9: Deprivation headcount rate (%) by dimension and region, children aged 0-4 years

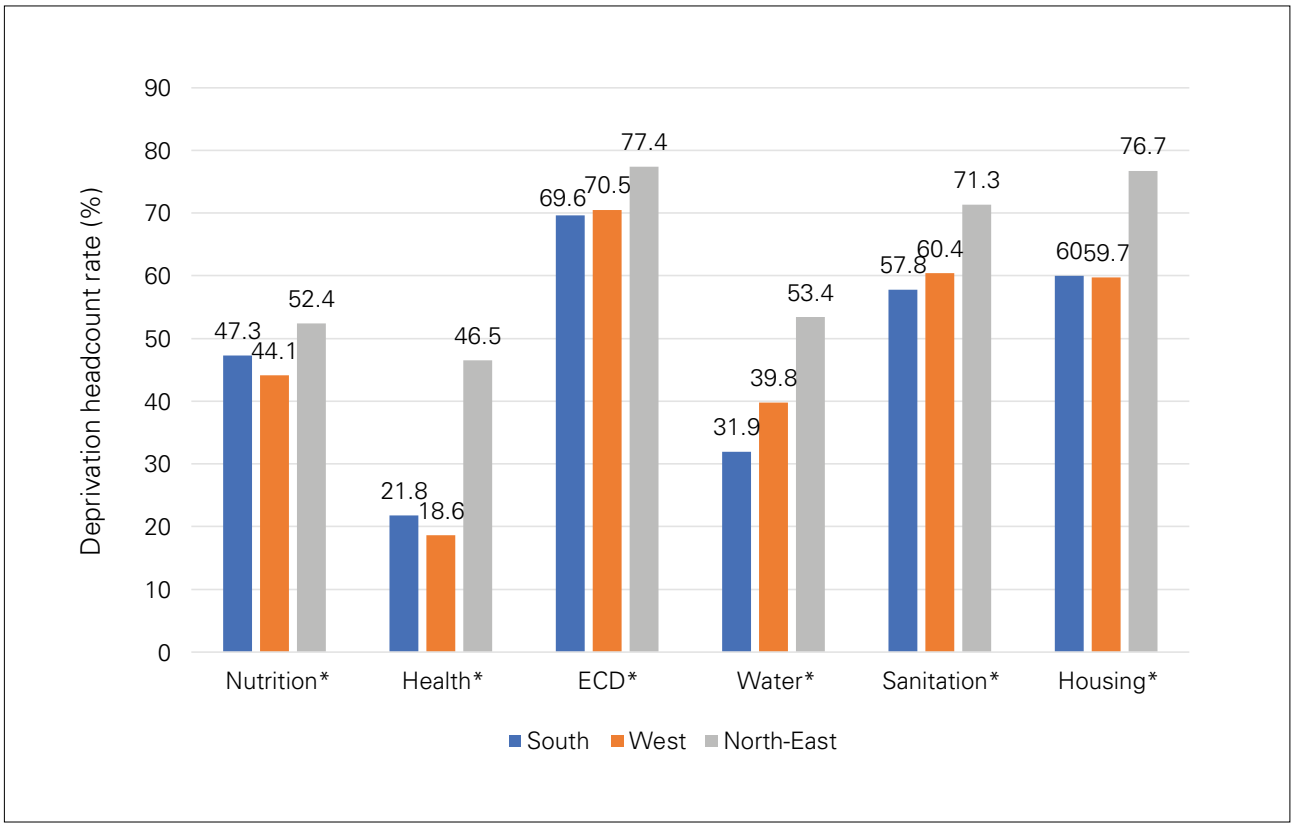
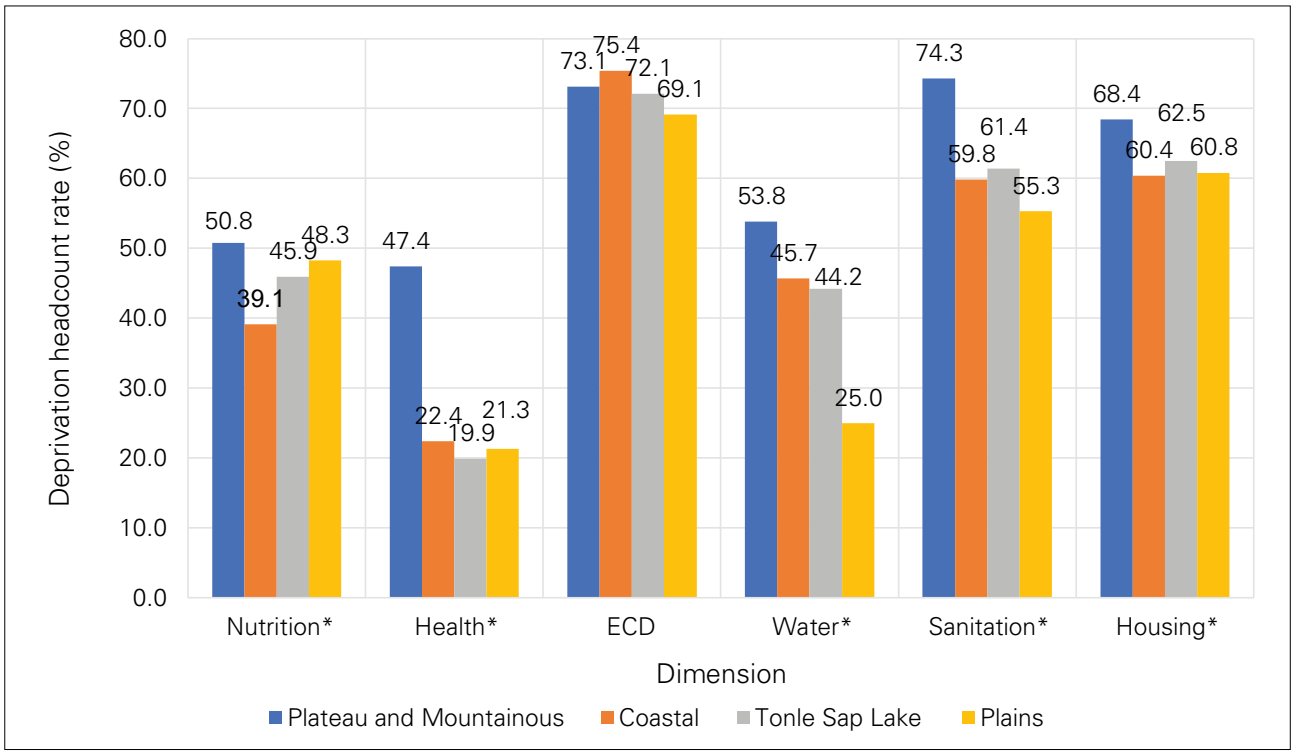


Figure 10: Deprivation headcount rate (%) by dimension and geographical zone, children aged 0-4 years



** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

4.1.3 Profiles of deprived children by geography

This section details a selection of profiling characteristics used to identify the most vulnerable groups of children across the analyzed single-sector dimensions. Figure 11 shows that children without a birth certificate or registration fare worse than children with birth certificate or registration in all dimensions. The largest discrepancy between children with and without birth registration is in the sanitation dimension, showing a statistically significant distinction of 19.7 percentage points. Children aged 0-4 living in households with three or more children are more likely to be deprived than children living in households with one or two children (Figure 12). The differences are statistically significant for all dimensions, except sanitation.

Figure 11: Deprivation headcount rate (%) by dimension and birth registration, children aged 0-4 years

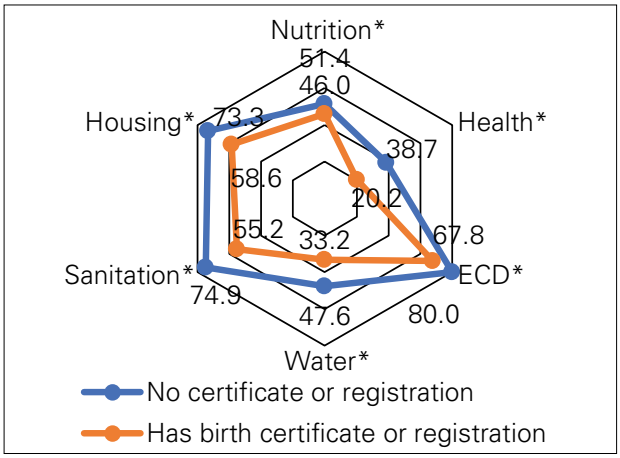
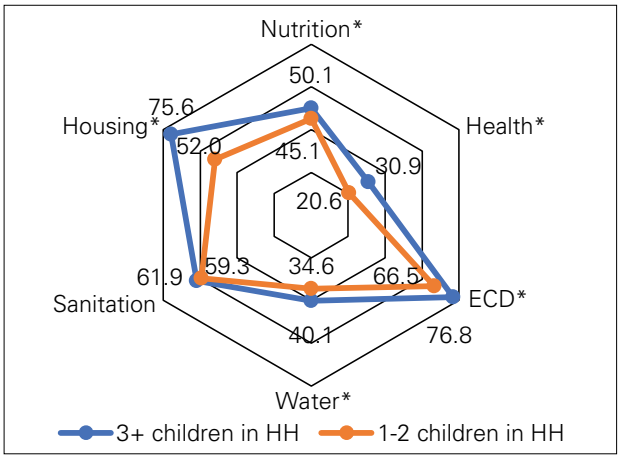


Figure 12: Deprivation headcount rate (%) by dimension and number of children in the household, children aged 0-4 years



** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05*

In addition to the above characteristics, Table 15 indicates the deprivation headcount rate by dimension according to various subgroups of children. The results show that children's exposure to deprivations has important relationships with their individual and household characteristics, including the characteristics of their parents. The most noteworthy observations include the following:

- Children from female-headed households are less likely to be deprived in the health and sanitation dimensions than those in male-headed households, but these differences are small.
- Stunted children are significantly more deprived in all dimensions compared to non-stunted children. See Chapter 4.3 for an in-depth analysis of stunting among children aged 0-4 years in Cambodia.
- Mother's education level and working status have important influence on their children's experience of deprivation in all dimensions. Children who have mothers with less than secondary education perform poorly in all dimensions at far higher rates of deprivation, compared with those who have mothers with at least secondary education. Children with continuously working and paid mothers are significantly less likely to be deprived in all dimensions except nutrition and ECD.
- Children living in a household where there has been an instance of under-five mortality are far more likely to be deprived in all dimensions except sanitation, compared to children living in households without an instance of under-five mortality.
- Living arrangements show an unclear relationship with the deprivation status of the child. Surprisingly, children living in labour-constrained households are less likely to be deprived in the nutrition and sanitation dimensions, but more likely to be deprived in the ECD dimension. Also surprisingly, children living with both parents show a higher rate of deprivation in the nutrition, ECD, water, sanitation and housing dimensions than children living without one or both parents. On the other hand, single or double orphans are slightly more likely to be deprived in water than non-orphan children.
- Mother's body mass index (BMI) and anaemia, as a proxy for mother's physical development and nutritional health, appear to be correlated with the child's deprivation in nutrition and sanitation. Children living with overweight and obese mothers are far less likely to be deprived in the nutrition dimension than those living with thin mothers. Children with anaemic mothers (both mild and severe) are more highly deprived in the health, water and sanitation dimensions than children with non-anaemic mothers.

Further in-depth analysis on birth registration among children younger than 5 in Cambodia can be found in Annex V.

Table 15: Deprivation headcount (%) by dimension and child's characteristics, children aged 0-4

Profiling variable	Sample	Dimension					
		Nutrition	Health	ECD	Water	Sanitation	Housing
National	National	47.4	25.2	71.1	37.1	60.5	62.5
Region	South	47.3*	21.8*	69.6*	31.9*	57.8*	60*
	West	44.1*	18.6*	70.5*	39.8*	60.4*	59.7*
	Northeast	52.4*	46.5*	77.4*	53.4*	71.3*	76.7*

Profiling variable	Sample	Dimension					
		Nutrition	Health	ECD	Water	Sanitation	Housing
Area	Rural	48.1*	27.4*	74.9*	41.8*	67.5*	66*
	Urban	42.6*	11.6*	47.7*	7.1*	16.1*	40.4*
Sex of household head	Female	45.7	21.3*	70.2	34	58.5*	59.7
	Male	47.8	26.3*	71.3	38	61.1*	63.4
Stunting	Child is stunted	64.5*	32*	77.4*	41.7*	67.7*	68.8*
	Child is not stunted	36*	23.5*	69.6*	34.5*	56.6*	60.5*
Mother's education	Mother has secondary or higher education	47*	12.2*	56.7*	25.4*	39.5*	48.1*
	Mother has no, primary or preparatory education	51.8*	31.7*	78.4*	43.5*	71.8*	70.7*
Mother works	Mother works all year and is paid	46.7	17.5*	61.7	28.3*	46.5*	51.5*
	Mother not employed continuously and/or not paid	52.2	30*	77	43.1*	70.1*	70.4*
Under-five mortality	Lives in a household with at least one child mortality in past 5 years	53.2*	42.5*	76.1*	54.3*	86.7	77.4*
	Child lives in household with no child mortality in past 5 years	49.5*	24.7*	71*	37*	60.4	63*
Median children in household	3+ children in household	50.1*	30.9*	76.8*	40.1*	61.9*	75.6*
	1-2 children in household	45.1*	20.6*	66.5*	34.6*	59.3*	52*
Birth registration	No certificate or registration	51.4*	38.7*	80*	47.6*	74.9*	73.3*
	Has birth certificate or registration	46*	20.2*	67.8*	33.2*	55.2*	58.6*

Profiling variable	Sample	Dimension					
		Nutrition	Health	ECD	Water	Sanitation	Housing
Household has labour constraint	Labour-constraint household	27.9*	38.6	87.8*	40.7	67.2	57.9*
	Not a labour-constraint household	47.9*	25	70.9*	36.9	60.3	62.7*
Mother's BMI	Total overweight and obese	41.1*	22.4	72.6	35	54.7*	62.4
	Total normal	47.3*	26.6	71.4	36.9	60.7*	64.6
	Mildly thin	61.6*	31.4	72.7	40.3	66.1*	64.1
	Moderately and severely thin	69.3*	30.2	73.8	39	71.6*	63.7
Mother's BMI	Total overweight and obese	41.1*	22.4	72.6	35	54.7*	62.4
	Total normal	47.3*	26.6	71.4	36.9	60.7*	64.6
	Total thin	64.7*	30.8	74.1	41.2	66.6*	63.5
Orphanhood	Single/double orphan	43	30.1	75.9	40.5*	73.5	64.4
	Both parents alive	47.4	25.1	71.1	37*	60.3	62.5
Mother's anaemia	Not anaemic	47.2	24*	71.1	35.2*	57.2*	62.9
	Mild anaemia	49.7	27.2*	73.6	38*	63.7*	65
	Moderate to severe anaemia	48.9	39.8*	73.4	47.5*	72.4*	72.3
Mother's height	Height is under 145 cm	59.3	30.8	74.8	45.2	71.3*	73.8*
	Height is at least 145 cm	49.7	25	71	37.1	60.6*	62.7*
Living arrangements: Living without one parent	Lives without one or both parents	34.4*	23.4	69.9*	30.6*	55.4*	56.9*
	Lives with both parents	49.7*	25.3	71.2*	38.4*	61.6*	63.7*
Geographic zones	Plateau and Mountainous	50.8*	47.4*	73.1	53.8*	74.3*	68.4*
	Coastal	39.1*	22.4*	75.4	45.7*	59.8*	60.4*
	Tonle Sap Lake	45.9*	19.9*	72.1	44.2*	61.4*	62.5*
	Plains	48.3*	21.3*	69.1	25*	55.3*	60.8*

** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

4.2 Multiple deprivation analysis

This study expands on the deprivation rates in each of the sectors by concentrating on children's joint experience of deprivations. The MODA methodology follows a child-sensitive method and for that reason starts by counting the number of deprivations per child. Based on the total number of deprivations for each child, a distribution of these deprivations gives an indication of the depth of multidimensional deprivation across the society. Understanding how certain dimensions overlap and are experienced further allows for identifying the most vulnerable groups of children.

4.2.1 Distribution of deprivations: How many deprivations do children have?

The deprivation distribution in Figure 13 shows the overall picture of multidimensional poverty among children aged 0-4 years in Cambodia. Most of these children suffer from multidimensional poverty, with only 22.1 per cent of children deprived in zero to one dimensions at a time. The deprivation distribution for these children peaks at 23.4 per cent deprived in a total of three dimensions. Rural-urban differences are stark: the deprivation distribution for children living in rural areas peaks at three deprivations, while the majority of children living in urban areas are deprived in one or no dimensions studied (Figure 14). Children in the northeastern region of Cambodia experience significantly higher rates of deprivation intensity than those children living in southern or western Cambodia (Figure 15).

Figure 13: Deprivation distribution at the national level for children aged 0-4 years

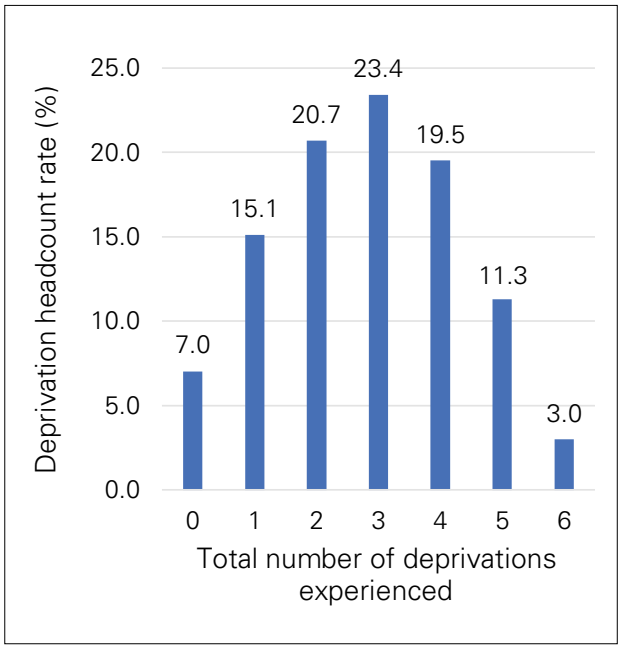


Figure 14: Deprivation distribution by area for children aged 0-4 years

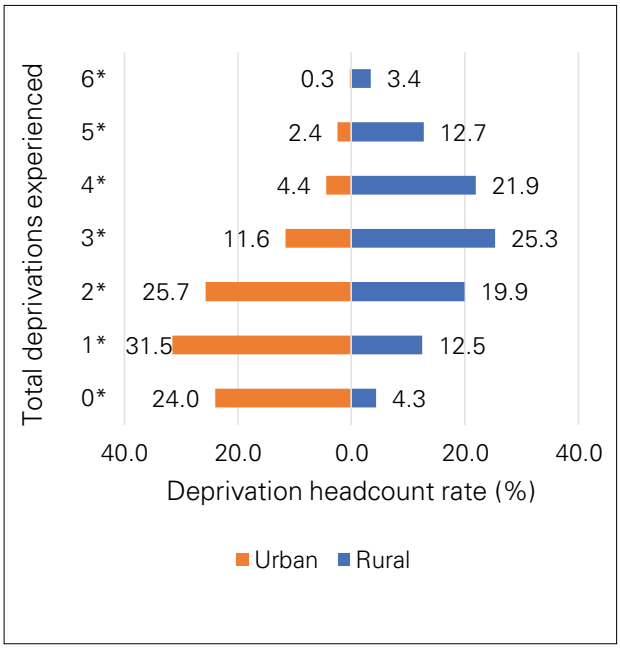
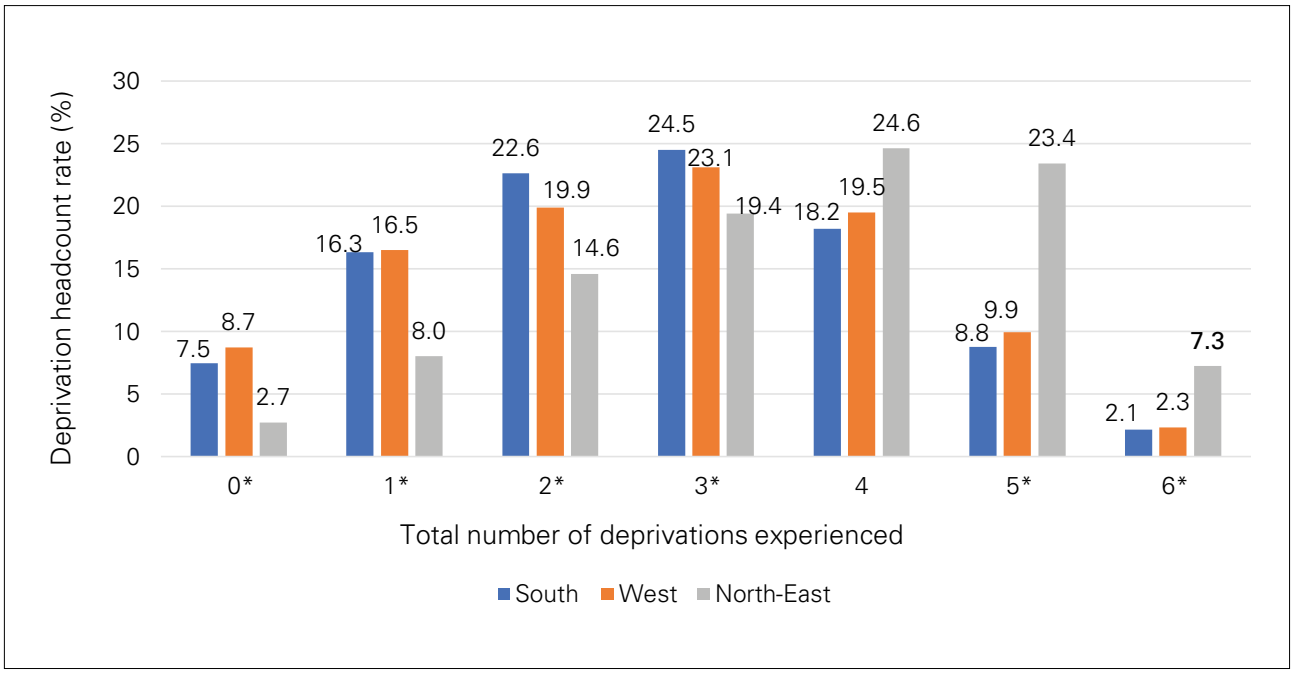


Figure 15: Deprivation distribution by region, children aged 0-4 years



** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

In addition to the above profiles, Table 16 shows differences between the deprivation distribution of subgroups of children based on a selection of additional individual and household characteristics. These results show:

- Stunted children and children with no certificate or registration are significantly more vulnerable to higher rates of multiple deprivations compared to non-stunted children and children with a birth certificate.
- Mother's characteristics correlate to a child's deprivation severity. Children with less educated or non-working/unpaid mothers, mothers with a height under 145 cm, mothers who are anaemic, and mothers who are thin according to BMI, are more vulnerable to higher rates of multiple deprivations than their respective counterpart subgroups.
- Household characteristics including living with a male household head, living in households with at least one instance of under-five mortality, living in larger households, and living in labour-constrained households have a higher chance of multiple deprivations than their counterpart subgroups.
- Counterintuitively, there are no significant differences between children's deprivation severity based on their orphan status. In terms of children's living arrangements, there is a higher proportion of children "living without one or both parents" who are deprived in zero to two dimensions compared to those children who living with both parent. In comparison, there is a higher proportion of children living with both parents who are deprived in four to six dimensions, while there is no significant difference between the proportion of children deprived in three dimensions for these two subgroups. Similarly, a higher proportion of children living without parents but are not orphans are deprived in zero to two dimensions compared to children living with one/both parents, while a higher proportion of children living with one/both parents are deprived in four to six dimensions compared to the other subgroup.

Table 16: Deprivation distribution by various profiling variables, children aged 0-4 years

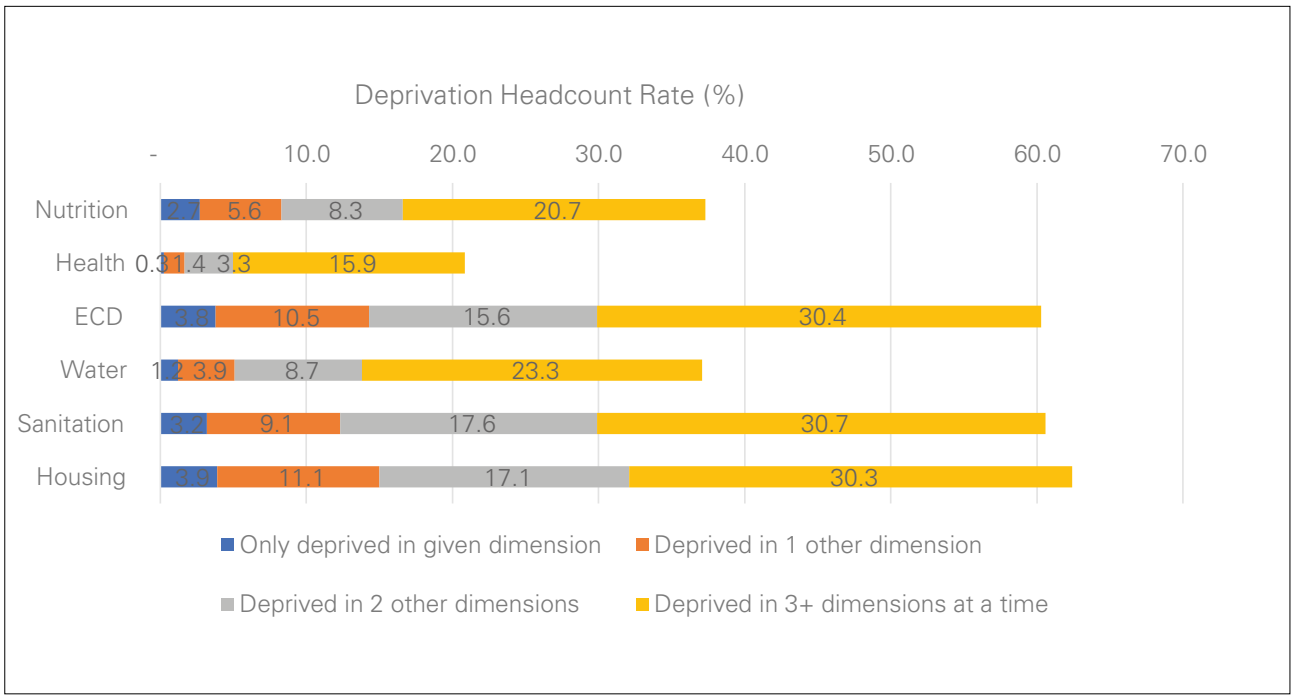
Profile	Samples	Total deprivations						
		0	1	2	3	4	5	6
National	National	7.0	15.1	20.7	23.4	19.5	11.3	3.0
Region	South	7.46*	16.3*	22.6*	24.5*	18.2*	8.8*	2.1*
	West	8.73*	16.5*	19.9*	23.1*	19.5*	9.9*	2.3*
	North-east	2.72*	8.0*	14.6*	19.4*	24.6*	23.4*	7.3*
Area	Rural	4.33*	12.5*	19.9*	25.3*	21.9*	12.7*	3.4*
	Urban	24.0*	31.5*	25.7*	11.6*	4.41*	2.4*	0.3*
Household head sex	Female	7.2	18.4*	22.7	22.7	18.2	8.8*	1.9*
	Male	7.0	14.0*	20.1	23.6	19.9	12.1*	3.3*
Stunting	Child is stunted	2.9*	9.4*	15.4*	23.3	25*	17.8*	6.1*
	Child is not stunted	8.1*	15.7*	21.1*	23.3	19.7*	9.71*	2.3*
Mother's education	Mother has secondary or higher education	11.0*	23.7*	25.2*	21.2	12.7*	5.2*	1.0*
	Mother has no, primary or pre-paratory education	2.4*	7.2*	16.3*	25.0	27*	17.3*	4.5*
Mother works	Mother works all year and is paid	10.0*	19.7*	23.8*	22.0	15.6*	6.9*	2.0*
	Mother not employed continu-ously and/or not paid	2.3*	8.4*	16.5*	24.7	26.4*	17.2*	4.5*
Under-five mortality	Child lives in hh with at least one child mortality in past 5 years	1.4*	6.0*	11.2	27.2	22.2	24.4*	7.6*
	Child lives in hh with no child mortality in past 5 years	5.6*	13.3*	19.9	23.8	21.7	12.5*	3.3*
Median children in household	3+ children in household	5.1*	11.0*	19.5	23.4	20.9	15.6*	4.4*
	1-2 children in household	8.5*	18.3*	21.7	23.4	18.4	7.9*	1.8*
Birth reg-istration	No certificate or registration	3.0*	7.9*	14.7*	24.6	24.6*	20.2*	5.2*
	Has birth certificate or registra-tion	8.4*	17.6*	22.7*	22.9	17.8*	8.3*	2.2*
Household has labour constraint	Labour-constraint household	16.6*	19.1	21.8	19.2	13.8	7.9	1.6*
	Not a labour-constraint house-hold	6.7*	14.9	20.7	23.5	19.7	11.4	3.0*
Mother's BMI 1	Total overweight and obese	6.9*	13.6	18.9	25.7	19.4	12.0*	3.5*
	Total normal	5.1*	11.6	18.2	23.5	24.5	13.5*	3.7*
	Mildly thin	2.3*	12.6	16.2	19.8	20.3	21.9*	6.8*
	Moderately and severely thin	0.7*	14.5	9.9	22.9	21.8	23.8*	6.4*

Profile	Samples	Total deprivations						
Mother's BMI 2	Total overweight and obese	6.9*	13.6	18.9	25.7	19.4	12.0*	3.5*
	Total normal	5.1*	11.6	18.2	23.5	24.5	13.5*	3.7*
	Total thin	1.8*	12.6	14.5	19.3	24.1	21.1*	6.6*
Sex of the child	Female	7.2	14.5	19.8	23.4	19.9	11.4	3.7*
	Male	6.9	15.6	21.6	23.4	19.1	11.2	2.3*
Orphan-hood	Single/double orphan	6.4	15.3	24.2	25.0	18.6	8.4	2.2
	Both parents alive	7.0	15.1	20.7	23.4	19.5	11.4	3.0
Mother's anaemia	Not anaemic	5.0	12.9*	19.6*	24.0	23.0	12.2*	3.3
	Mild anaemia	5.1	11.6*	15.6*	23.1	24.3	16*	4.4
	Moderate to severe anaemia	2.6	4.82*	17.3*	21.9	27.4	19.2*	6.9
Mother's height	Height is under 145 cm	1.8*	9.9	13.9	18.9	26.0	19.8*	9.7*
	Height is at least 145 cm	5.4*	12.9	19.5	24.1	22.1	12.7*	3.3*
Living arrange-ments: Living without one parent	Lives without one or both par-ents	13.5*	24.1*	26.6*	22.3	9.1*	3.7*	0.8*
	Lives with both parents	5.7*	13.2*	19.5*	23.6	21.7*	12.9*	3.4*
Living arrange-ments and orphan status	Lives without parents but not orphan	20.4*	31.7*	26.2*	19.4	2.4*	0.0*	0.0*
	Living with one/both parents	5.8*	13.5*	20.2*	23.8	21.1*	12.4*	3.0*
Geograph-ical zone	Plateau and Mountainous	3.1*	8.6*	16.4*	19.4*	23.3*	21.8*	7.5*
	Coastal	5.9*	14.7*	22.4*	24.4*	21.4*	8.5*	2.6*
	Tonle Sap Lake	7.1*	15.0*	19.3*	23.2*	21.6*	11.3*	2.5*
	Plains	8.4*	17.4*	23.0*	24.8*	16.5*	8.12*	1.9*

4.2.2 Deprivation overlap analysis

The deprivation overlap analysis reveals to what extent deprivation in a single dimension is a unique problem or whether these deprivations are usually experienced together with other deprivations. These results guide the design of policies that appropriately address problems in single sectors as issues that relate to other, additional sectors. The deprivation overlap for children aged 0-4 shows that less than 5 per cent are uniquely deprived in any of these dimensions, while around 20-30 per cent of children deprived in any one dimension are deprived in at least three additional dimensions (Figure 16). The majority of children deprived in any of these dimensions experience one to two other deprivations in addition to the specified dimension.

Figure 16: Single dimension deprivation overlap, children aged 0-4 years



4.2.3 Three-way overlap of deprivations

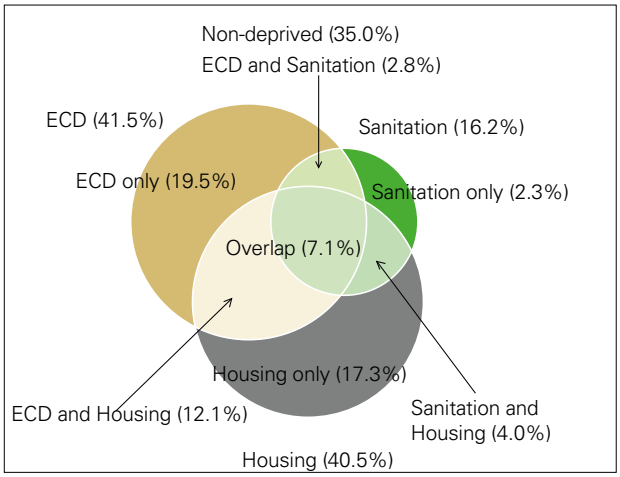
The analysis described in the previous section shows that in general, multiple deprivations in the dimensions used in this study are experienced together rather than on their own. This section demonstrates which of those deprivations are usually experienced together through Venn diagrams.[12] A selection of the most interesting results are presented.

The national-level results of the overlap deprivation analysis are largely driven by rural-level results, making the overlap analysis more useful to be separately analyzed at the urban and rural levels. The highest rate of deprivation in three dimensions at a time is between ECD, sanitation and housing. Figure 17 shows that this overlap varies largely between urban and rural levels. While 7.1 per cent of children are deprived in these dimensions in urban areas, nearly five times as many (34.5 per cent) are deprived in all three in rural areas. Compared to 35 per cent of children deprived in none of these three dimensions in urban areas, only 8.4 per cent of children in rural areas are deprived in none of these dimensions. These results point to a greater tendency towards multidimensional poverty in rural areas, and suggests the need for greater integration of the ECD-, sanitation- and housing-related policies to address multidimensional poverty.

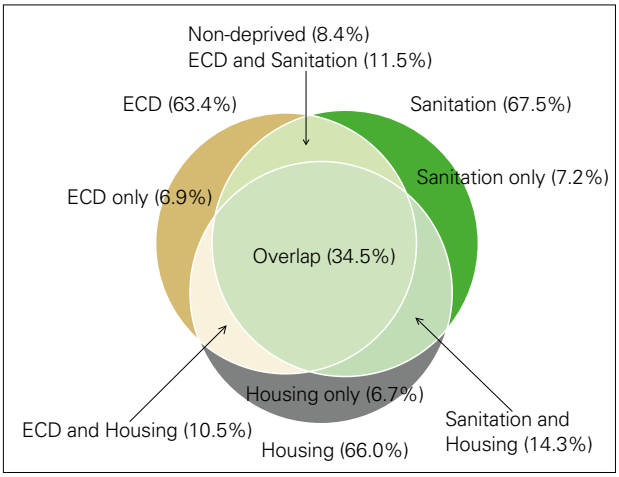
12 A Venn diagram showing a combination of three dimensions describes deprivation levels for 1) each dimension separately; 2) overlap between two dimensions; 3) overlap between three dimensions; and 4) the population not deprived in any of the three dimensions.

Figure 17: Three-way deprivation overlap for the combination of child development, housing and sanitation dimensions for children aged 0-4 years, by area

Urban



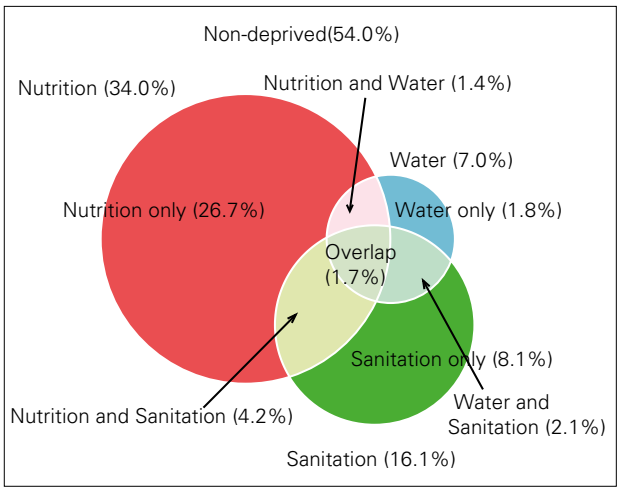
Rural



The three-way overlap analysis consistently shows a higher rate of overlap between dimensions at the rural level, suggesting that while certain single-sector deprivations are more likely to be unique problems affecting pockets of the population in urban areas, children in rural areas are more likely to have multiple and overlapping deprivations. Figure 18 shows the three-way overlap of deprivation in nutrition, water and sanitation in urban and rural areas. Compared to rural areas, there is a higher headcount of children deprived in nutrition in urban areas and a lower headcount of children deprived in water and sanitation. The overlap between these dimensions is very high in rural areas (11.8 per cent deprived in all three dimensions), whereas they are more uniquely experienced in urban areas (1.7 per cent). Most distinctly, nutrition deprivation in urban areas is a more unique occurrence than in rural areas – 26.7 per cent of children are deprived in only nutrition, compared to 8.4 per cent in rural areas. These results again point to the likely higher impact of simultaneously implemented and integrated nutrition and WASH policies in rural areas.

Figure 18: Three-way deprivation overlap for the combination of nutrition, water and sanitation dimensions for children aged 0-4 years, by area

Urban



Rural

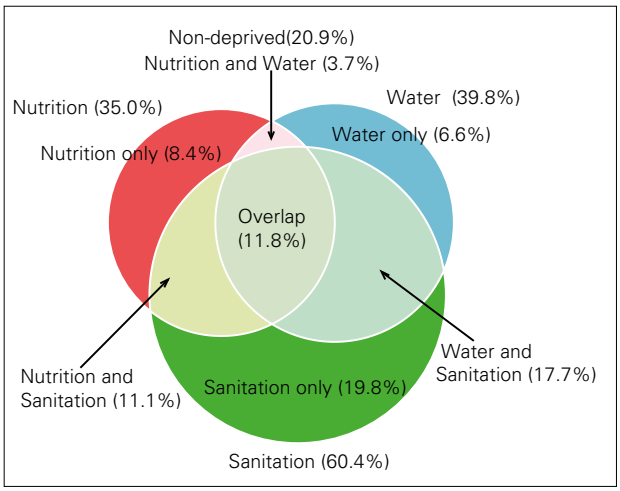
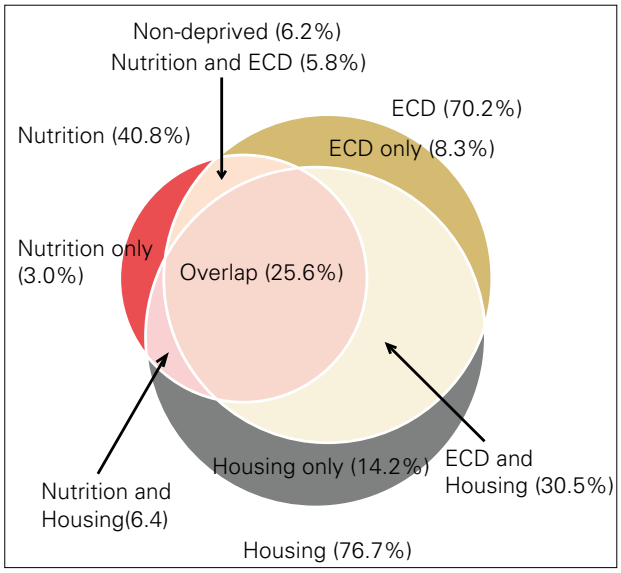


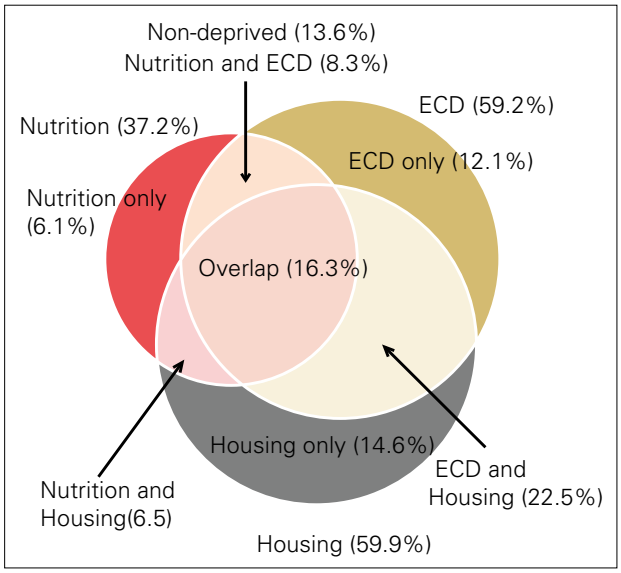
Figure 19 disaggregates the overlap of deprivation between the nutrition, ECD and housing dimensions for children aged 0-4 years by the region where the child lives. These results echo earlier patterns showing that the children living in the north-east are the most vulnerable to the experience of a higher deprivation intensity compared to children living in the southern and western regions. There is a much higher rate of overlap (25.6 per cent) between all three dimensions in the north-east compared to southern (16.3 per cent) and western (17.2 per cent) regions, suggesting that deprivations in the northeastern region are appropriately addressed in tandem, with a more focused policy integration of these sectors.

Figure 19: Three-way deprivation overlap for the combination of nutrition, ECD and housing dimensions for children aged 0-4 years by region

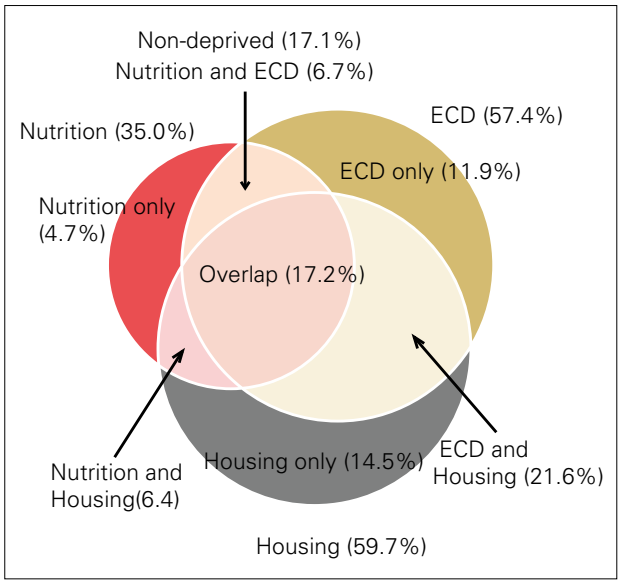
North-east



South



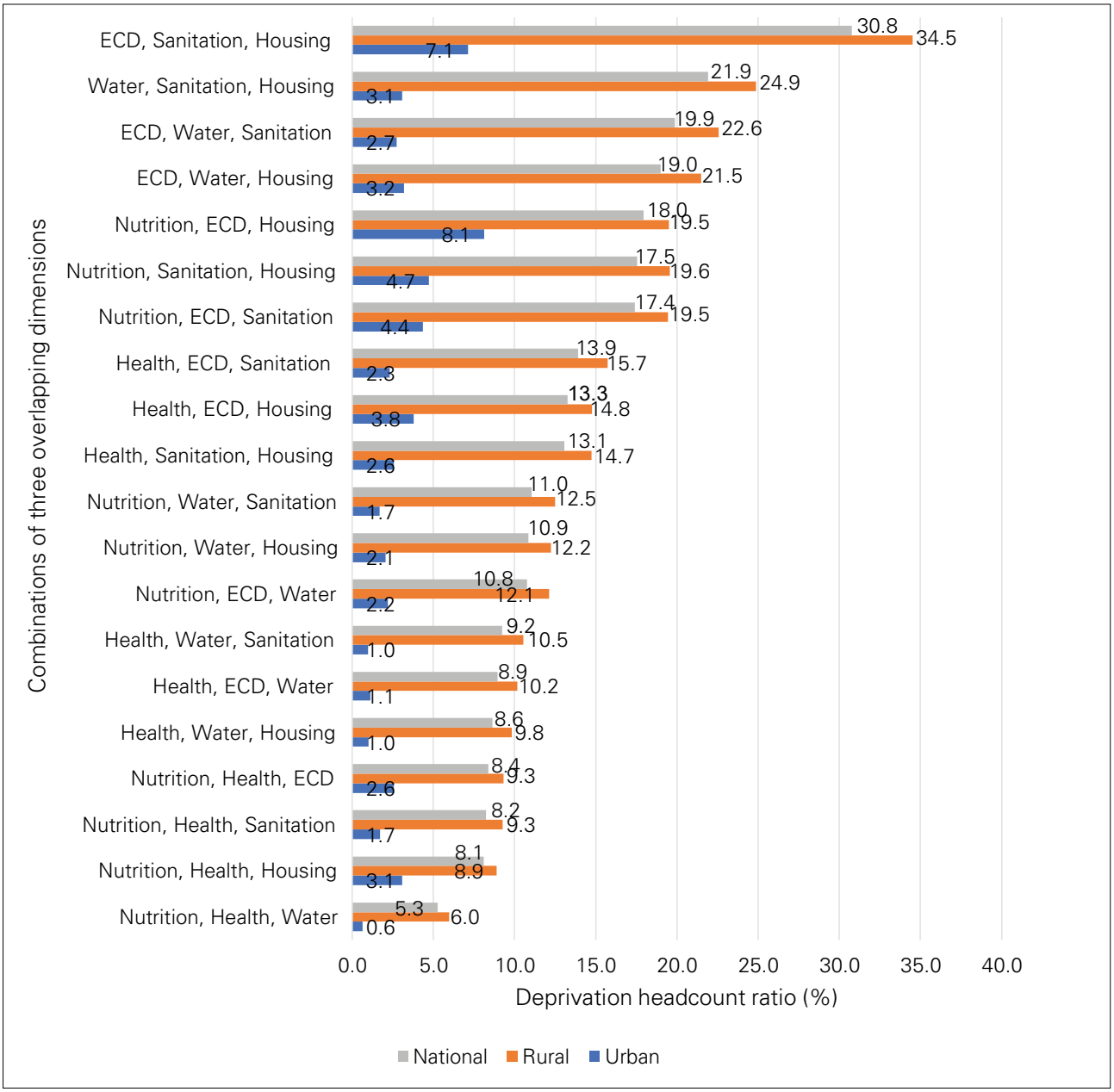
West



As consistently seen throughout the analysis, stark differences can be observed in the extent of overlap between combinations of three dimensions based on a child's area of residence (urban vs.

rural). Figure 20 presents the headcount rate of children who are simultaneously deprived in all three specified dimensions, for each possible permutation of three dimensions. The results are disaggregated at the national, urban and rural levels, and clearly show the extreme extent to which national-level results are driven by rural-level rates. This figure provides a general picture of the extent to which certain overlapping deprivations are a problem for children aged 0-4 years in Cambodia and echoes the results shown in Figure 17 and Figure 18. Combinations of overlap with ECD, sanitation, nutrition and housing yield the highest rates of three-way overlap and these are far higher in rural areas than in urban areas. In urban areas, the highest rate of three-way overlap is in the combination of deprivation in nutrition, ECD and housing, although at a mere 8.1 per cent compared to 19.5 per cent in rural areas. These rates provide some indication of which manner of geographical targeting, and which combination of integrated, cross-sectoral interventions could yield the highest impact on children.

Figure 20: Headcount of children simultaneously deprived in three dimensions at the national, rural and urban levels, children aged 0-4 years



4.2.4 Multidimensional deprivation indices

The multidimensional deprivation indices complement the analysis on the distribution and overlap of deprivations, by indicating the overall incidence and intensity of deprivation among children. Table 17 shows the indices H, A and M0, for all children aged 0-4 years.

The multidimensional deprivation headcount (H) shows the proportion of children experiencing at least one, two, three and more deprivations at a time, for all possible cut-off points (k). For example, when using the deprivation cut-off point of three to six deprivations (k=3), 57.1 per cent of children aged 0-4 years are defined as multidimensionally deprived. On average, these children are deprived in 3.9 deprivations at a time, or 64.8 per cent of all possible deprivations.

For policy and targeting purposes, H provides information about the potential size the impact of certain policies targeting multidimensionally poor will have. For example, policies targeting all children deprived in two dimensions at a time should impact around 78 per cent of the population of children aged 0-4 years.

The intensity of deprivation (A) is the average number of dimensions multidimensionally poor children experience, going beyond identifying how many multidimensionally poor children there are, by understanding how intensely they experience multidimensional poverty. Policymakers might decide to focus interventions on the most-intensely deprived children, for example those who are deprived in five to six dimensions at a time (14 per cent of children aged 0-4), aiming to reduce H by also reducing the average number of deprivations experienced, A.

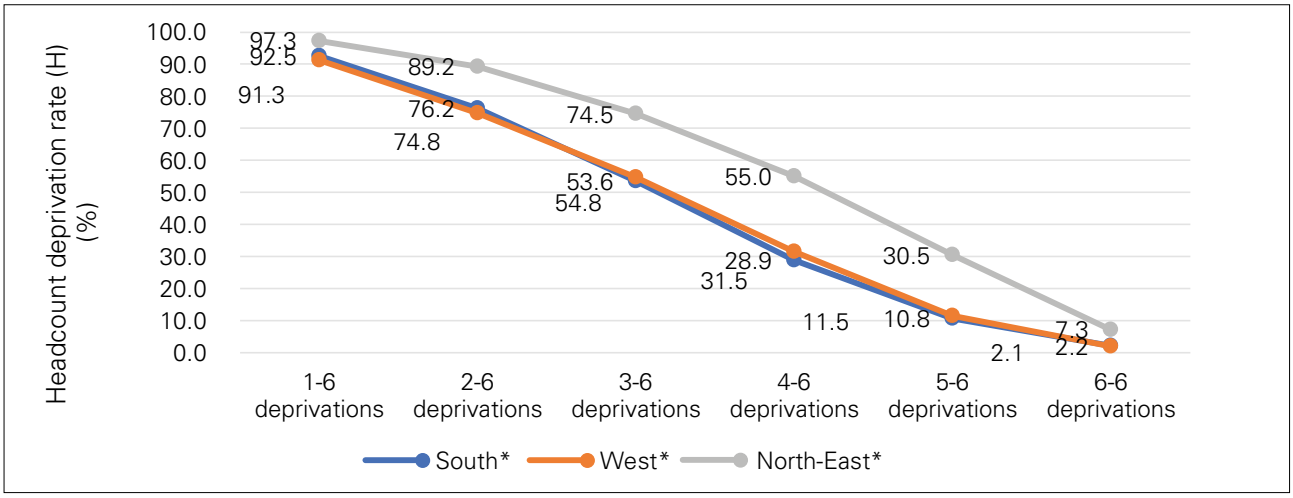
Table 17: Multidimensional deprivation indices at the national level for children aged 0-4 years

	Multidimensional deprivation headcount (H), %	Average number of deprivations among the deprived (A)	Average intensity among the deprived (A); %	Adjusted multidimensional deprivation headcount (M0)
1-6 deprivations	93.0	3.0	49.9	0.46
2-6 deprivations	77.9	3.4	56.4	0.44
3-6 deprivations	57.1	3.9	64.8	0.37
4-6 deprivations	33.6	4.5	75.1	0.25
5-6 deprivations	14.1	5.2	86.9	0.12
6 deprivations	3.0	6.0	100.0	0.03

Figure 21 shows how, at every level of deprivation intensity (higher cut-off point), children living in the north-east present a significantly higher incidence of multidimensional poverty than children living in the south and west, which show very similar rates to one another. Figure 22 compares H, A and M0 at the national level to those at the area and zone levels, for children deprived in three to six dimensions at a time (k). The headcount of multidimensionally poor children (H) varies between zones – highest in Plateau and Mountainous (71.9 per cent) and lowest in Plains – and areas – highest in rural areas (70.8 per cent) compared to urban areas (58.4 per cent). Although this rate of multidimensionally deprived children varies geographically, these children experience a similar intensity of deprivations, varying between 62.5 per cent of all possible deprivations in Plains to 70.7 per cent in Plateau and Mountainous.

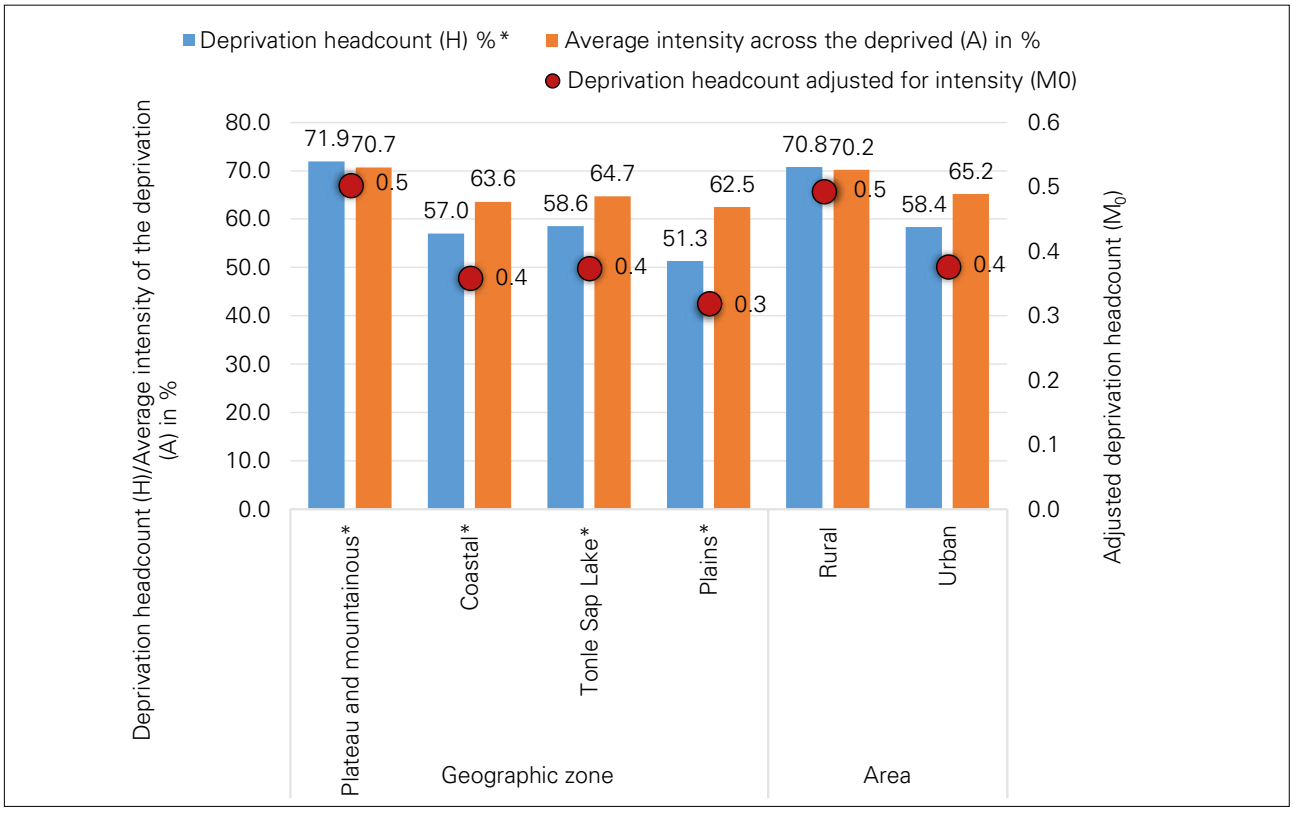
The adjusted multidimensional deprivation headcount, M0, as the product of H and A, provides a summary measure of the overall deprivation situation of children deprived in three to six dimensions (incidence and intensity of deprivation). This measure in Figure 21 shows that, on average, children living in rural areas (M0=0.50) are significantly worse off in terms of multidimensional poverty than children in urban areas (M0=0.38), and children in the Plateau and Mountainous zone rank far worse (M0=0.51) compared to children in Plains (M0=0.32).

Figure 21: Multidimensional deprivation headcount rate by region for all levels of deprivation intensity



** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05*

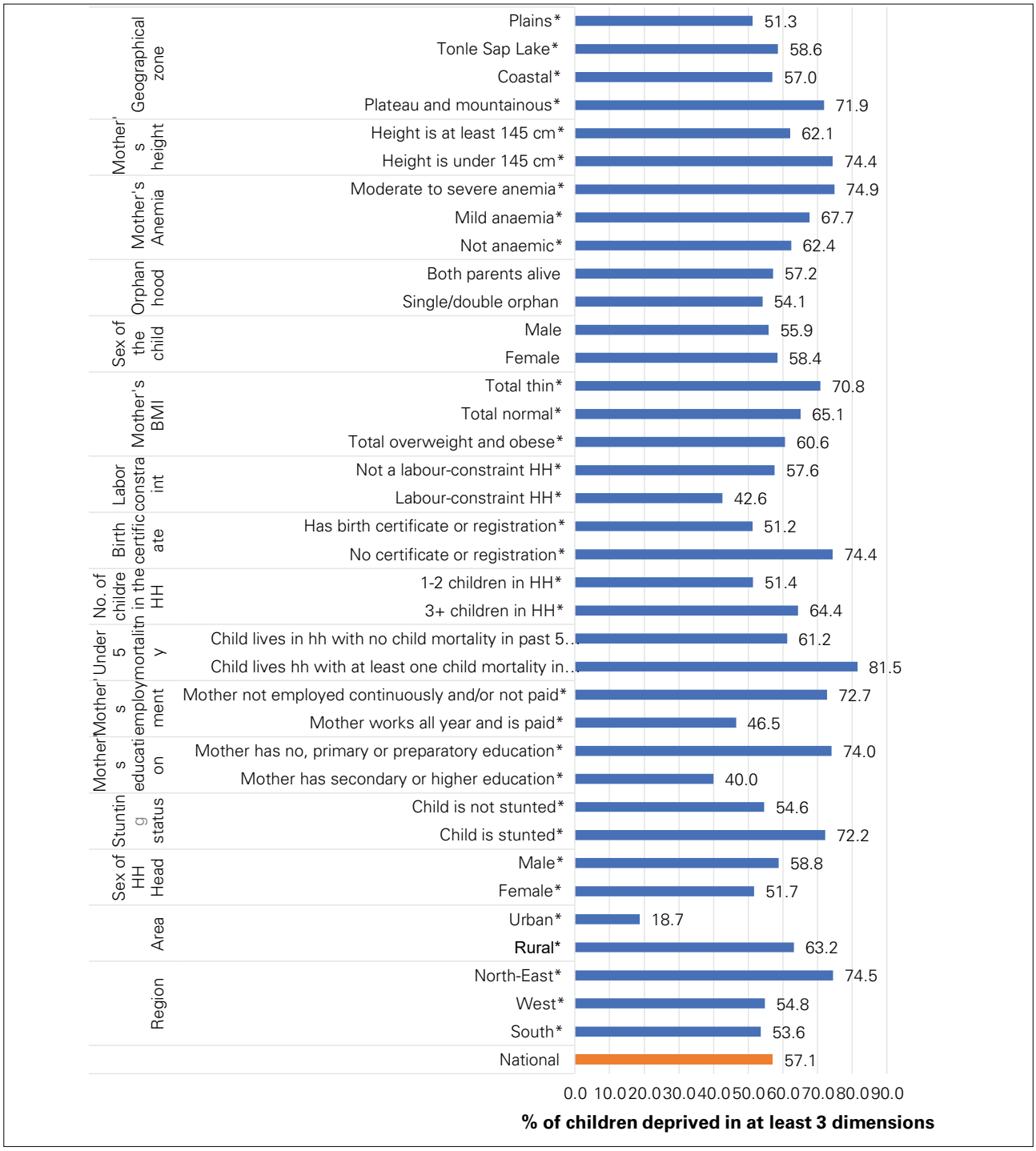
Figure 22: Multidimensional deprivation indices (H, A, M0) by geographical zone and area, children aged 0-4 years deprived in at least three dimensions (k=3)



** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

Deprivation headcount rates for children deprived in three to six dimensions are profiled by the household and socio-economic characteristics of the child are also illustrated in Figure 23. The results demonstrate that the likelihood of a child's exposure to multidimensional deprivation is closely related to the following additional individual and household characteristics: education level, height, BMI, anaemic status, and employment of the mother; labour constraints; being in a male-headed household; being in a household with more than three children; having birth registration; being stunted; and being in a household with an instance of under-five mortality. In contrast, gender of the child orphanhood do not seem to significantly affect the likelihood that he/she is multidimensionally deprived.

Figure 23: Multidimensional deprivation headcount for children aged 0-4 years deprived in three or more dimensions, by children's individual and household characteristics



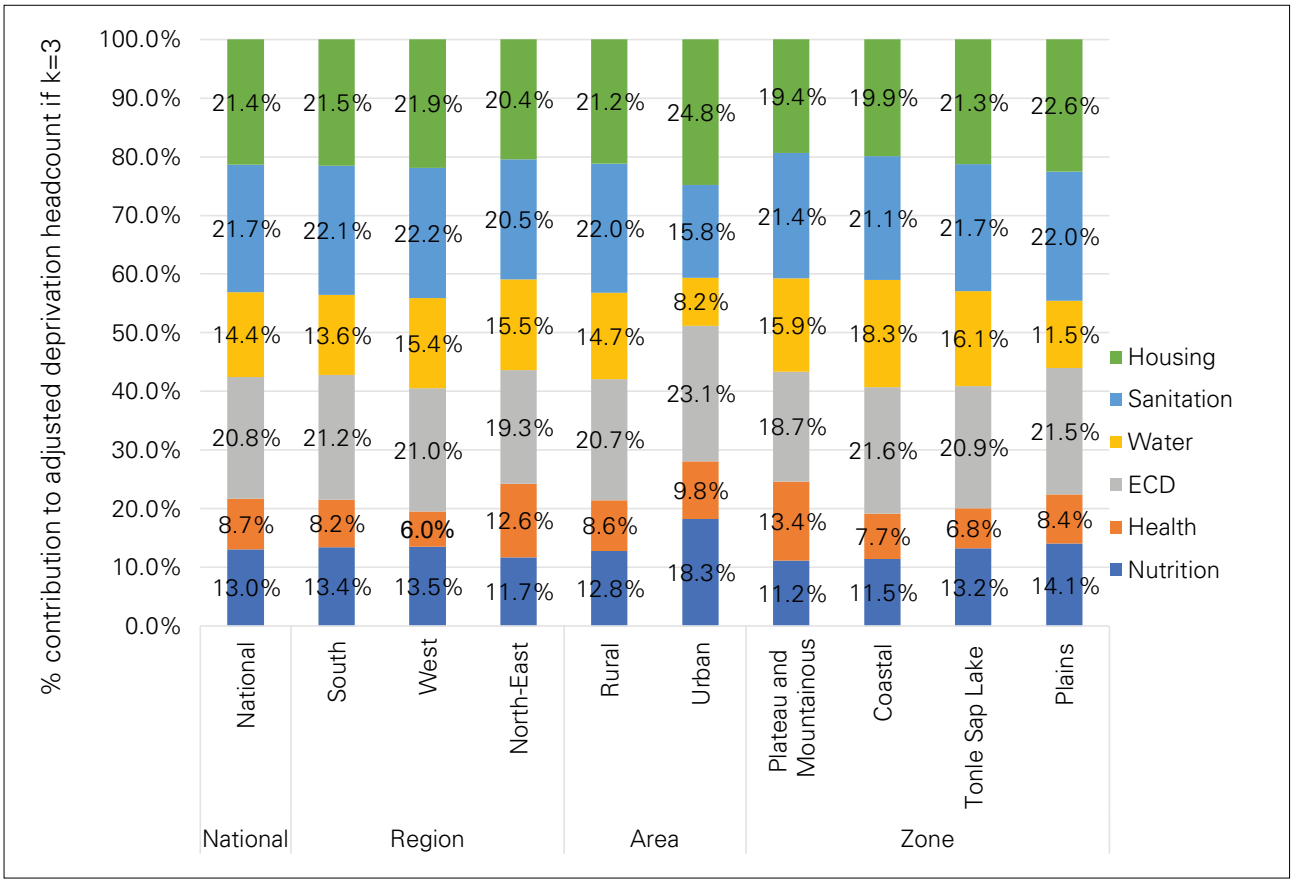
** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

4.2.5 How does each dimension contribute to overall deprivation incidence and intensity?

The adjusted multidimensional deprivation headcount index (M0) can be decomposed by the studied dimensions of deprivation, allowing us to assess the relative[13] percentage contribution of each dimensional deprivation to the overall deprivation rate (M0).

As seen in Figure 24, deprivation in the ECD, sanitation and housing dimensions contribute the most to the adjusted deprivation headcount at the national level and at all geographical disaggregations (region, area, zone) while deprivation in health and water contribute the least. These percentages of contribution of all dimensions do not vary much across all regional disaggregations. The most notable difference is the relative smaller contribution of sanitation and water to overall deprivation in urban areas and the greater contribution of nutrition (18.3 per cent) and housing (24.8 per cent). These results give some indication of the dimensions of the greatest concern in various geographical regions.

Figure 24: Decomposition of the adjusted multidimensional deprivation ratio (M0) for children with k=3, by dimensions, 0-4 years



13 These figures indicate the relative importance of deprivation in various dimensions in that particular profile (subgroup of children), but do not necessary indicate that deprivation in a dimension is worse in one subgroup of children compared to another.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5

Further Analysis: Stunting Among children aged 0-4 years

5. Further Analysis: Stunting Among children aged 0-4 years

Stunting remains a significant impediment to human development in Cambodia. As a primary indicator for infant and child malnutrition, stunting is defined by the WHO as having a low height-for-age ratio, below minus two standard deviations (-2SD) from the median of the reference population (WHO, UNICEF). Stunting is frequently used as an indicator to track the status of overall child well-being, chronic poverty, and inequalities in economic development in a country. As corroborated by a wide range of literature, stunting is a consequence of numerous unfavourable conditions including in utero malnutrition, malnutrition, inadequate health conditions, insufficient micronutrient intake, infectious diseases, food insecurity, and other environmental and psychological hazards (Campisi, Cherian and Bhutta; Greffeuille, Sophonneary and Laillou; Onis and Branca; Semba, Shardell and Sakr Ashour; Semba, Pee and Sun). Stunting has been shown to determine a child's potential for both physical and cognitive development (Campisi, Cherian and Bhutta; de Neubourg and de Neubourg; World Health Organization (Ed.) 1997 – WHO Global Database on Child). A healthy society is one in which no child is stunted.

Cambodia has successfully reduced stunting rates and improved maternal and child nutrition and health indicators over the past decade through effective health and nutrition policies and rapid economic growth and development (Greffeuille, Sophonneary and Laillou; Ikeda, Irie and Shibuya). However, stunting remain high, at a rate that threatens the sustainability of meaningful economic and human development and impedes the vital development of human capital for continued growth, all of which are necessary for Cambodia to meet its SDGs by 2030. Stunting in Cambodia has been estimated to have a significant cost of 1.7 per cent of Cambodia's gross domestic product (Moench-Pfanner, Silo and Laillou).

According to our child sample and echoed by the CDHS 2014 report, 31.8 per cent of children aged 0-4 years are stunted at the national level. Stunting levels are high across all geographic levels, as seen in Figure 25. The north-east has the highest rate of stunted children (37.2 per cent). Figure 26 shows that most stunted children live in rural areas and in the northeastern region of Cambodia. This section presents an in-depth analysis of the situation of stunting within the multidimensional analysis of children aged 0-4 years. The analysis uses the reduced sample of children for whom anthropometric data was available.

Figure 25: Percentage of stunted children in each geographic level

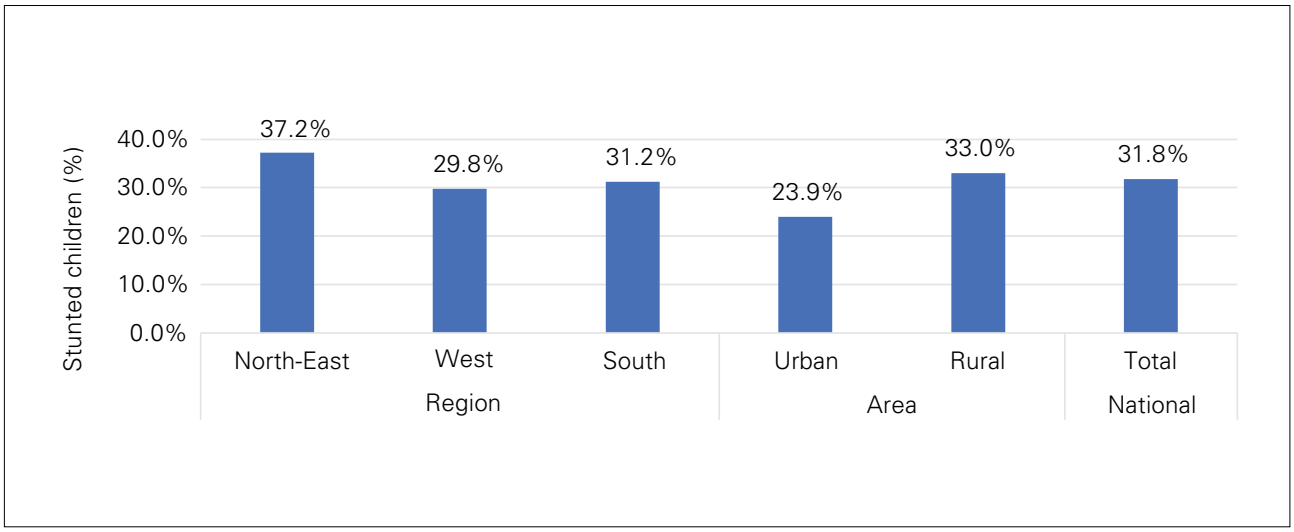
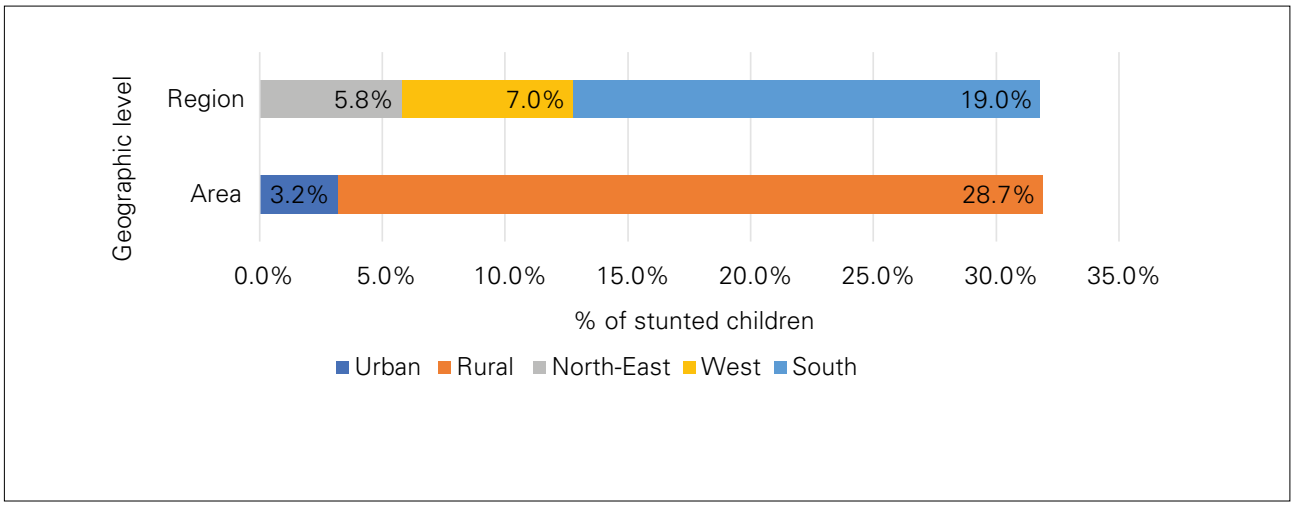


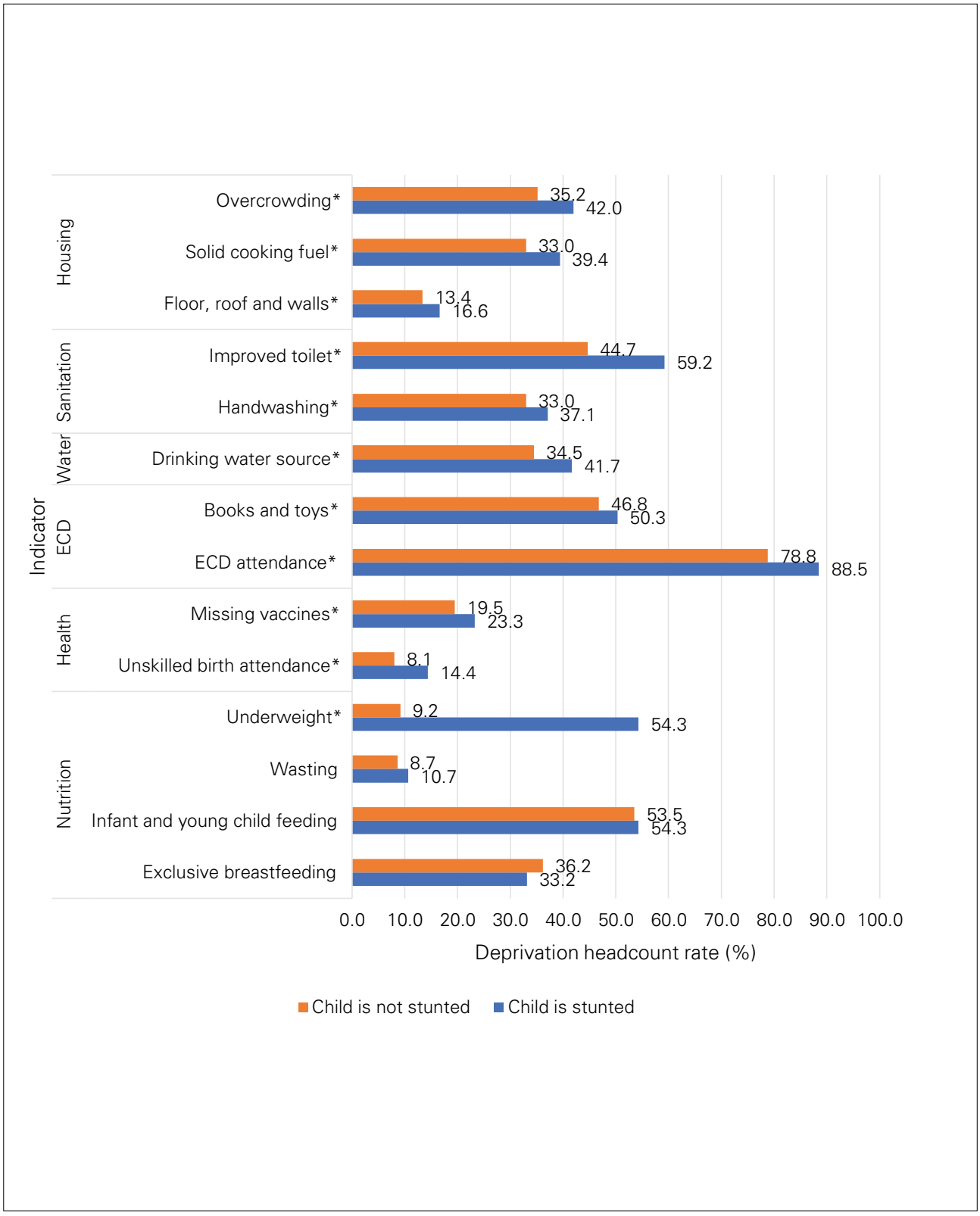
Figure 26: Decomposition of all stunted children by geographic level



5.1 Single sector deprivations of stunted and non-stunted children

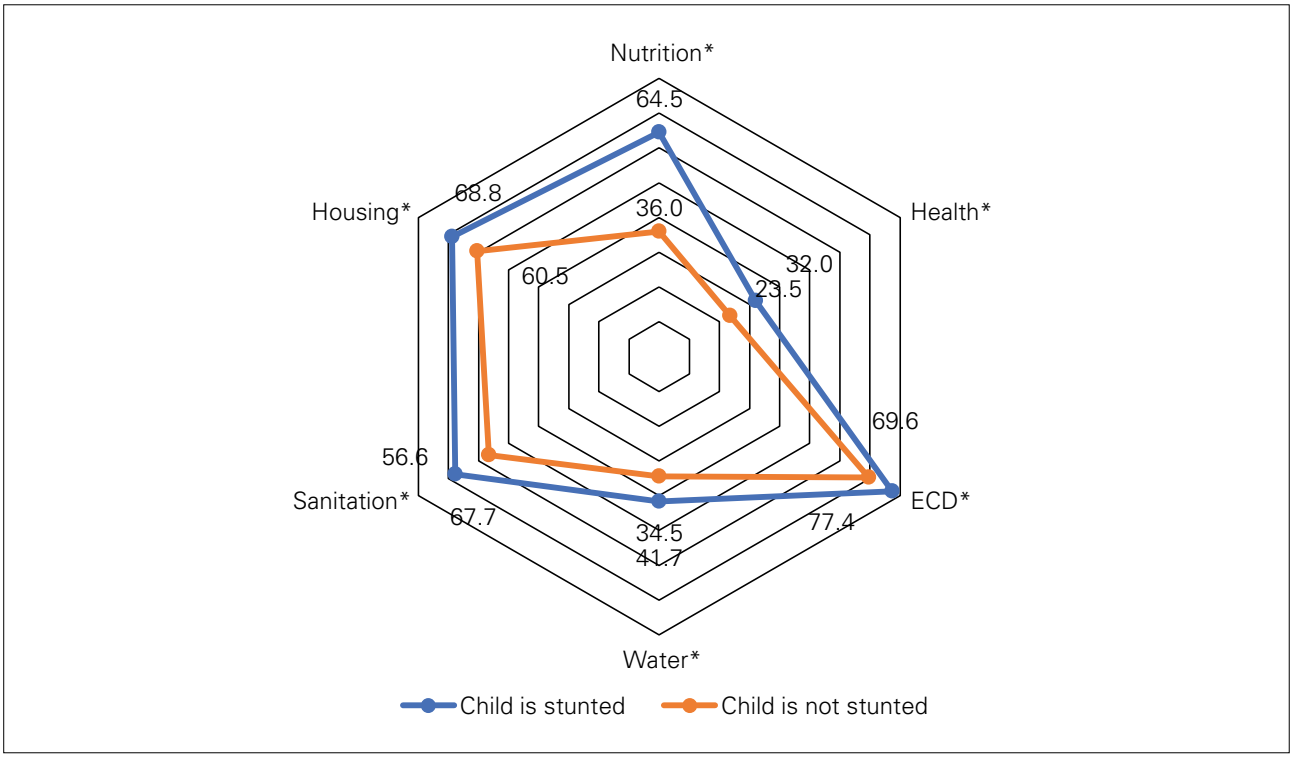
Stunted children face higher deprivation rates than non-stunted children in all indicators and dimensions analyzed (Figure 27, Figure 28). At the indicator level, differences between stunted and non-stunted children are significant at the $p<0.05$ level for all indicators except exclusive breastfeeding, infant and young child feeding, and wasting. This suggests that stunted and non-stunted children are not necessarily fed differently, but that they have large differences in the other conditions determining their well-being and in the combination of these conditions. These conditions are defined in part by the indicators measured across the health, ECD, water, sanitation and housing dimensions in addition to the underweight indicator of the nutrition dimension. At the dimension level, the largest discrepancy for children in this age group can be found in nutrition: 64.5 per cent of stunted children are deprived versus 36 per cent of non-stunted children, largely driven by deprivation in the underweight indicator – 54.3 per cent of stunted children are underweight compared to only 9.2 per cent of non-stunted children.

Figure 27:Deprivation headcount ratio (%) by indicator and stunting status, children aged 0-4 years



** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

Figure 28: Deprivation headcount ratio (%) by dimension and stunting status, children aged 0-4 years

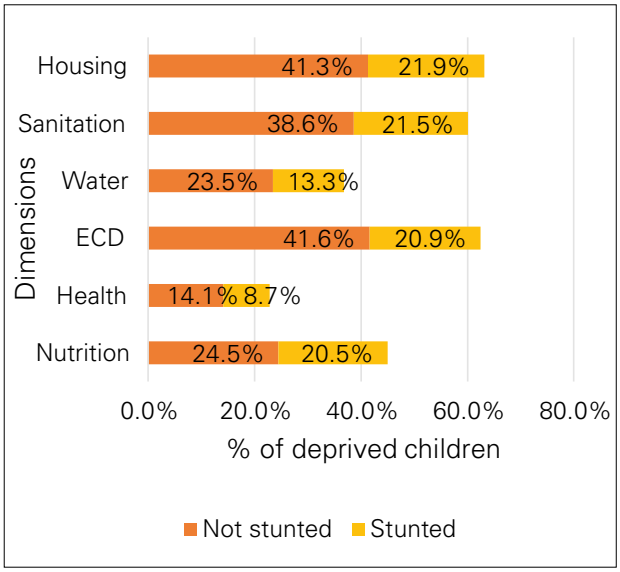


** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

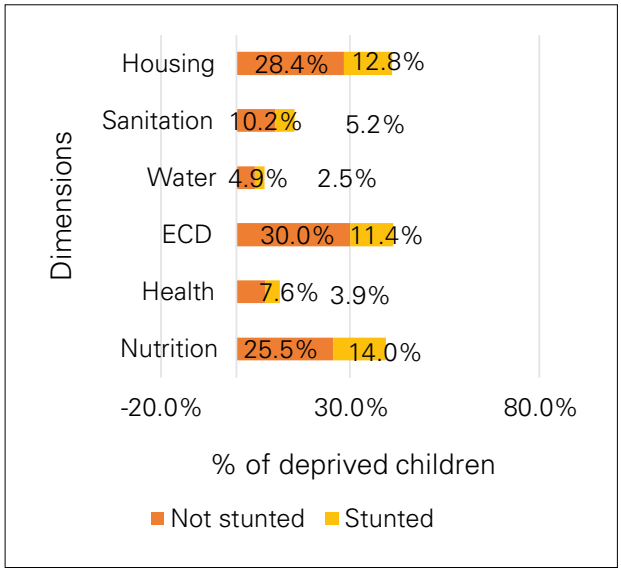
Figure 29 provides information about the percentage of children who are stunted as a proportion of the percentage of children who are counted as deprived in each single dimension, at the national, urban and rural levels. For example, of all children who are deprived in sanitation in rural areas, 24.1 per cent are stunted and 43.0 per cent are not stunted.

Figure 29: Composition of dimensional deprivations by stunted and non-stunted children, at national, urban and rural levels

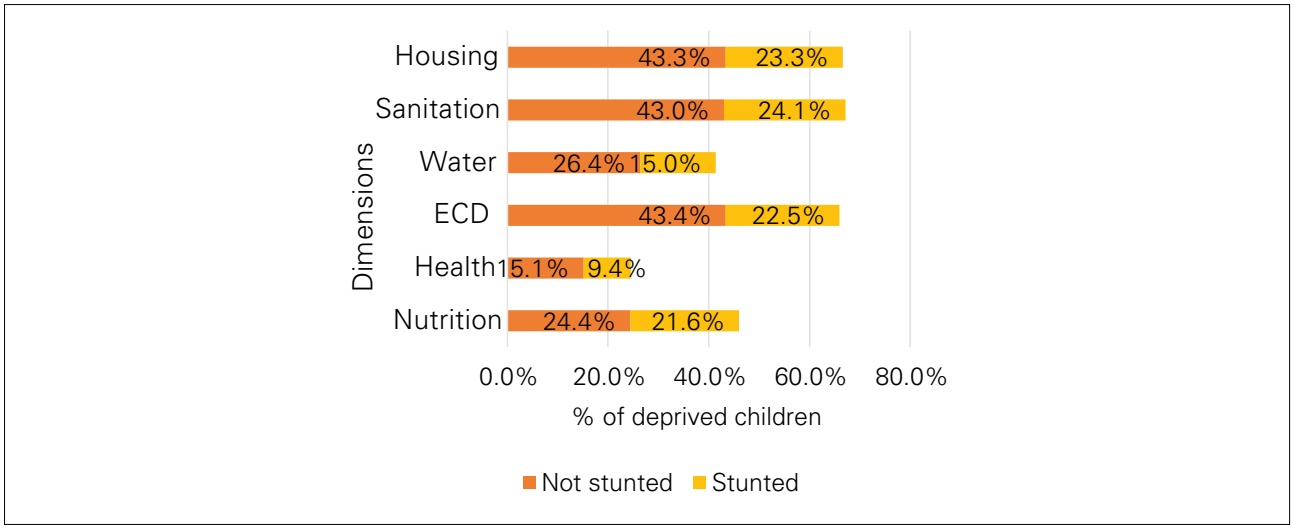
National



Urban



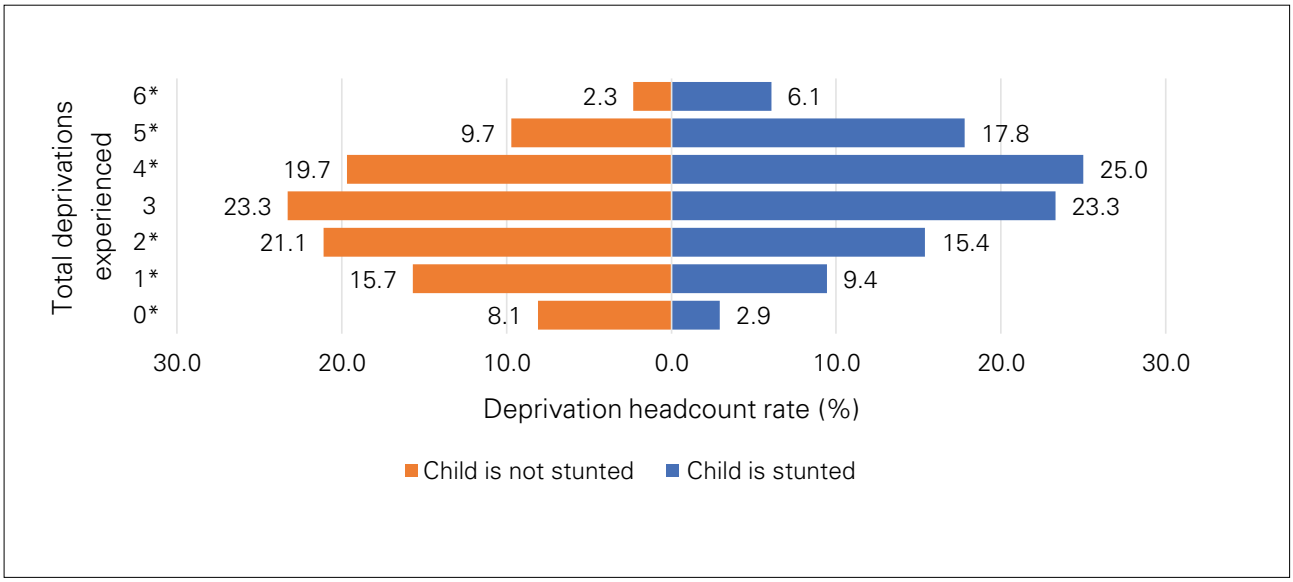
Rural



5.2 Deprivation distribution of stunted and non-stunted children

Figure 30 shows the difference between the deprivation distributions for children who are stunted and not stunted. The figure clearly shows that children who are stunted are much more likely to be deprived in more dimensions than non-stunted. Compared to the distribution of deprivations from non-stunted children, the distribution from stunted children shows a higher proportion of children experiencing four to six deprivations, 48.9 per cent, compared to only 31.7 per cent of non-stunted children. The distribution peaks at four deprivations experienced by one quarter (25.0 per cent) of stunted children. The majority of stunted children, 72.2 per cent, experience at least three deprivations at a time, compared to 55.0 per cent of non-stunted children. At the lower end of the distribution, just under half (44.9 per cent) of non-stunted children experience zero to two deprivations at a time, compared to 27.8 per cent of stunted children.

Figure 30: Deprivation distribution by stunting status, children aged 0-4 years

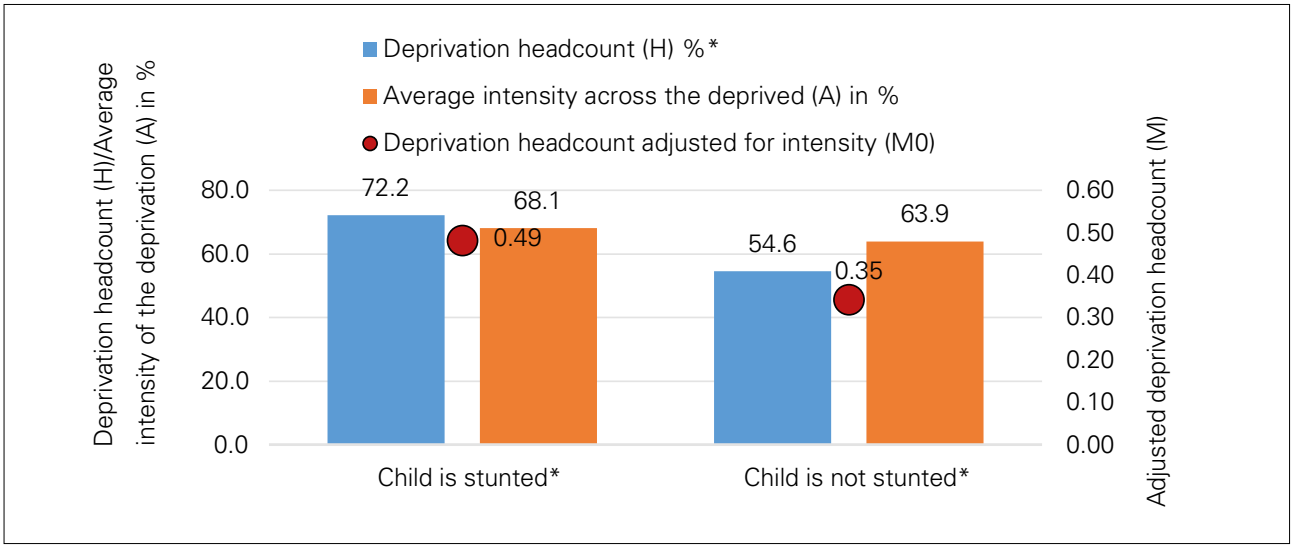


** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

5.3 Multidimensional poverty indices of stunted and non-stunted children

Figure 31 shows that with a threshold of three to six deprivations, 72.2 per cent of stunted children are considered multidimensionally poor (deprived), compared to a lower 55 per cent of non-stunted children. These stunted children experience on average 68.1 per cent of all possible deprivations. The multidimensional poverty index, M0, emphasizes that children who are stunted (M0=0.49) are far worse off in terms of overall multidimensional poverty (incidence and intensity) than non-stunted children (M0=0.35). Altogether, these results demonstrate that multidimensional poverty is a significant problem for stunted children and solving stunting will necessitate a multidimensional perspective. Although there is a higher incidence of stunted and deprived children than non-stunted, both stunted and non-stunted children experience similar levels of deprivation intensity (68.1 per cent and 63.9 per cent of all possible deprivations, respectively).

Figure 31: Multidimensional deprivation indices (H, A and M0) for children aged 0-4 years deprived in at least three dimensions (k=3), by stunting status



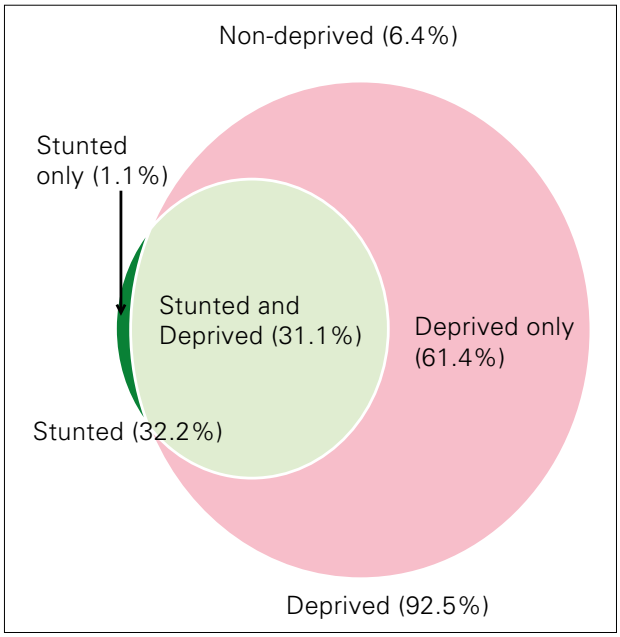
** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

5.4 Stunting and multidimensional poverty

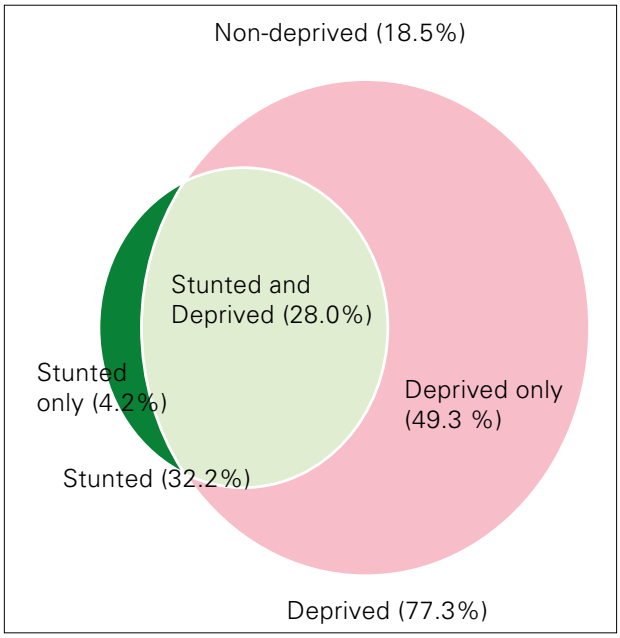
The analysis shows that the majority of children who are stunted are also multidimensionally poor. This is important for understanding the situation of children who are stunted, as it is likely that stunting is not a single sector issue but one that must be resolved through integrated interventions addressing deprivation across several dimensions. Figure 32 illustrates this point by showing the extent to which stunted children overlap with children who are multidimensionally poor according to the poverty headcount ratio, H, at threshold of being deprived in at least one, two or three dimensions at a time. It is clear that nearly all children who are stunted will also be deprived in at least one dimension, taking a deprivation threshold of one to six deprivations. Among children who are deprived in at least three dimensions at a time, 22.8 per cent are both multidimensionally poor and stunted, while 9.4 per cent are only stunted and 34.6 per cent are only multidimensionally poor and not stunted, while 33.2 per cent are neither stunted nor deprived. The figures suggest that at least some part of being stunted is possible to be explained by multidimensional poverty.

Figure 32: Two-way overlap between multiple deprivations (k=1, k=2, k=3) and stunting

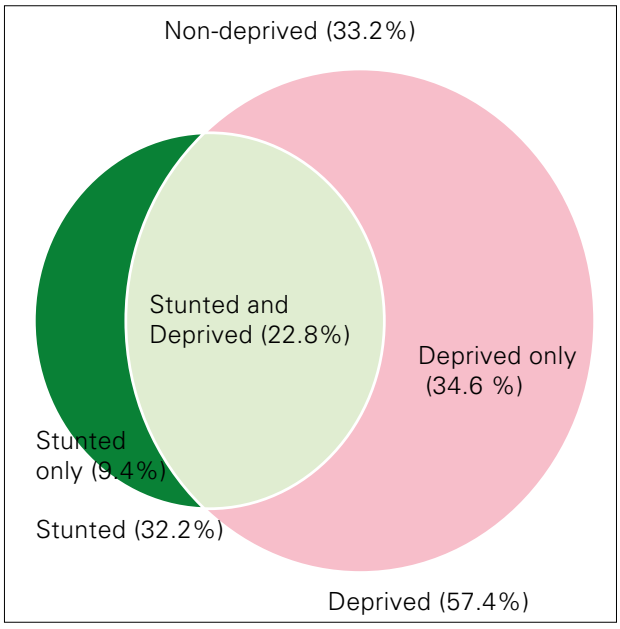
1-6 deprivations



2-6 deprivations



3-6 deprivations



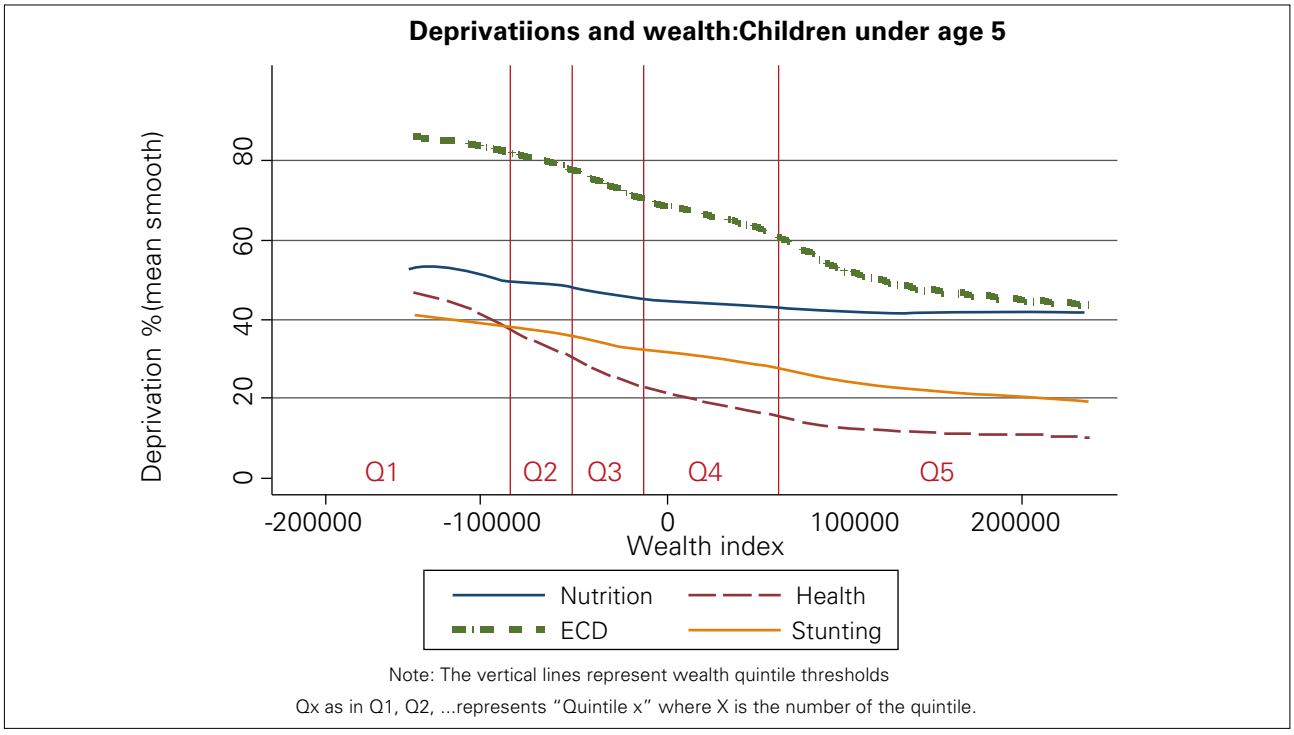
While the CDHS 2014 survey does not include a monetary welfare aggregate to discern the relationship between household financial wealth and the incidence of stunting, a proxy variable measuring household wealth in terms of an asset-wealth index provides more indication that factors beyond household wealth influence the incidence of stunting. Figure 33 plots the incidence of deprivation in nutrition, ECD, health and stunting among children younger than 5 against the CDHS wealth-asset index at the household level of these children.[14] The vertical lines in the graph represent the wealth quintile thresholds. The figure shows that as household wealth, as measured by the CDHS wealth-asset index, rises, the incidence of stunting (as well as the incidence of deprivation in nutrition) decreases

14 The housing, water and sanitation dimensions could not be included as curves plotted against the CDHS 2014 asset index as the asset index includes various factors that are also used in the construction of the housing, water and sanitation indicators.

only at a very low rate. Even at the highest levels of the wealth index, for children living in households in the highest wealth quintile (past the fourth vertical line in the figure), there is still a high rate of stunting. This shows that even among the wealthiest households in terms of the asset index, the problem of stunting is not fully reduced, suggesting an imperfect relationship between household wealth and success in eliminating stunting, and that other factors are likely to influence stunting beyond wealth.

Similarly, the headcount rate of deprivation in the nutrition, ECD and health dimensions are not fully reduced, even among those in the highest wealth quintiles, and the rates of reduction across the wealth quintiles is fairly flat. This figure suggests that asset-wealth alone, as measured by the CDHS 2014 asset index, does not perfectly account for the rate of stunting among children under age 5. It is most likely that a combination of conditions determines the incidence of stunting, which may include wealth, and are likely to include multiple other factors affecting children's well-being as measured by the nutrition, ECD, health, water, sanitation and housing dimensions. Altogether, these findings suggest a strong relationship between children's multidimensional deprivation and their likelihood of being stunted, worthy of further research.

Figure 33: National incidence of deprivation in the nutrition, health and ECD dimensions, and incidence of stunting



Note: The vertical lines represent wealth quintile thresholds

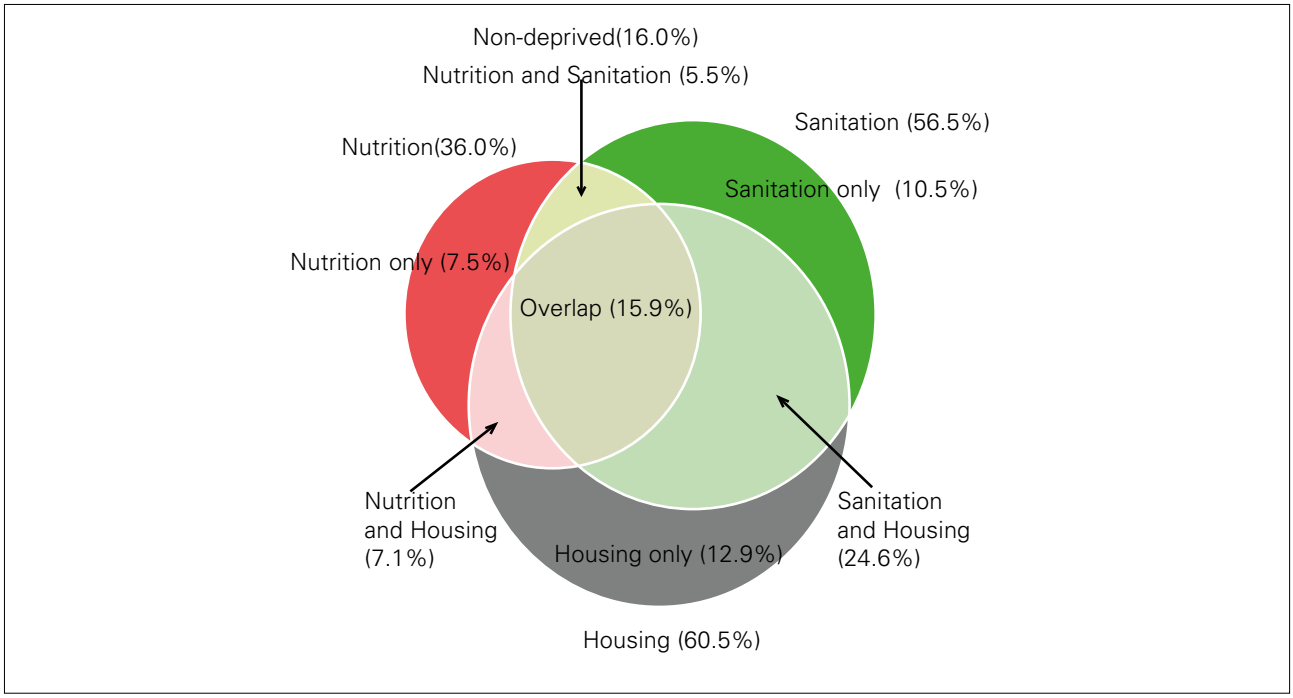
Qx as in Q1, Q2, ...represents "Quintile x" where X is the number of the quintile.

5.5 Overlapping deprivations of stunted and non-stunted children

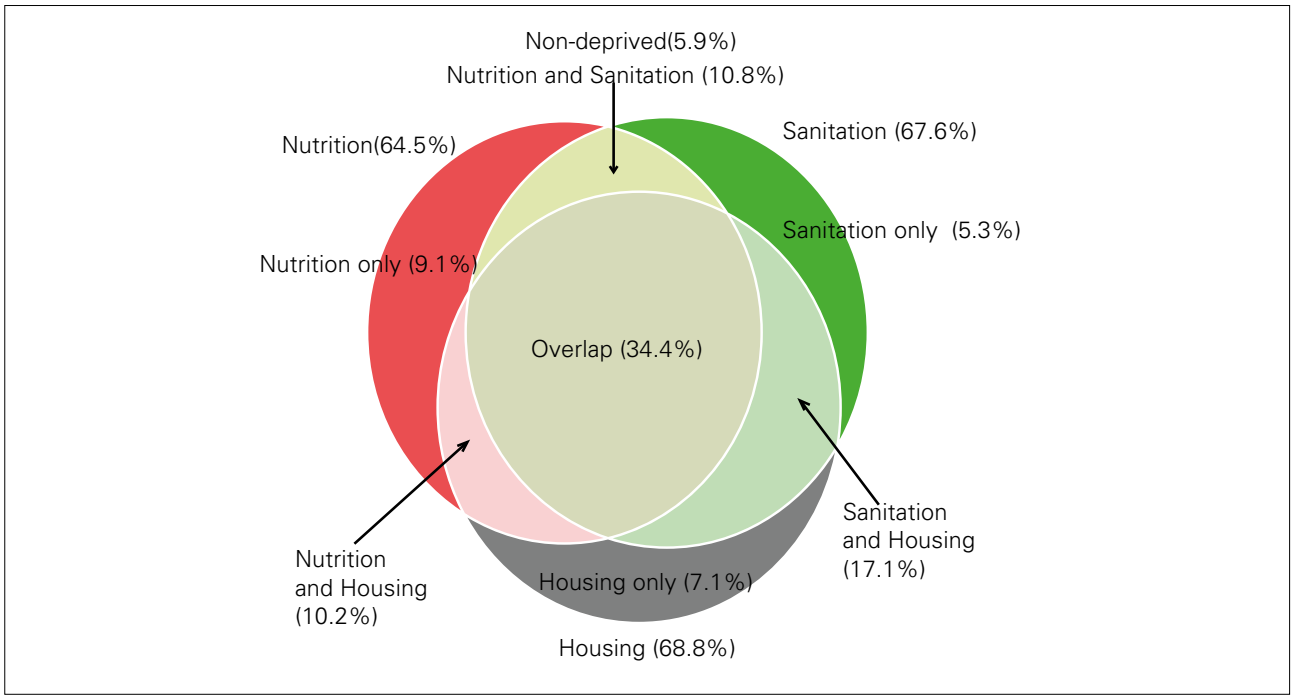
As shown in the previous section, the majority of stunted children are also multidimensionally deprived. This section details some of the highest overlaps between specific dimensions for stunted and non-stunted children. These figures show that the problems of multidimensional poverty are much more severe for children who are stunted – stunted children are more likely to have simultaneous and overlapping deprivations than non-stunted children. Figure 34 shows that among children deprived in sanitation, nutrition and housing, 15.9 per cent of non-stunted children are deprived in all three dimensions at the same time, compared to a doubled rate of stunted children (34.4 per cent).

Figure 34: Three-way deprivation overlap in nutrition, sanitation and housing dimensions for children aged 0-4 years, by stunting status

Not stunted



Stunted



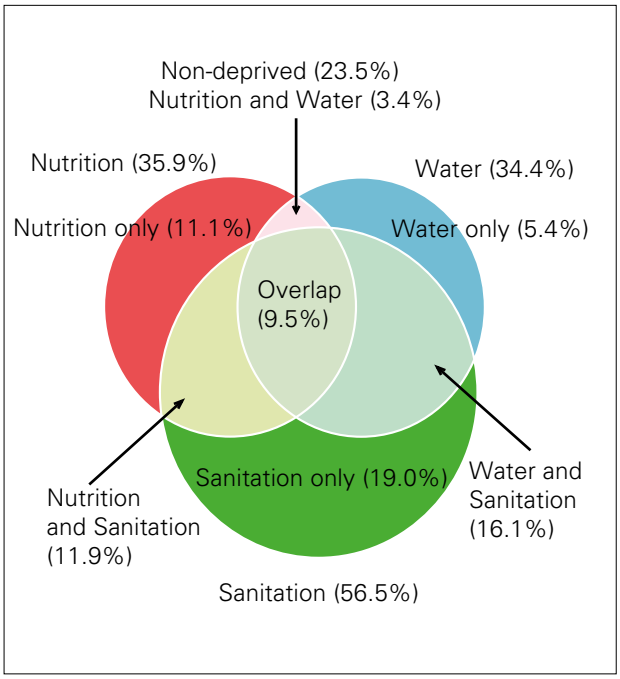
Both the headcount of children deprived in each of these three dimensions, as well as the extent to which these deprivations are experienced together, is greater for stunted children than non-stunted children. Nearly every stunted child who is deprived in housing, for example, will also be deprived in sanitation and nutrition. In the case of non-stunted children, although overlapping deprivations

still exist, there is a greater likelihood compared to stunted children that these deprivations will be experienced on their own. In both subgroups of children, there remains a very high overlap of the sanitation and housing dimensions. In both cases, but especially for stunted children, interventions to reduce stunting should be sensitive to the inter-sectoral nature of their deprivations.

These figures also support the need to consider interventions beyond only nutrition-focused dimensions to alleviate child stunting. WASH interventions crossing into the housing and sanitation sectors would help alleviate the broader situation of deprivation faced by stunted children. These same patterns are observed in Figure 35 for the combined overlap of water, sanitation and nutrition.

Figure 35: Three-way deprivation overlap for the combination of water, sanitation and nutrition dimensions for children aged 0-4 years, by stunting status

Not stunted



Stunted

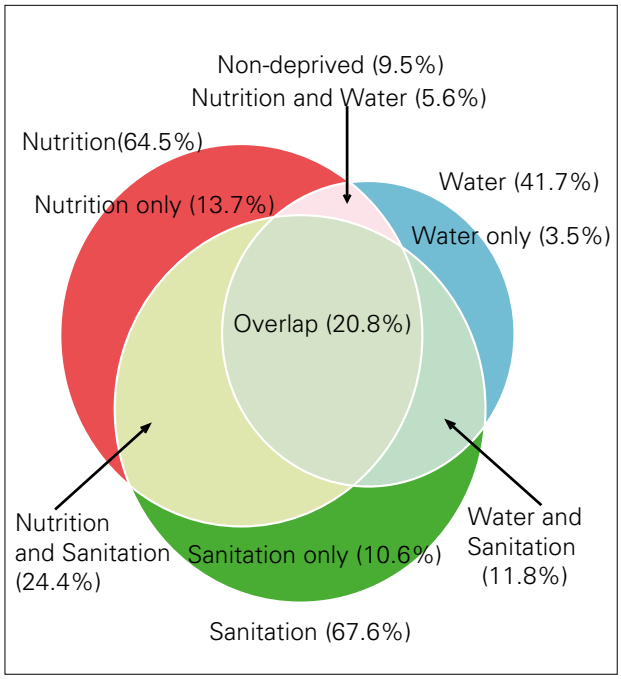
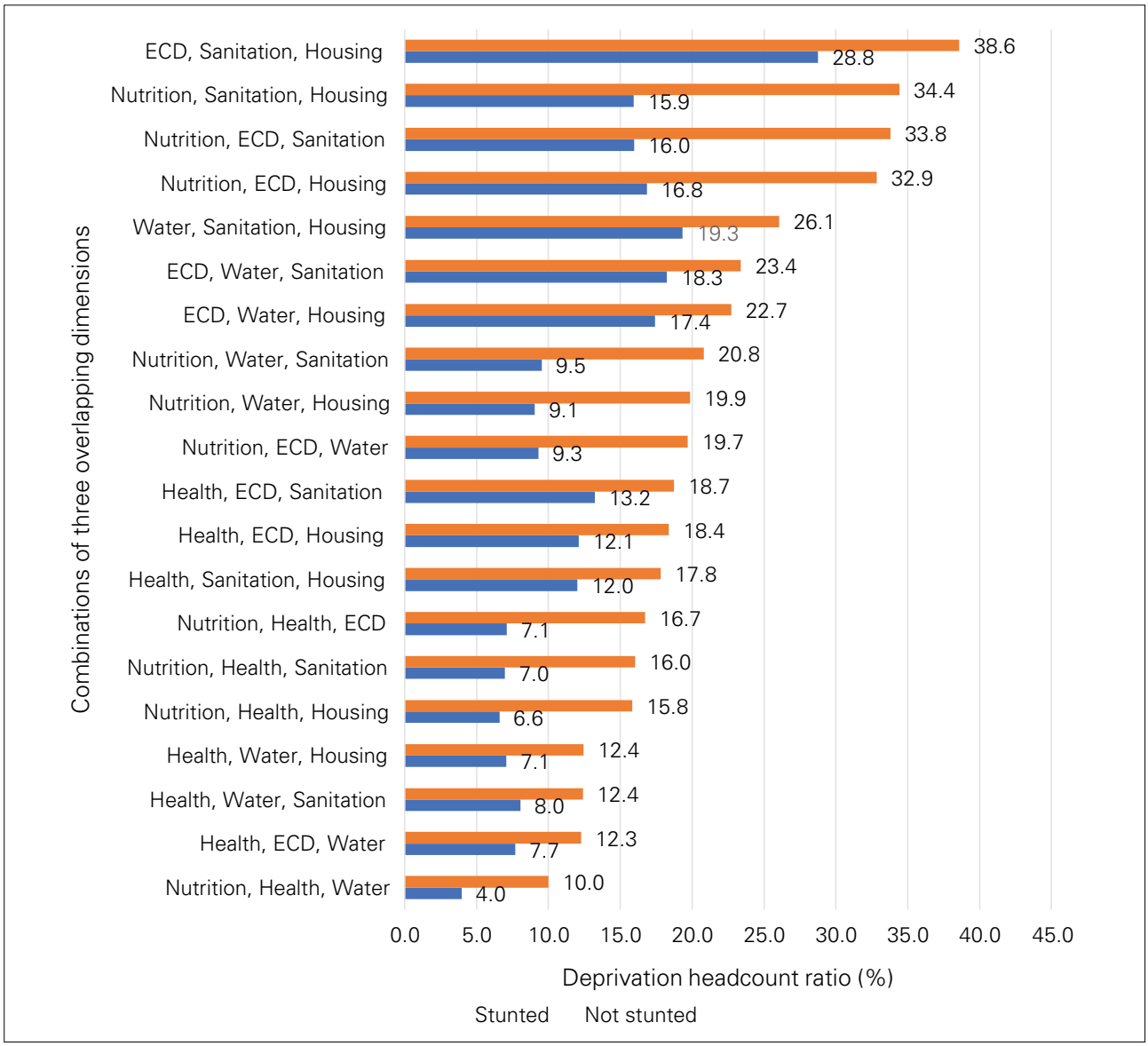


Figure 36 shows the rate of children deprived in all three dimensions at the same time, for every combination of three dimensions, for both stunted and non-stunted children. It is clear that among stunted children there is a much higher rate of children deprived in all three dimensions simultaneously for all combinations than non-stunted children. While these figures do not demonstrate causality – they do not prove that the higher rate of stunting is strictly due to these combined deprivations – they indicate that there are high associations between stunting and multidimensional poverty, which supports the literature on the overall physical and environmental conditions of child well-being needing to be considered to improve child stunting rates. These interventions need to go beyond nutrition-focused interventions by considering that even a child with perfect nutritional status will still be at risk of stunting if they are exposed to the health hazards of unimproved sanitation and housing conditions.

Figure 36: Headcount of children simultaneously deprived in three dimensions at the level of stunted and non-stunted children aged 0-4 years



5.6 What factors are associated with stunting? How can the probability of stunting be reduced?

This section details the analysis of several multivariate logistic regressions that aim to study the relationship of factors significantly associated with the probability of being stunted and the probability of reducing stunting. The logistic regression models use logistic binomial regression to calculate odds ratios and the marginal effects. They measure how predicted probabilities change when the binary independent variables change from 0 to 1. The models estimate how the probability to be deprived in terms of the dependent variable, such as the probability to be stunted, (P(Y=1) instead of P(Y=0)) would change if the independent variable X changes from 0 to 1, holding all other independent variables constant.

Table 18 shows the results of a multivariate logistic regression analysis focusing on stunting as the dependent variable and various individual and household characteristics as control variables. The table contains the main household and individual characteristics that might affect the probability of children to be stunted, estimated using a logistic regression and expressed as marginal effects.

Table 18: Factors associated with the probability to be stunted at the national level: Multivariate analysis reporting percentage change in probability to be stunted, in decimals

Variable	Category	Marginal effects
Wealth quintiles	Poorest or poorer (ref. middle/richer/richest)	0.0985***
Mother's education	No or primary education (ref. sec./higher)	0.0139
Mother's age when giving first birth	Under 18 (ref. 18+)	0.00655
Mother's height	Under 145cm (ref. 145+cm)	0.191***
Child's gender	Boy (ref. girl)	0.0148
Child's age	Additional year	0.0479***
Number of children in household	Additional child aged 0-4 years	0.00754
	Additional child aged 5-14	0.0263***
	Additional child aged 15-17	-0.0159
Number of adults aged 18-59 in household	Additional adult aged 18-59	-0.00161
Number of adults aged 60+ in household	Additional adult aged 60+	0.0138
Area of residence	Rural (ref. urban)	0.0430**
Region of residence	North-east (ref. south, west)	
Observations		4,389

*** p<0.01, ** p<0.05, * p<0.1

Sample: Children aged 0-59 months sampled for the anthropometric module

Source: Author's calculations, CDHS 2014

Holding constant all characteristics listed in the 'Variable' column, being in the poorest two wealth quintiles, having a mother with no or primary education, having a mother with less than 145 cm height, an additional year of the child's age, having an additional child aged 5-14 years in the household, and living in the north-east are positively associated with a statistically significant effect on the probability to be stunted. Having a mother who is under 145 cm tall increases the probability of child stunting by 19 percentage points. Household wealth, measured by proxy of the wealth quintiles included in the CDHS, is also associated with the probability of being stunted, where children from the lowest two quintiles have a 10 percentage higher probability of being stunted. An additional year of the child's age is associated with a 5 percentage point higher probability of being stunted.

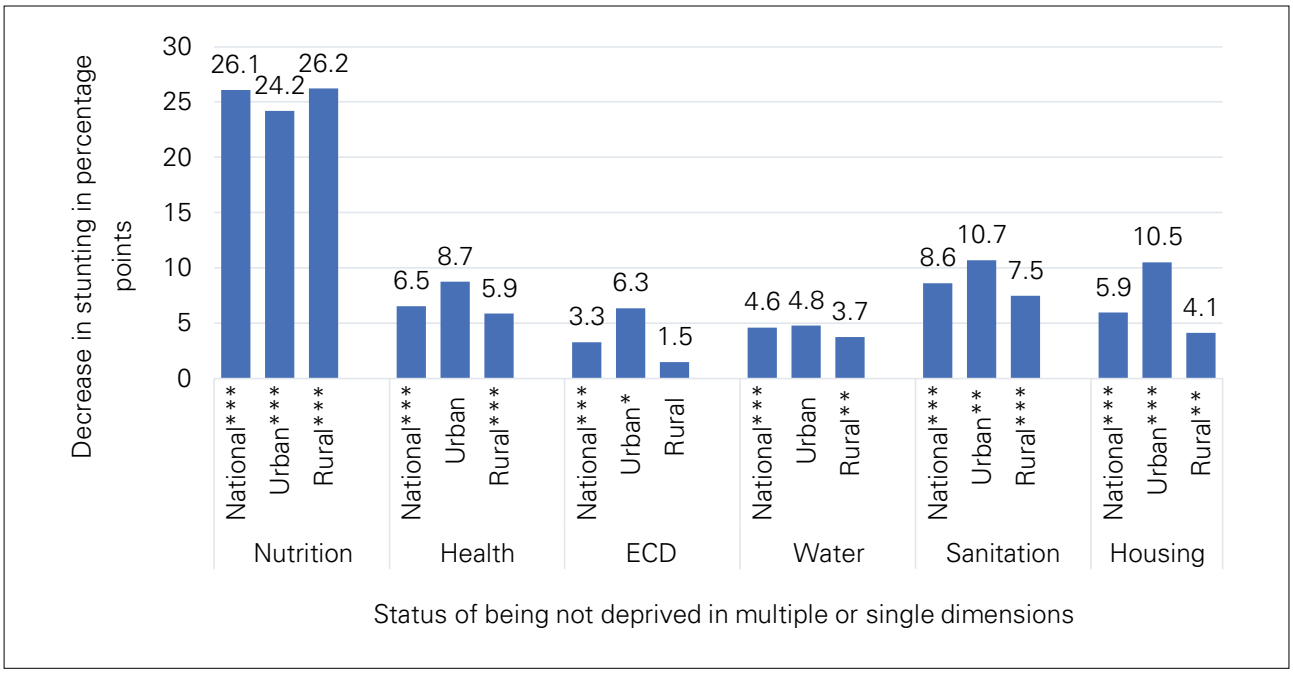
How can the probability of stunting be reduced?

Figure 37 and Figure 79 (Annex IV) present the summary findings of the regression output in Table 36, Table 37 and Table 38 in Annex IV. Figure 37 presents the probability of reducing stunting by reducing deprivation in each single dimension, controlling for the main individual and household characteristics, at the national urban and rural levels. The probabilities are expressed as marginal effects. Figure 79 (Annex IV) presents the reduced output of the same regression, when adding in all the single dimensions as control variables to control for the probability of being deprived in all other dimensions, keeping only the statistically significant marginal effects for the presentation of the figure.

Figure 37 shows that at the national level, controlling only for key characteristics, reducing deprivation in the nutrition dimension has the highest significant marginal effect on the probability of reducing stunting. The probability of reducing stunting increases by 26.1 percentage points if the child is not deprived in nutrition. This probability is similar at the urban (24.2 percentage points) and rural (26.2 percentage point) levels. The figure also shows that in rural areas, holding constant key characteristics, not being deprived in all dimensions except ECD is significantly associated with a reduction in the probability of being stunted (not controlling yet for deprivation in other dimensions).

Figure 79 (Annex IV), based on the last column of the regression output in Table 36, Table 37 and Table 38 is the same model but additionally controlling for the effect of non-deprivation in all dimensions, in order to explain their joint relationship and the effect on the probability of stunting.

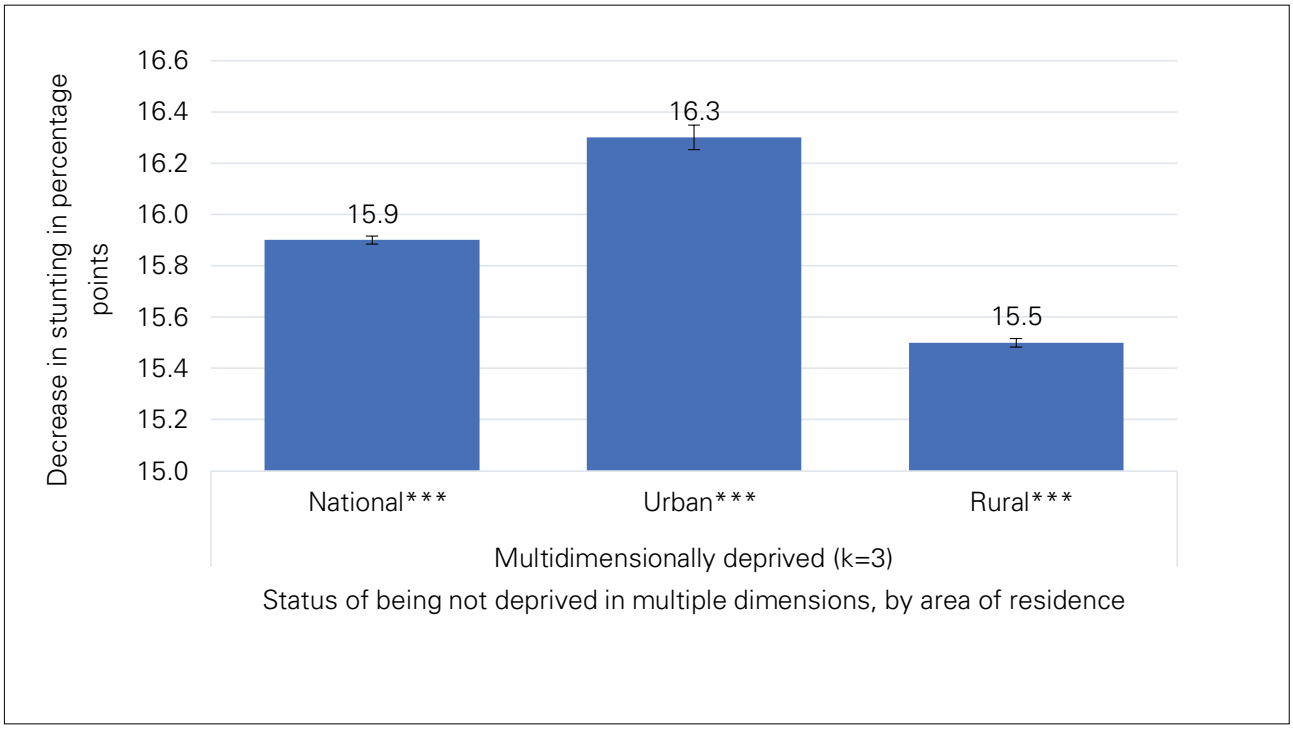
Figure 37: Probability of reducing stunting through reducing deprivations in single dimensions, controlling for individual and household characteristics, at the national, urban and rural level



**** p<0.01, ** p<0.05, * p<0.1*

Figure 38 presents an attempt to estimate the probability that stunting can be reduced by decreasing the child's multidimensional poverty (defined as being deprived in at least three deprivations), expressed as marginal effects. The full results of the multivariate logistic regression analysis are found in Table 39 in Annex IV. These results show how having a lower intensity of deprivations/lowering the intensity of deprivations (to 0, 1 or 2 deprivations) will impact the probability of being stunted. At the national and rural levels, controlling for key individual and household characteristics, reducing deprivation intensity is associated with a statistically significant negative effect on the probability of becoming stunted. This suggests that, for example, at the rural level, reducing the number of deprivations is associated with a -15.5-percentage point change in the probability of becoming stunted. In urban areas, reducing the number of deprivations is associated with a -16.3 percentage point change in the probability of becoming stunted.

Figure 38: Average marginal effect on the probability of reducing stunting by reducing multidimensional poverty (defined as being deprived in at least three deprivations, k=3), at national, urban and rural levels



*** p<0.01, ** p<0.05, * p<0.1

In summary, reducing the probability of child stunting in Cambodia will have the highest impact through interventions that:

- Are sensitive to the multidimensional nature of poverty for stunted children. Stunting is a multidimensional problem requiring multidimensional solutions.
- Reduce children's deprivation intensity, focusing on children living in rural areas and the north-east.
- Focus on nutrition-focused interventions, in addition to and simultaneously with nutrition-sensitive interventions in the water, sanitation and housing sectors. These interventions must be sensitive to the differences in urban and rural children with a focus on children living in the north-east.
- Focus on early intervention in the first 1,000 days of the child's life. The probability of stunting increases with each additional year of the child's age.

In the longer term, reducing child stunting in Cambodia will also necessitate investing in maternal health, nutrition, education and empowerment. As stunting can begin in utero, the health and physical conditions of the mother are paramount to reducing the cycle of intergenerationally transmitted stunting. Mothers who are stunted are more likely to have stunted children.

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6

Results: Multidimensional Child Poverty for Children aged 5-14 years

6. Results: Multidimensional Child Poverty for Children aged 5-14 years

Highlights

- 44.2 per cent of children in this age group are multidimensionally poor, facing on average 3.6 out of five deprivations.
- Children living in rural areas and the Plateau and Mountainous zones are doing worst. For example, 57.8 per cent of children living in Plateau and Mountainous zones are deprived in all five dimensions analyzed.
- Around half of Cambodian children aged 5-14 years do not have access to improved toilet facilities, while 47 per cent of children are living in overcrowded households with more than four people per sleeping room. Additionally, primary school attainment needs attention, with 44.6 per cent of children beyond primary school age (12-14 years) not completing the six grades of primary school education.
- An inter-sectoral approach is especially needed for the high overlap between housing and sanitation.
- Across all levels (national, rural and urban), housing and sanitation have the largest impact on the multidimensional headcount ratio adjusted for intensity of deprivation (M0).

6.1 Single deprivation analysis

The following sections show the results of the analysis results by single sector. The deprivation headcount ratio represents the proportion of children deprived in each indicator or dimension as a percentage of total children in the age group in question for whom data was available, otherwise referred to as the reference population.

To aggregate the indicators into dimensions, MODA uses the union approach ($0<k\leq1$) to determine if a child experiences deprivation in a certain dimension or not. This means that a child who is deprived in at least one of the indicators will be defined as deprived in the whole dimension.

Figure 39 and Figure 40 show high rates of deprivation in many indicators for children aged 5-14 in Cambodia. Children in this age group experience the highest deprivation headcount rate in the household-level housing dimension, driven by the high rates of deprivation in the overcrowding indicator (47.0 per cent) and solid cooking fuel use (34.4 per cent). Almost half of children aged 5-14 do not have access to an improved toilet facility (49.7 per cent). Moreover, 61.6 per cent of the children in this age group do not have access to safe and improved sanitation conditions at the dimension level, which is similar to the deprivation rate for children aged 15-17. Just under half of children in this age group (42.5 per cent) lack adequate media exposure.

For children aged 5-14, 22.5 per cent are deprived in the education dimension, likely primarily driven by the high rate of incomplete primary education among children who are beyond primary school

age (ages 12, 13, 14 years) and by the 16.8 per cent of children in this age group who are two or more years behind in school. This is troubling given that even if basic school attendance is high, a disproportionate fraction of children do not complete their primary schooling in the correct amount of time. This suggests the existence of weaknesses in the Cambodian school quality that keep children from progressing to higher levels at the suitable rate for their age, or living conditions that keep children from finishing school such as low family income, a school/labour trade-off or late school enrolment. Underperformance in the education indicators may also be linked to inadequate integrated ECD, such as a lack of adequate feeding in early childhood leading to more difficulties in learning as these children enter school. Deprivation rates in household-level indicators in the housing, sanitation and water dimensions are similarly high to those in other age groups.

Figure 39: Deprivation headcount rate (%) by indicators, children aged 5-14 years

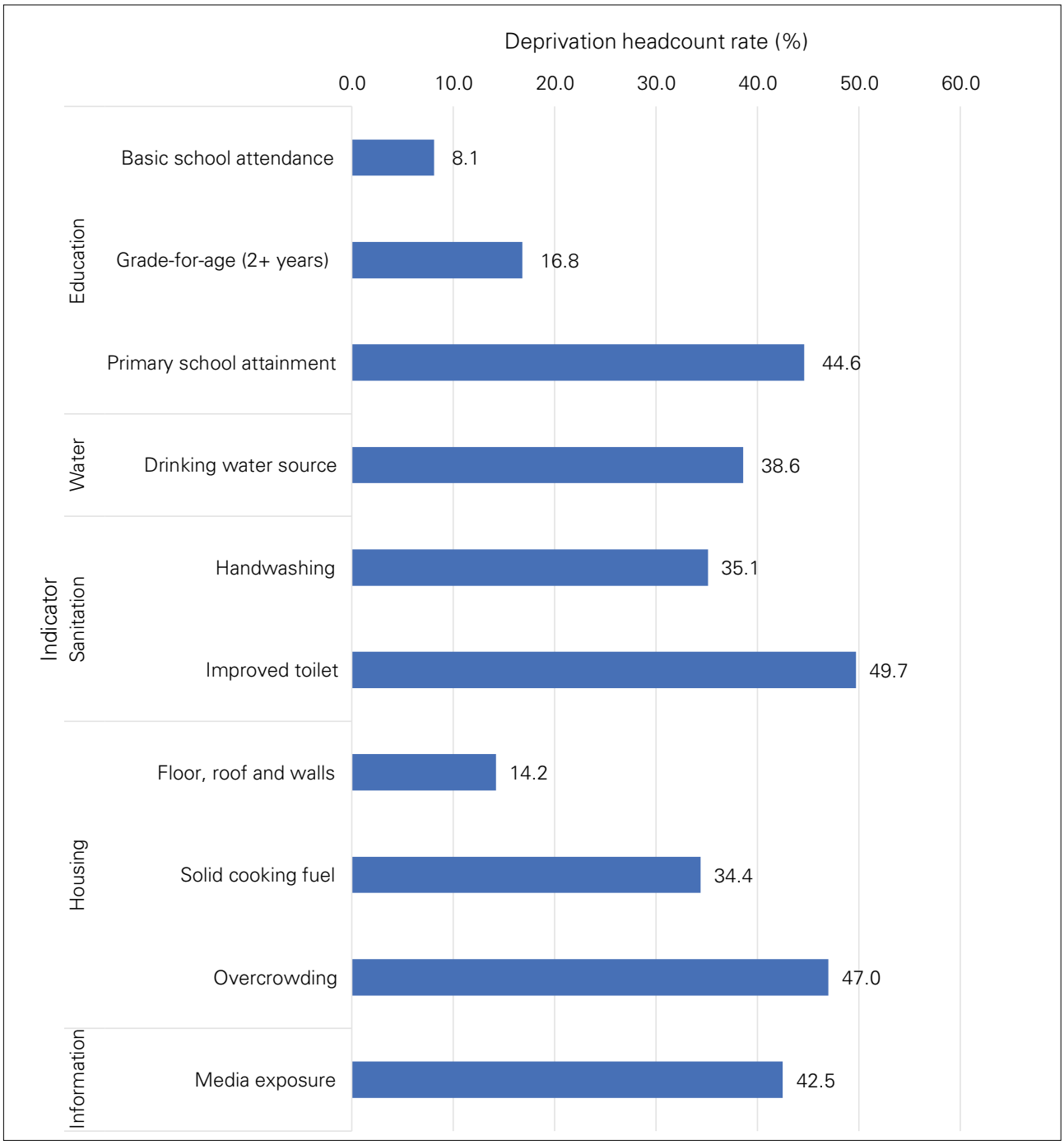
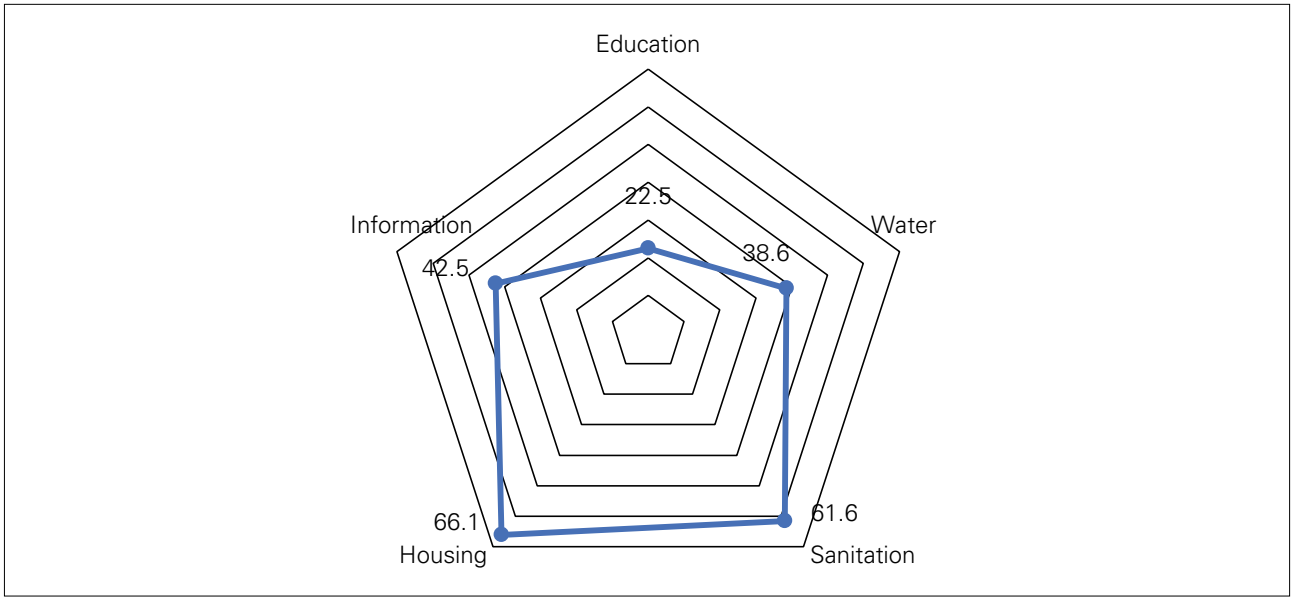


Figure 40: Deprivation headcount rate (%) by dimensions, children aged 5-14 years



6.1.1 Profiles of deprived children by geography and household composition

Figure 43 shows that the majority of children deprived in each dimension live in rural areas and in the Plateau and Mountainous zone. In contrast, the headcount rate of children deprived in each dimension is significantly lower in urban areas and in Plains. These geographical patterns are consistent with children in the other age groups and are repeated in all other parts of the poverty analysis. Headcount rates are fairly similar between Coastal and Tonle Sap zones, except in the information dimension where Tonle Sap outperforms the Coastal zone by 12.6 percentage points. As previously seen, the urban-rural discrepancy is most notable in the sanitation, water and housing dimensions, in addition to information, pointing to the possibility of supply-driven weaknesses in infrastructure and service provision in rural areas (Figure 41). While children in urban areas are better off in education than rural areas, this difference is small and the high rate of deprivation remains a concern.

Figure 41: Deprivation headcount rate (%) by dimension and area, children aged 5-14 years

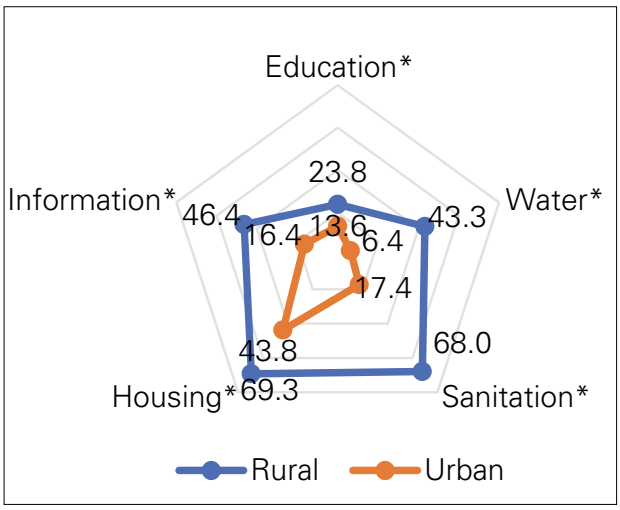


Figure 42: Deprivation headcount rate (%) by dimension and number of children in the household, children aged 5-14 years

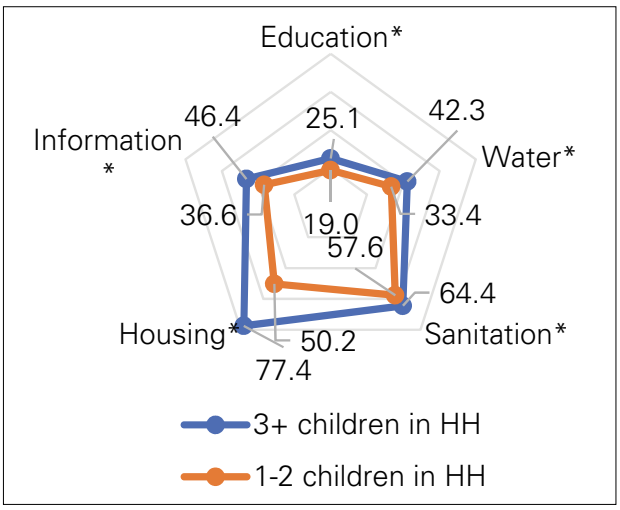
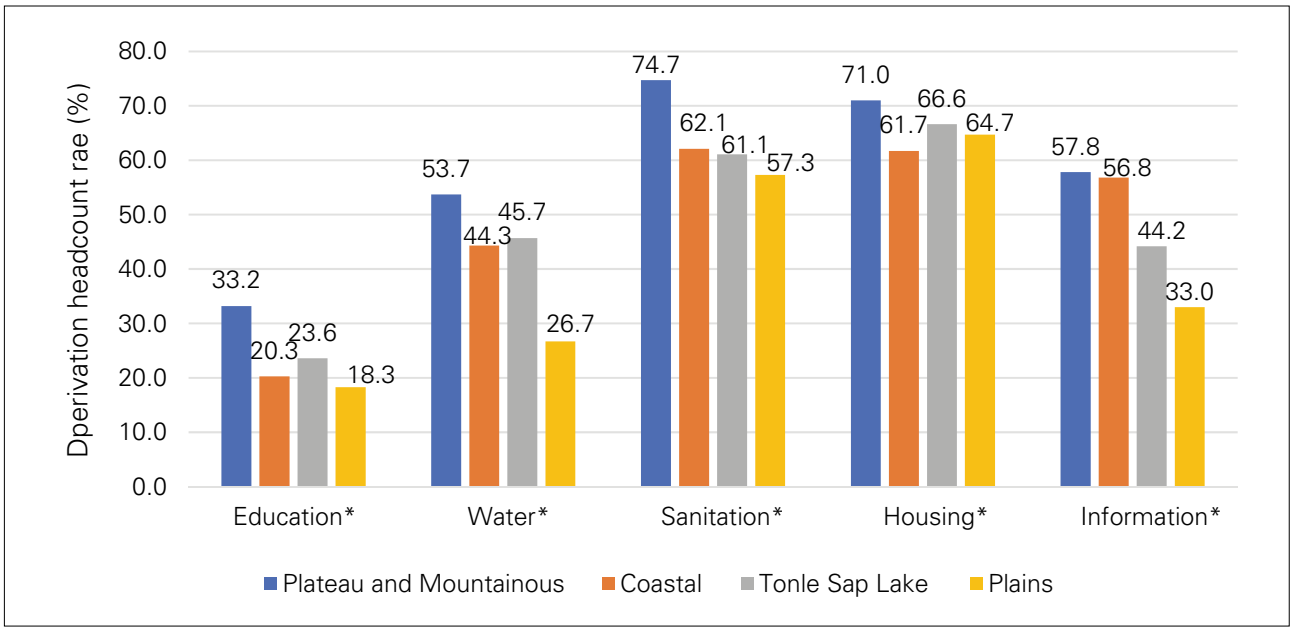


Figure 43: Deprivation headcount rate (%) by dimension and geographical zone, children aged 5-14 years



** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

Table 19 presents the decomposition of the deprivation headcount rate by dimension, by various individual and household characteristics.

Further in-depth analysis on deprivation in education among children aged 5-17 in Cambodia can be found in Annex VI.

Table 19: Deprivation headcount (%) by dimension and child's characteristics, children aged 5-14 years

Profile	Sample	Dimensions				
		Education	Water	Sanitation	Housing	Information
National	National	22.5	38.6	61.6	66.1	42.5
Area	Rural	23.8*	43.3*	68.0*	69.3*	46.4*
	Urban	13.6*	6.37*	17.4*	43.8*	16.4*
Living arrangements: Living without one parent	Lives without one or both parents	28.9*	37.4	58.3	60.5*	38.7*
	Lives with both parents	20.7*	38.9	62.5	67.7*	43.3*
Sex of household head	Female	24.9*	35.3	61.6	62.5*	41.4
	Male	21.9*	39.5	61.6	67.1*	42.7
Mother's education	Mother has secondary or higher education	6.89*	24.3*	34.6*	49.1*	25.1*
	Mother has no, primary or preparatory education	23.1*	42.1*	69.5*	71.6*	48.9*

Profile	Sample	Dimensions				
		Education	Water	Sanitation	Housing	Information
Mother works	Mother works all year and is paid	15.3*	29.2*	47.5*	57.2*	32.0*
	Mother not employed continuously and/or not paid	22.6*	44.6*	72.0*	73.4*	51.9*
Under-five mortality	Lives in household with at least one child mortality in past 5 years	30.7*	45.3	82.3*	80.8*	55.6
	Child lives in household with no child mortality in past 5 years	18.9*	38.5	62.7*	69.2*	44.0
Median children in household	3+ children in household	25.1*	42.3*	64.4*	77.4*	46.4*
	1-2 children in household	19.0*	33.4*	57.6*	50.2*	36.6*
Household has labour constraint	Labour-constraint household	27.0*	42.5	66.2	70.8	47.8
	Not a labour-constraint household	22.3*	38.3	61.3	65.8	42.3
Living arrangements and orphan status	Lives without parents but not orphan	23.8	33.4*	51.6*	59.1*	28.4*
	Living with one/both parents	22.4	39.2*	62.7*	66.8*	43.4*
Living arrangements: Living without any parents	Lives without parents	24.9	33.6*	53.1*	60.0*	30.5*
	Lives with one or both parents	22.2	39.3*	62.7*	66.9*	43.5*
Orphan status	Single/double orphan	37.7*	42.3	65.0	65.6	46.9
	Both parents alive	21.5*	38.3	61.3	66.1	42.2
Disability	Has difficulty	41.3*	35.8	61.7	65.4	43.8
	No difficulty	22.2*	38.6	61.6	66.1	42.4
Geographical zone	Plateau and Mountainous	33.2*	53.7*	74.7*	71.0*	57.8*
	Coastal	20.3*	44.3*	62.1*	61.7*	56.8*
	Tonle Sap Lake	23.6*	45.7*	61.1*	66.6*	44.2*
	Plains	18.3*	26.7*	57.3*	64.7*	33.0*

** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

6.2 Multiple deprivation analysis

This study expands on the deprivation rates in each of the sectors by concentrating on children's joint experience of deprivations. The MODA methodology follows a child-sensitive method and for that reason starts by counting the number of deprivations per child. Based on the total number of deprivations for each child, a distribution of these deprivations gives an indication on the depth of multidimensional deprivation across the society. Understanding how certain dimensions overlap and are experienced further allows for identifying the most vulnerable groups of children.

6.2.1 Distribution of deprivations: How many deprivations do children have?

The deprivation distribution in Figure 44 shows that the majority of children in this age group suffer from multiple deprivations. The distribution for children aged 5-14 peaks at 24.5 per cent of children facing two simultaneous deprivations. Half of all children of this age in Cambodia suffer from two to three dimensions at a time. Children living in rural areas are, furthermore, far more likely than urban children to have multiple deprivations. The deprivations distribution in Figure 45 for children living in rural areas peaks at three deprivations, while that of children in urban areas peaks at 41 per cent of children deprived in zero dimensions. These urban-rural differences are highly pronounced and notable given that nearly 90 per cent of Cambodia's population lives in rural areas. Children living in the Plateau and Mountainous zone tend towards higher deprivation severity than children living in Plains, who have a similar deprivation distribution to children in Coastal and Tonle Sap Lake zones (Figure 46).

Figure 44: Deprivation distribution at the Cambodia level for children aged 5-14 years

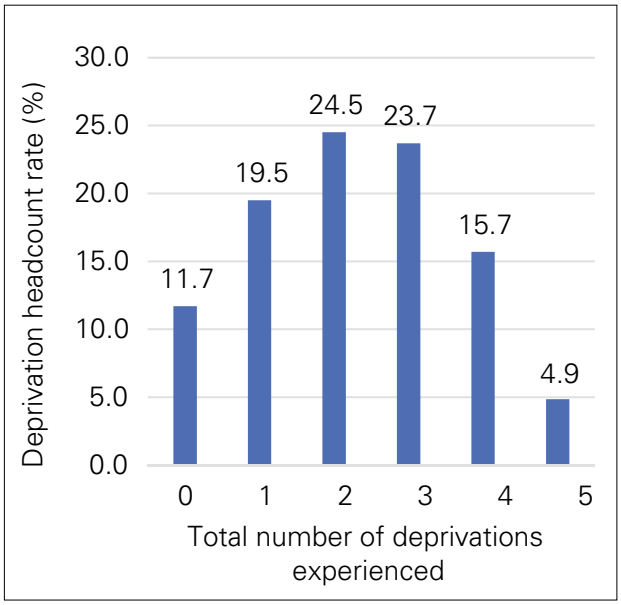
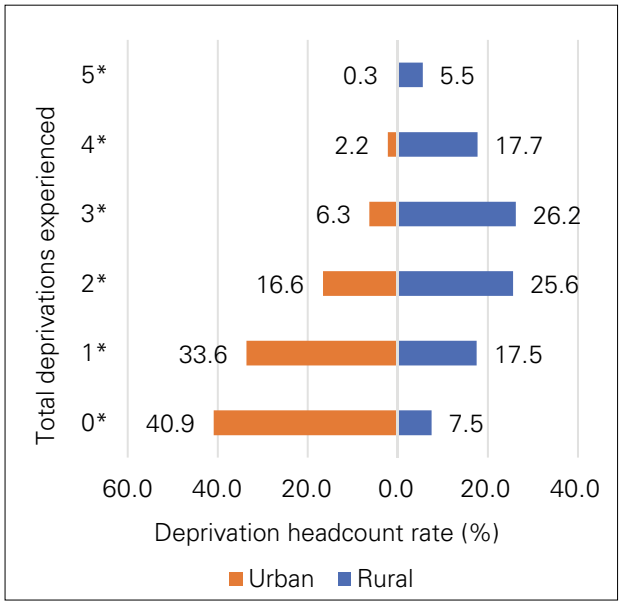


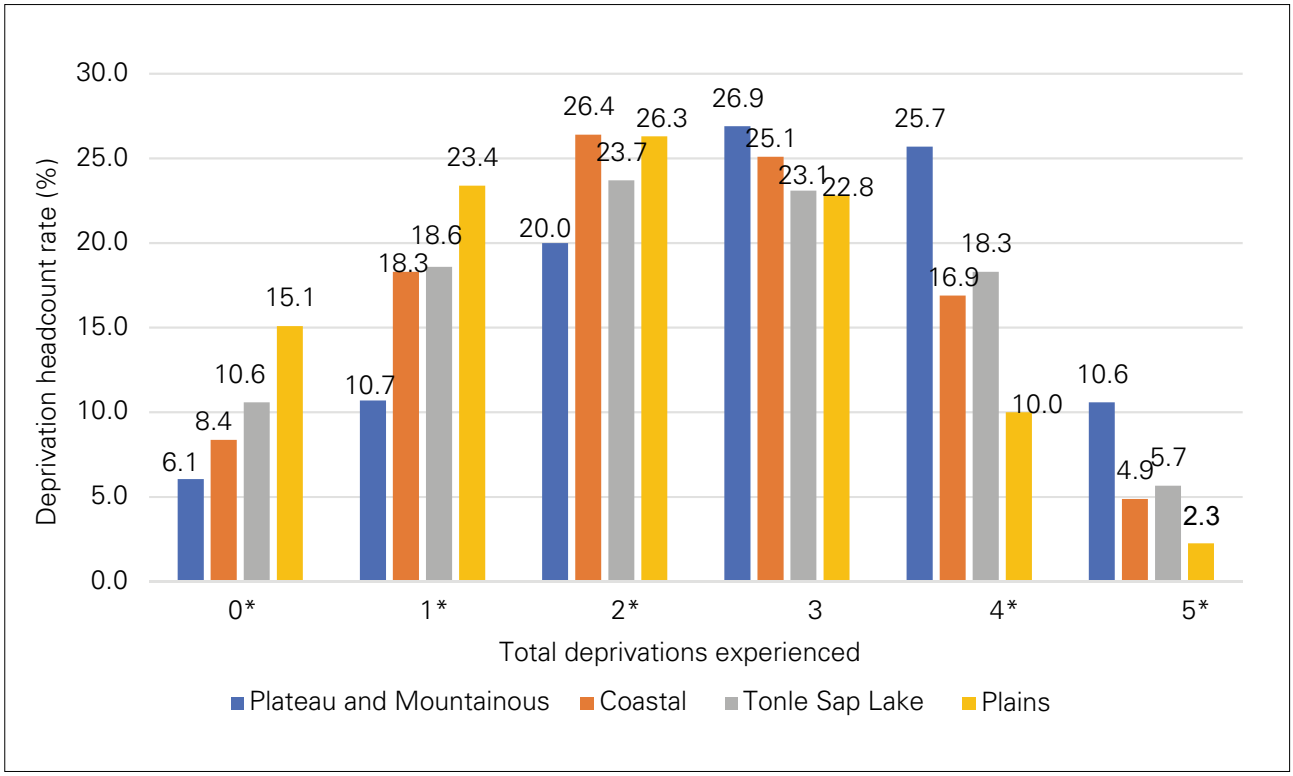
Figure 45: Deprivation distribution by area for children aged 5-14 years



** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05*

Additional individual and household characteristics associated with higher levels of deprivation severity in terms of the deprivation distribution are detailed in Figure 47, Figure 48 and Table 20. These characteristics include having a mother with less than secondary education or unemployment/unpaid work; living in a household with an instance of under-five child mortality; living in a household with more than three children; being a single/double orphan. Surprisingly, living arrangements have counterintuitive associations with children's likelihood of being multidimensionally deprived. The sex of the child and of the household head, as well as the disability status of the child, do not appear to have a significant influence on the child's total number of deprivations. On the other hand, disability status does show a statistically significant difference at the single-dimension level: Table 19 shows that 41.3 per cent of children who have a disability are deprived in education compared to 22.2 per cent of those who do not have a disability (22.2 per cent).

Figure 46: Deprivation distribution by geographical zone for children aged 5-14 years



** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

Figure 47: Deprivation distribution by mother's highest education for children aged 5-14 years

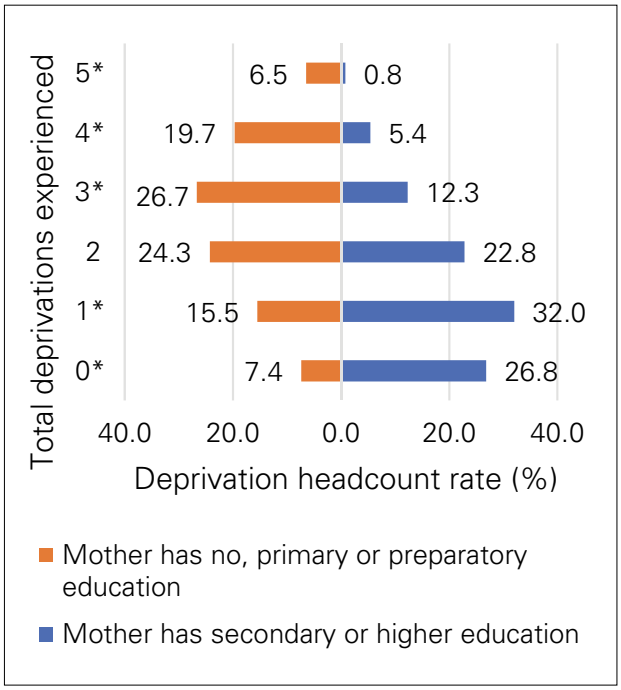
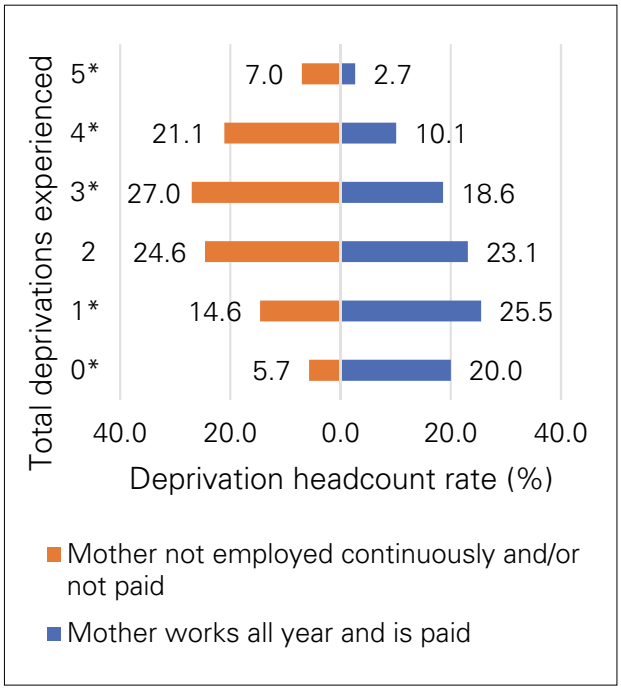


Figure 48: Deprivation distribution by mother's employment for children aged 5-14 years



** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05*

Table 20: Deprivation distribution by various profiling variables, children aged 5-14 years*

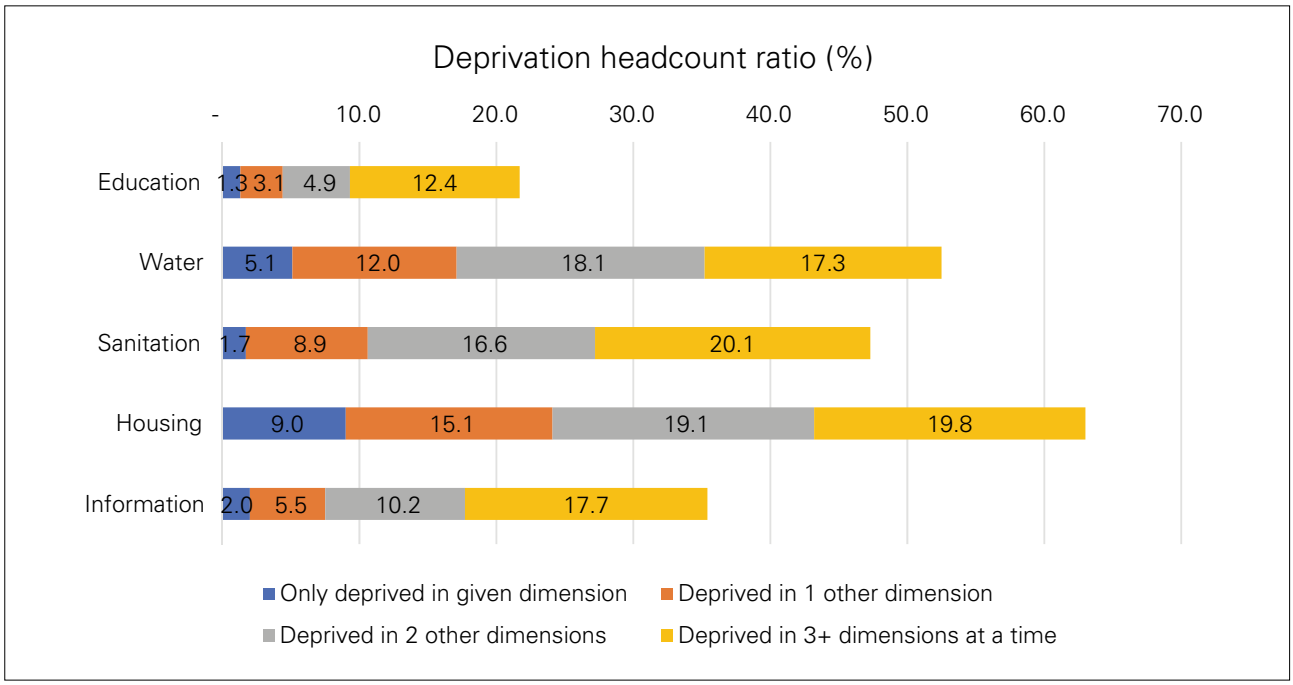
Profile	Sample	Total deprivations					
		0	1	2	3	4	5
National	National	11.7	19.5	24.5	23.7	15.7	4.9
Area	Rural	7.5*	17.5*	25.6*	26.2*	17.7*	5.5*
	Urban	40.9*	33.6*	16.6*	6.3*	2.2*	0.3*
Living arrangements: Living without one parent	Lives without one or both parents	14.0*	20.7	25.6	22.3	13.5*	4.0
	Lives with both parents	11.1*	19.2	24.2	24.1	16.4*	5.1
Sex of household head	Female	12.5	20.7	25.4	23.1	14.3	4.0
	Male	11.5	19.2	24.2	23.8	16.1	5.1
Mother's education	Mother has secondary or higher education	26.8*	32.0*	22.8	12.3*	5.4*	0.8*
	Mother has no, primary or preparatory education	7.4*	15.5*	24.3	26.7*	19.7*	6.5*
Mother works	Mother works all year and is paid	20.0*	25.5*	23.1	18.6*	10.1*	2.7*
	Mother not employed continuously and/or not paid	5.7*	14.6*	24.6	27.0*	21.1*	7.0*
Under-five mortality	Child lives hh with at least one child mortality in past 5 years	5.3*	10.1*	21.3	24.6*	25.1*	13.5*
	Child lives in hh with no child mortality in past 5 years	10.8*	18.6*	24.2	24.2*	16.8*	5.2*
Median children in household	3+ children in household	8.4*	16.3*	23.4*	25.9*	19.4*	6.7*
	1-2 children in household	16.5*	24.0*	26.0*	20.6*	10.6*	2.3*
household has labour constraint	Labour-constraint household	10.4	18.0	27.8	25.7	14.3	3.9
	Not a labour-constraint household	11.8	19.6	24.3	23.5	15.8	4.9
Living arrangements and orphan status	Lives without parents but not orphan	17.0*	26.3*	25.1	20.0*	10.3*	1.3*
	Living with one/both parents	11.2*	18.8*	24.4	24.1*	16.3*	5.3*
Sex of the child	Female	12.0	19.6	24.4	23.7	15.5	4.8
	Male	11.5	19.4	24.6	23.7	15.9	4.9
Living arrangements: Living without any parents	Lives without parents	16.4*	24.6*	26.5	20.0*	10.5*	1.9*
	Lives with one or both parents	11.1*	18.8*	24.2	24.2*	16.4*	5.3*
Orphan status	Single/double orphan	9.8	14.9*	28.0	21.2	17.8	8.3*
	Both parents alive	11.9	19.8*	24.2	23.8	15.6	4.6*
Disability	Has difficulty	9.0	17.0	29.3	19.3	17.1	8.2
	No difficulty	11.8	19.6	24.4	23.7	15.7	4.8
Zones	Plateau and Mountainous	6.1*	10.7*	20*	26.9	25.7*	10.6*
	Coastal	8.4*	18.3*	26.4*	25.1	16.9*	4.9*
	Tonle Sap Lake	10.6*	18.6*	23.7*	23.1	18.3*	5.7*
	Plains	15.1*	23.4*	26.3*	22.8	10.0*	2.3*

** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

6.2.2 Deprivation overlap by single dimensions

The deprivation overlap analysis reveals to what extent deprivation in a single dimension is experienced together with other deprivations. For children aged 5-14 years, none of the dimensions are likely to be uniquely experienced deprivations (Figure 49). Around 5 per cent or less are deprived in only the specified dimension, except for 9 per cent of children deprived in only housing, while around 17-39 per cent of children who are deprived in any of the specified dimensions are deprived in at least two additional dimensions.

Figure 49: Single dimension deprivation overlap, children aged 5-14 years



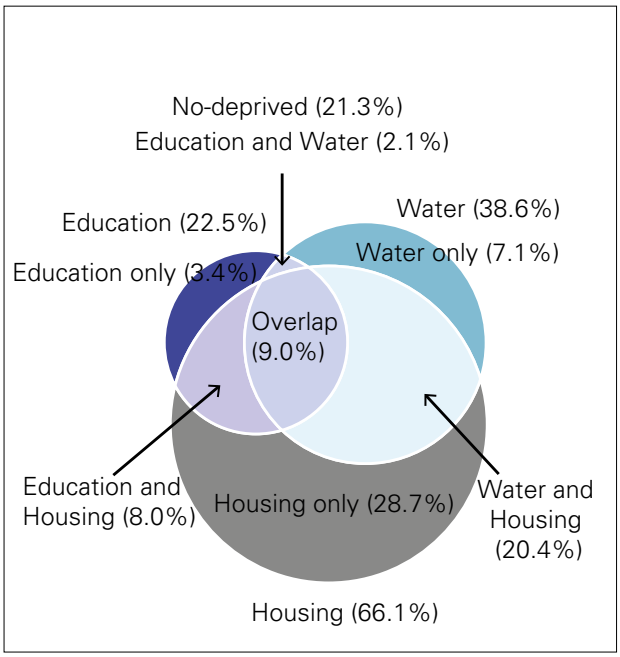
6.2.3 Three-way deprivation overlap

This section presents the findings of a deprivation overlap analysis of all the possible combinations of three dimensions. Figure 50 and Figure 51 show that national results are very strongly driven by rural-level results, as seen for the 0-4 age group. In the combination of education, water and housing, there is a much larger overlap of deprivation in all three dimensions (10.1 per cent) compared to in urban areas (1.3 per cent). There is both a lower incidence of deprivation in each of these dimensions in urban areas, as well as a lower rate of overlap between them. This suggests that integrated interventions will be much more effective in rural areas, while sector-specific interventions targeting single deprivations will be effective in urban areas. In urban areas, 49.4 per cent of children are not deprived in any of these dimensions, compared to 17.2 per cent of children in rural areas.

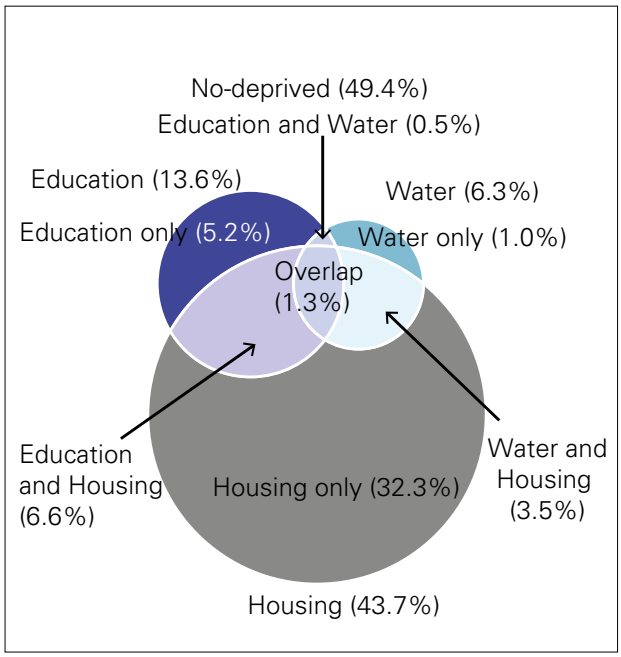
According to Figure 51, the highest rate of overlap between any three dimensions is 26.6 per cent of children in rural areas who are deprived in sanitation, housing and information at the same time. This compares starkly to a mere 3.7 per cent of children simultaneously deprived in these dimensions in urban areas. Altogether these results suggest that integrated WASH-related interventions and WASH-sensitive interventions in combination with education- and information-specific interventions will be most high impact for alleviating multidimensional poverty among rural children.

Figure 50: Three-way deprivation overlap for the combination of education, water and housing dimensions for children aged 5-14 years at the national level and by area

National level



Rural



Urban

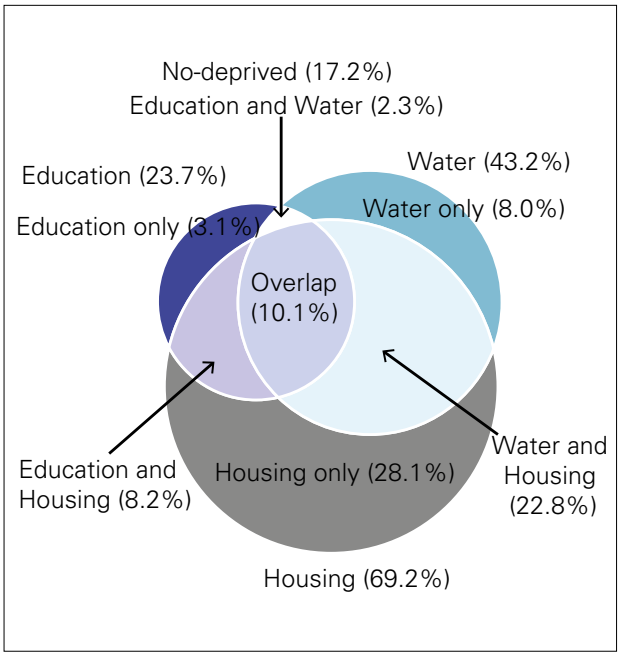
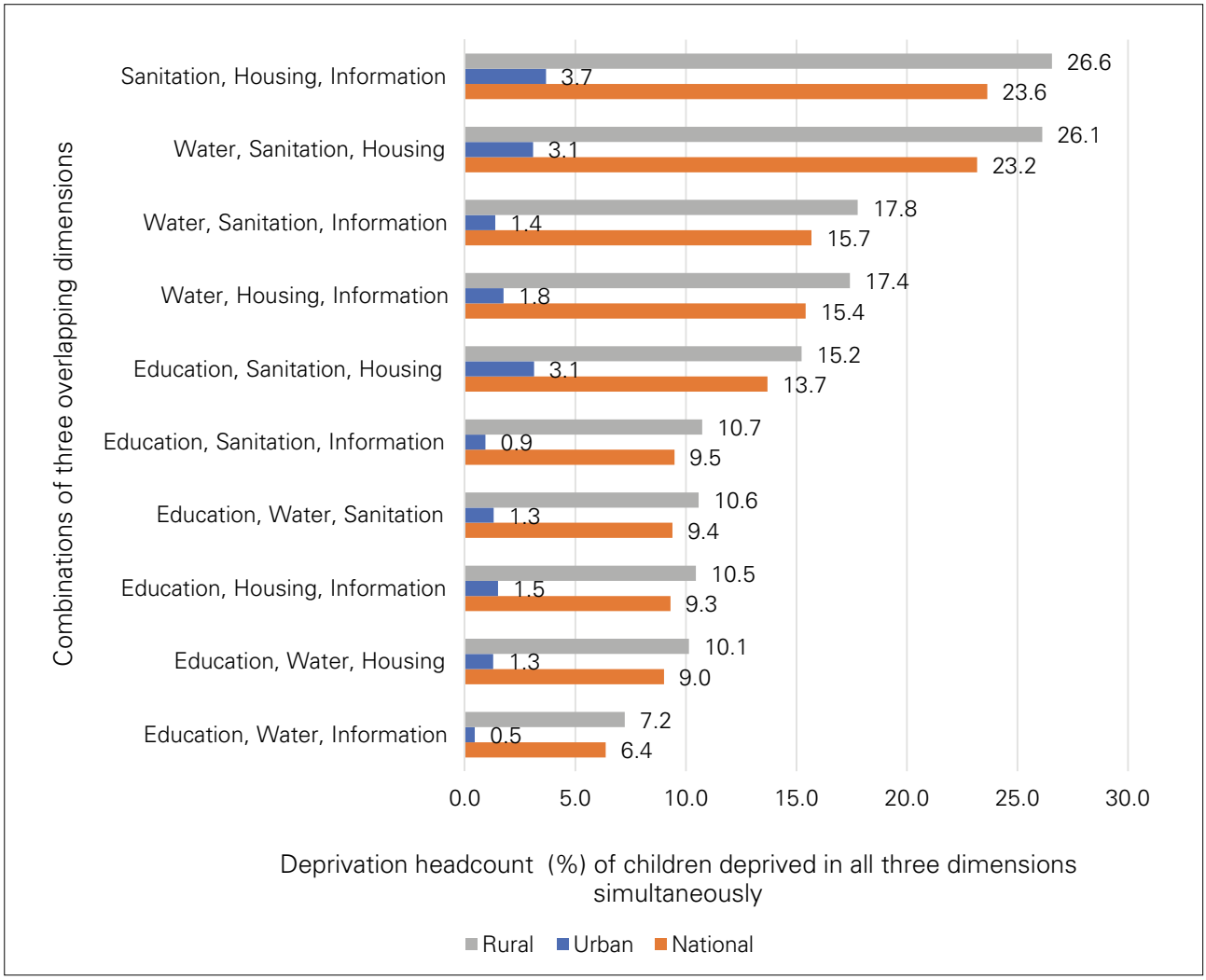


Figure 51: Headcount of children simultaneously deprived in three dimensions at the national, rural and urban levels, children aged 5-14 years



6.2.4 Multidimensional deprivation indices

The multidimensional deprivation indices complement the analysis on the distribution and overlap of deprivations by indicating the overall incidence and intensity of deprivation among children. Table 21 shows the indices, H, A and M0 for all children aged 5-14 years. When using a cut-off point of three to five deprivations (where k=3), 44.2 per cent of all children are defined as multidimensionally deprived. On average, these children are deprived in 3.6 deprivations at a time, or 71.5 per cent of all possible deprivations.

Figure 52 and Figure 53 present the headcount rate of multidimensionally deprived children (H) at every cut-off level, k. Echoing the results of the 0-4 age group, these figures show a far higher rate of multidimensionally poor children in rural areas compared to urban areas and the Plateau and Mountainous zone compared to Plains at nearly every level of deprivation intensity. The headcount rate of multidimensionally poor children is very similar for those living in Coastal and Tonle Sap Lake zones. The gap between the urban and rural children is largest at the level of two to five deprivations and smallest at the level of five deprivations, with very few children deprived at this level of intensity.

Table 21: Multidimensional deprivation indices at the national level for children aged 5-14 years

	Multidimensional deprivation headcount (H), %	Average no. of deprivations among the deprived (A)	Average intensity among the deprived (A); %	Adjusted multidimensional deprivation headcount (M0)
1-5 deprivations	88.3	2.6	51.4	0.45
2-5 deprivations	68.7	3.0	60.3	0.41
3-5 deprivations	44.2	3.6	71.5	0.32
4-5 deprivations	20.6	4.2	84.7	0.17
5 deprivations	4.9	5.0	100.0	0.05

Figure 52: Multidimensional deprivation headcount (H%) by various cut-off points for children aged 5-14 years, by area

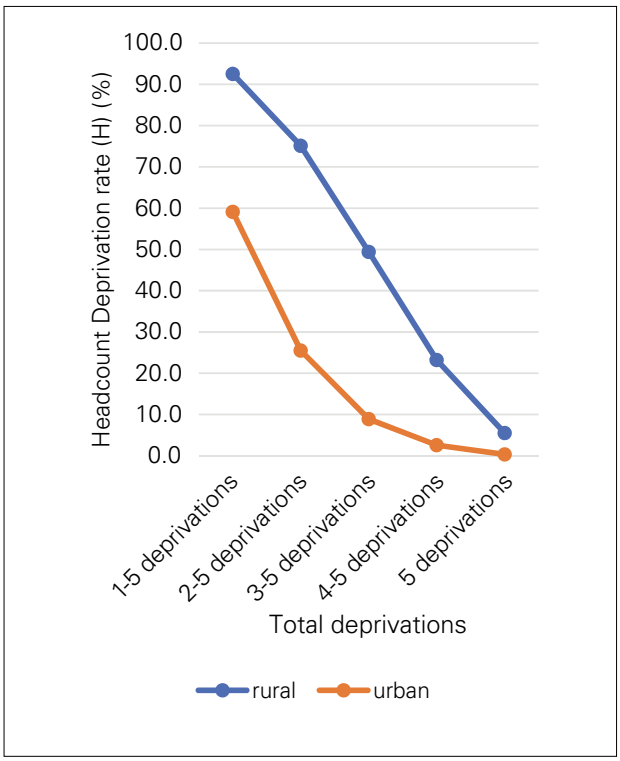
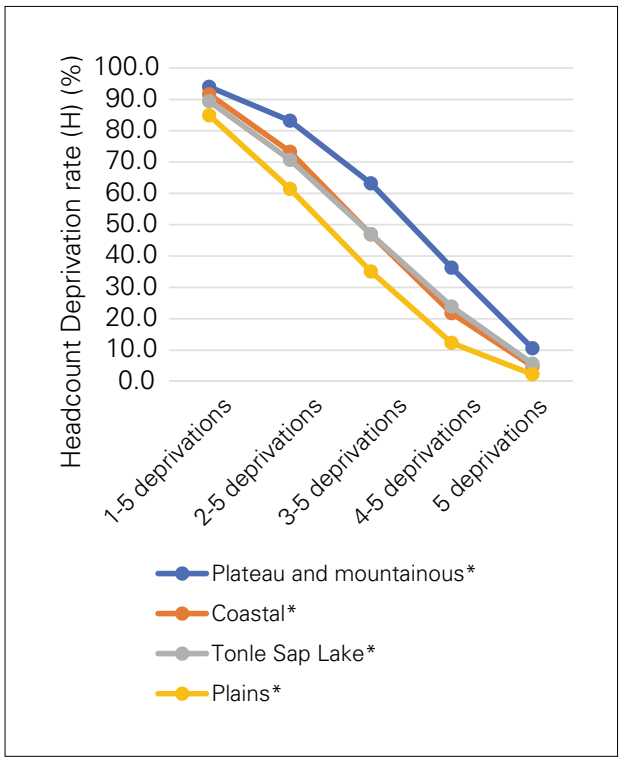
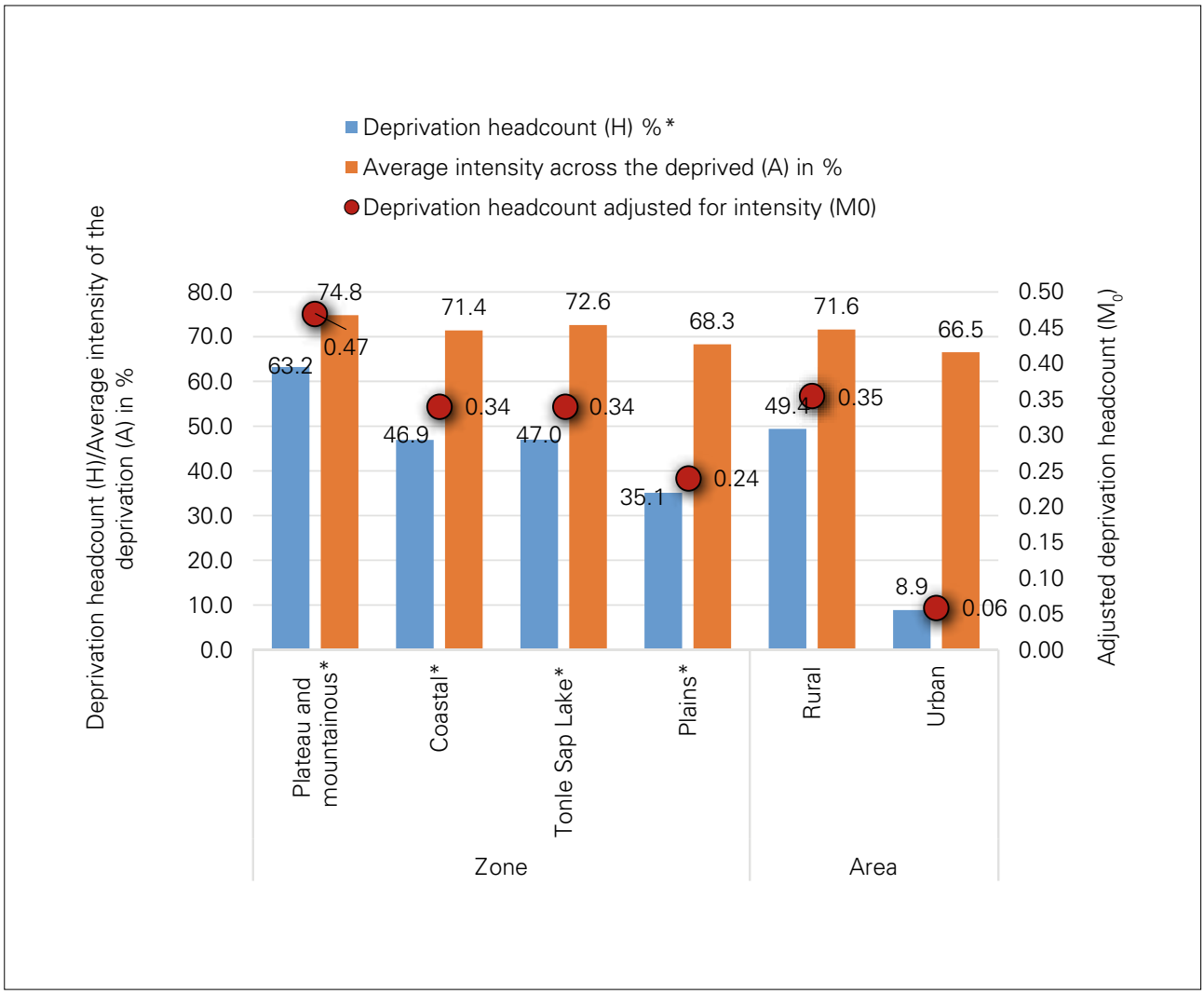


Figure 53: Multidimensional deprivation headcount (H%) by various cut-off points for children aged 5-14 years, by geographical zone



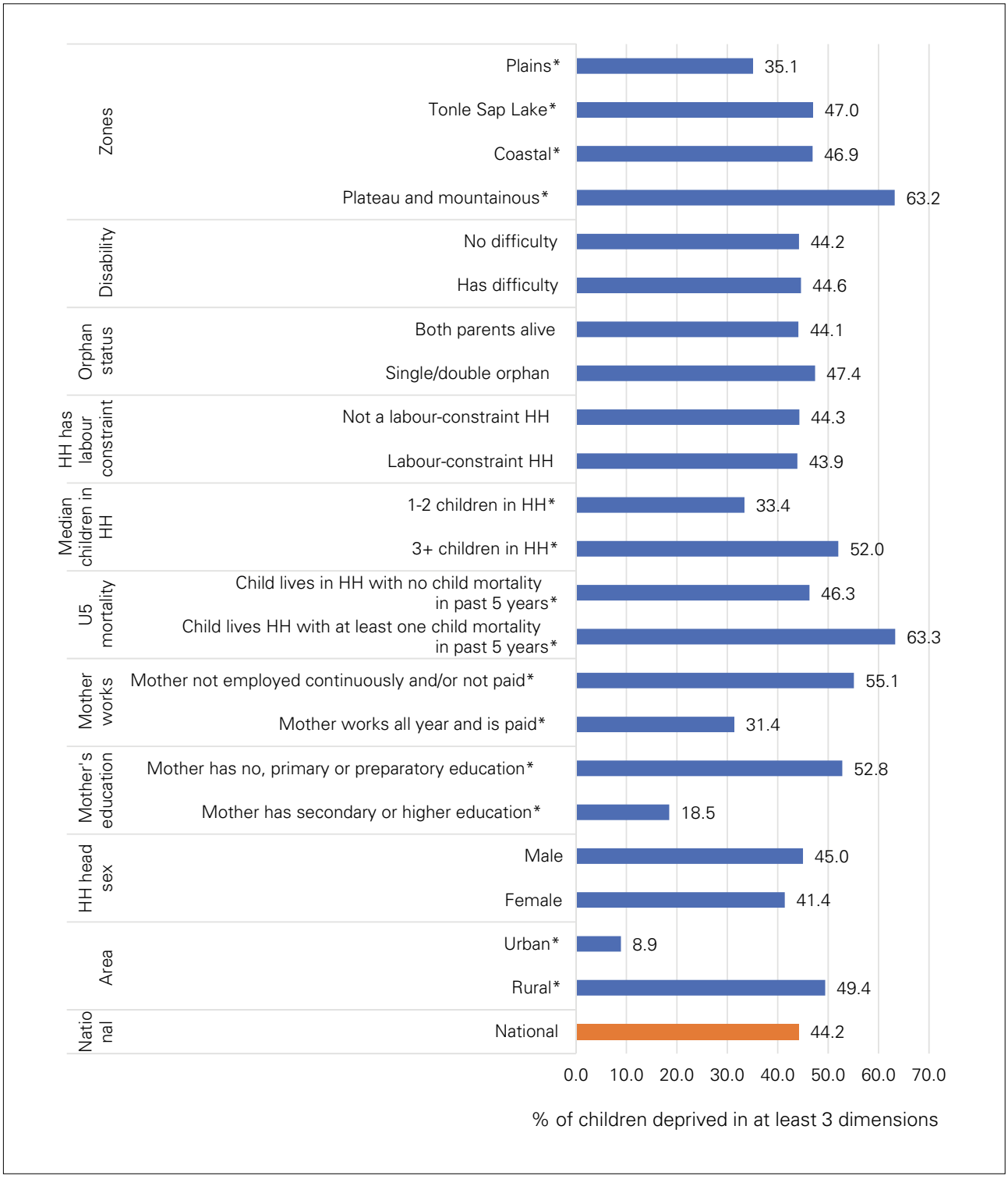
The adjusted multidimensional deprivation headcount, M0, as the product of H and A, provides a summary measure of the overall deprivation situation of children deprived in two to five dimensions (both incidence and intensity of deprivation). This measure in Figure 54 shows that, on average, children living in rural areas (M0=0.35) are significantly worse off in terms of multidimensional poverty than children in urban areas (M0=0.06), and children in the Plateau and Mountainous zone rank far worse (M0=0.471) compared to children in Plains (M0=0.24).

Figure 54: Multidimensional deprivation indices (H, A and M0) for children aged 5-14 years deprived in at least three dimensions (k=3), by geographical zone and area



Deprivation headcount rates for children deprived in three to five dimensions are profiled by the household and socio-economic characteristics of the child, and these disaggregations are also illustrated in Figure 55. The results demonstrate that higher rates of multidimensional deprivation are closely associated with the following individual and household characteristics: the education level and employment of the mother; being in a household with more than three children; and being in a household with an instance of under-five mortality. In contrast, gender of the child, labour constraints, sex of the household head, disability status and orphanhood do not seem to significantly affect the likelihood that he/she is multidimensionally deprived.

Figure 55: Multidimensional deprivation headcount, H, for children deprived in at least three dimensions (k=3) by children's characteristics, children aged 5-14 years

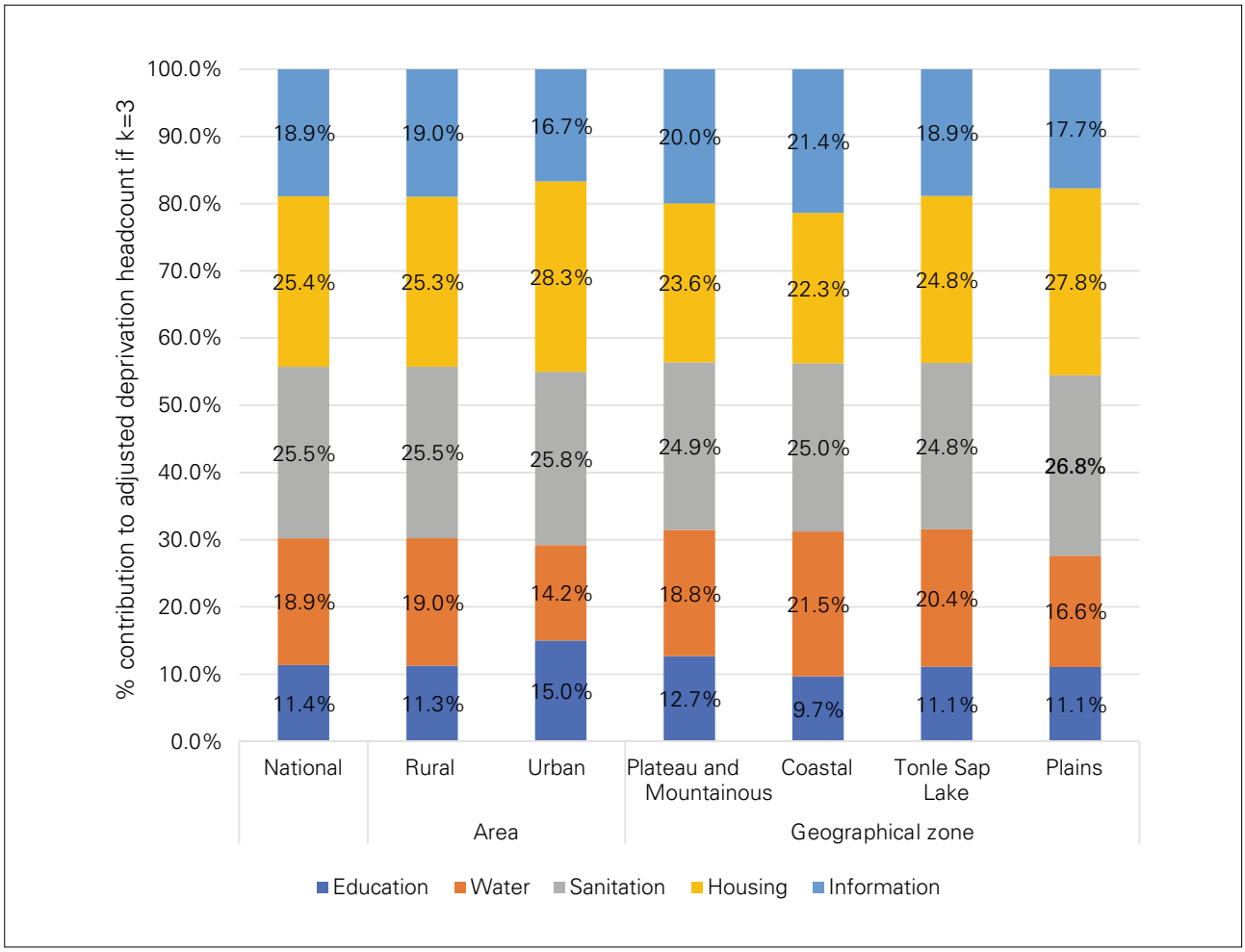


6.2.5 How does each dimension contribute to overall deprivation incidence and intensity?

Figure 56 shows the adjusted deprivation headcount (M0) decomposed in order to find out which of the dimensions is contributing more to the overall deprivation level in Cambodia. This index captures both the headcount and intensity of deprivation. This decomposition is shown in Figure 56 at national, area and geographic zone level.

The sanitation and housing dimensions contribute the most, by around 25 per cent, to deprivation levels at specified geographic levels, while education contributes the least (varying between 11-15 per cent). All dimensions contribute at similar rates across all geographic levels specified.

Figure 56: Decomposition of the adjusted multidimensional deprivation ratio (M0) for children with at least three deprivations (k=3), by dimensions, 5-14 years



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7

Results: Multidimensional Child Poverty for Children aged 15-17 years

7. Results: Multidimensional Child Poverty for Children aged 15-17 years

Highlights

- Deprivation headcount rates for children aged 15-17 years in Cambodia are the highest in the education and housing dimensions. Close to 60 per cent of children in this age group are two or more years behind at school, while approximately 43 per cent of 15-year-olds are not attending school at all. Moreover, more than four of 10 children are living in overcrowded households with more than four people per sleeping room.
- Half of the children in this age group are multidimensionally poor, experiencing on average 3.7 deprivations.
- The combination of education, sanitation and housing has the largest overlap (32 per cent) of all possible combinations of three dimensions for children aged 15-17.
- In urban areas, the dimension water is less relevant compared to rural areas. However, education and housing are both contributing most to the adjusted multidimensional deprivation headcount (M0) at the national, urban and rural level.

7.1 Single deprivation analysis

The following sections show the results of the analysis results by single sector. The deprivation headcount ratio represents the proportion of children deprived in each indicator or dimension as a percentage of total children in the age group in question for whom data was available, otherwise referred to as the reference population. To aggregate the indicators into dimensions, MODA uses the union approach ($0<k\leq1$) to determine if a child experiences deprivation in a certain dimension or not. This means that a child who is deprived in at least one of the indicators will be defined as deprived in the whole dimension.

Figure 57 shows high rates of deprivation in nearly all indicators for children aged 15-17 in Cambodia. Strikingly, the rate of deprivation in the education dimension is disproportionately high and unsuitably so for the effective development of human capital. Figure 58 shows that 65.8 per cent of Cambodian children aged 15-17 are deprived in the education dimension, with nearly 60 per cent of children being two or more years behind in school, 43.2 per cent being of basic school age but not attending basic school, and nearly one in three children being beyond primary school age but having not completed primary school. Substantially more children aged 15-17 are deprived in the education dimension compared to children aged 5-14 (65.8 per cent vs. 22.5 per cent) as seen in the previous chapter. This is consistent with the high rates of deprivation in the primary school attainment and grade-for-age indicators for children aged 5-14. These results suggest a high rate of school attrition – children beyond primary school age either drop out of school early or do not complete primary school.

These figures are alarming and consistent with previous studies on the status of education in Cambodia. An education-focused brief referred to schools in Cambodia as a "barrier to learning" – in the 2010/11 school year, around 17 per cent of primary schools "did not offer the full six grades", and in those that did, "fewer than half of children enrolled in Grade 1 are expected to complete their primary education" (UNICEF Cambodia). The brief lists problems with quality of education, teacher qualifications, effec-

tive teaching methods, school management and community involvement as factors reducing children's learning impact and incentive for staying in school. In this context, the results of this multidimensional poverty analysis point to a need to invest in improving Cambodia's educational system from early childhood up to and including secondary education at least. Not only must schooling quality better serve children of schooling age, but children also need to be better prepared to advance in school.

Previous studies on education in Cambodia claim that the lack of water and sanitation exacerbates the aforementioned obstacles to education, with 34 per cent of primary schools lacking drinking water and another 21 per cent functioning without toilets (UNICEF Cambodia). In combination with the high rates of deprivation across the sanitation (53.2 per cent), housing (62.9 per cent) and water (39.3 per cent) dimensions, the studies suggest that children face obstacles to learning both at home and in their schools. In designing policies to improve education indicators for children in Cambodia, it is necessary to consider and improve the wider environmental conditions that affect children's well-being and which may influence whether a child finishes basic schooling.

Figure 57: Deprivation headcount rate (%) by indicators, children aged 15-17 years

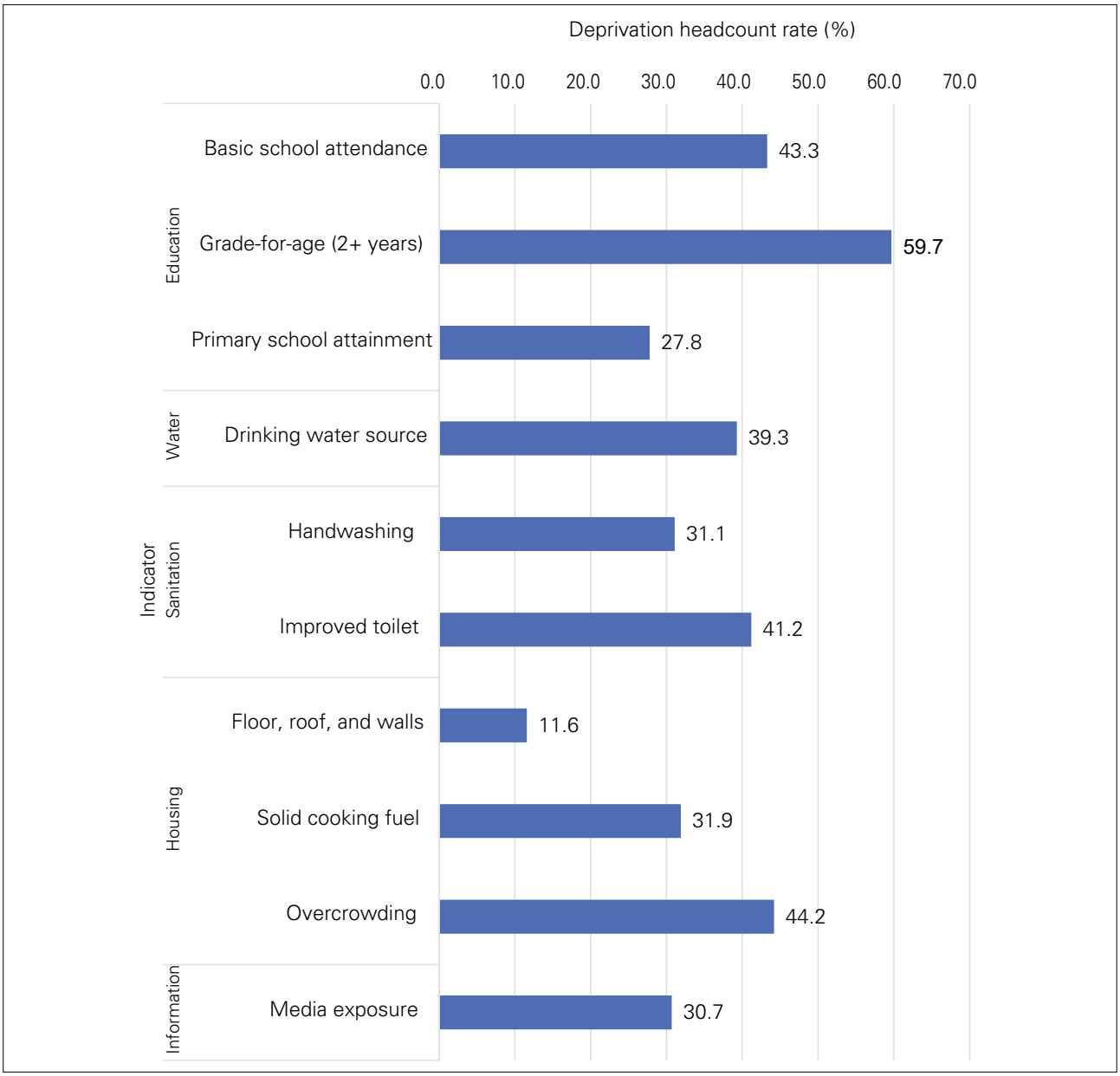
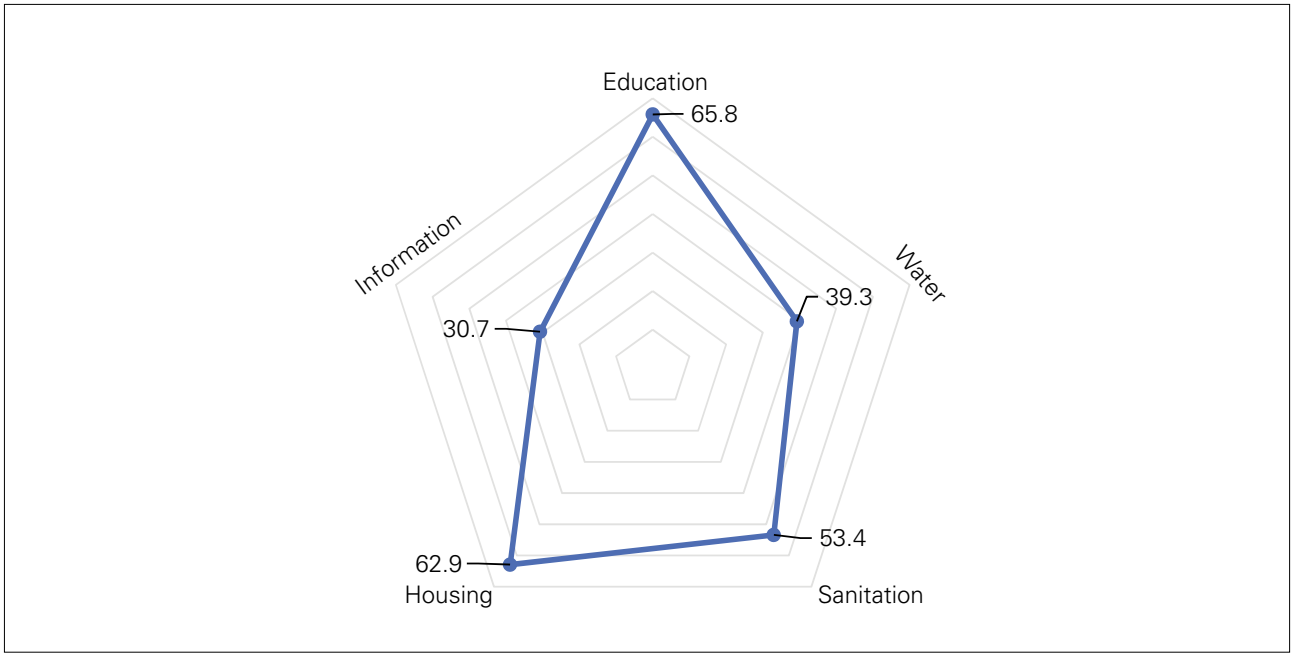


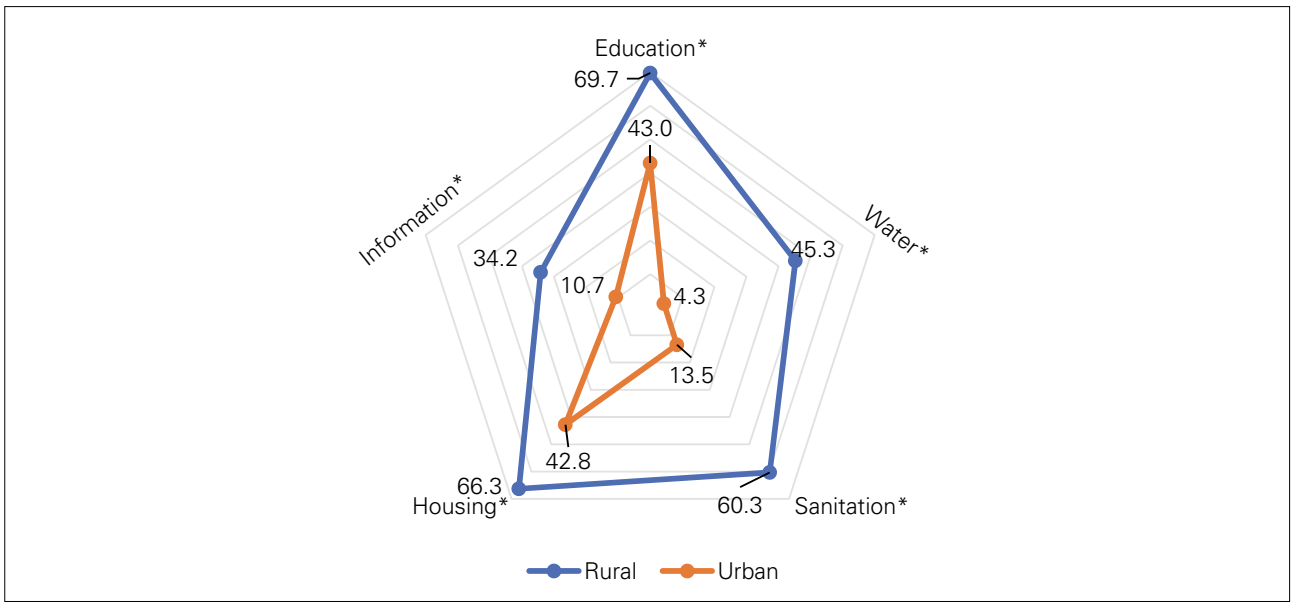
Figure 58: Deprivation headcount rate (%) by dimensions, children aged 15-17 years



7.1.1 Profiles of deprived children by geography

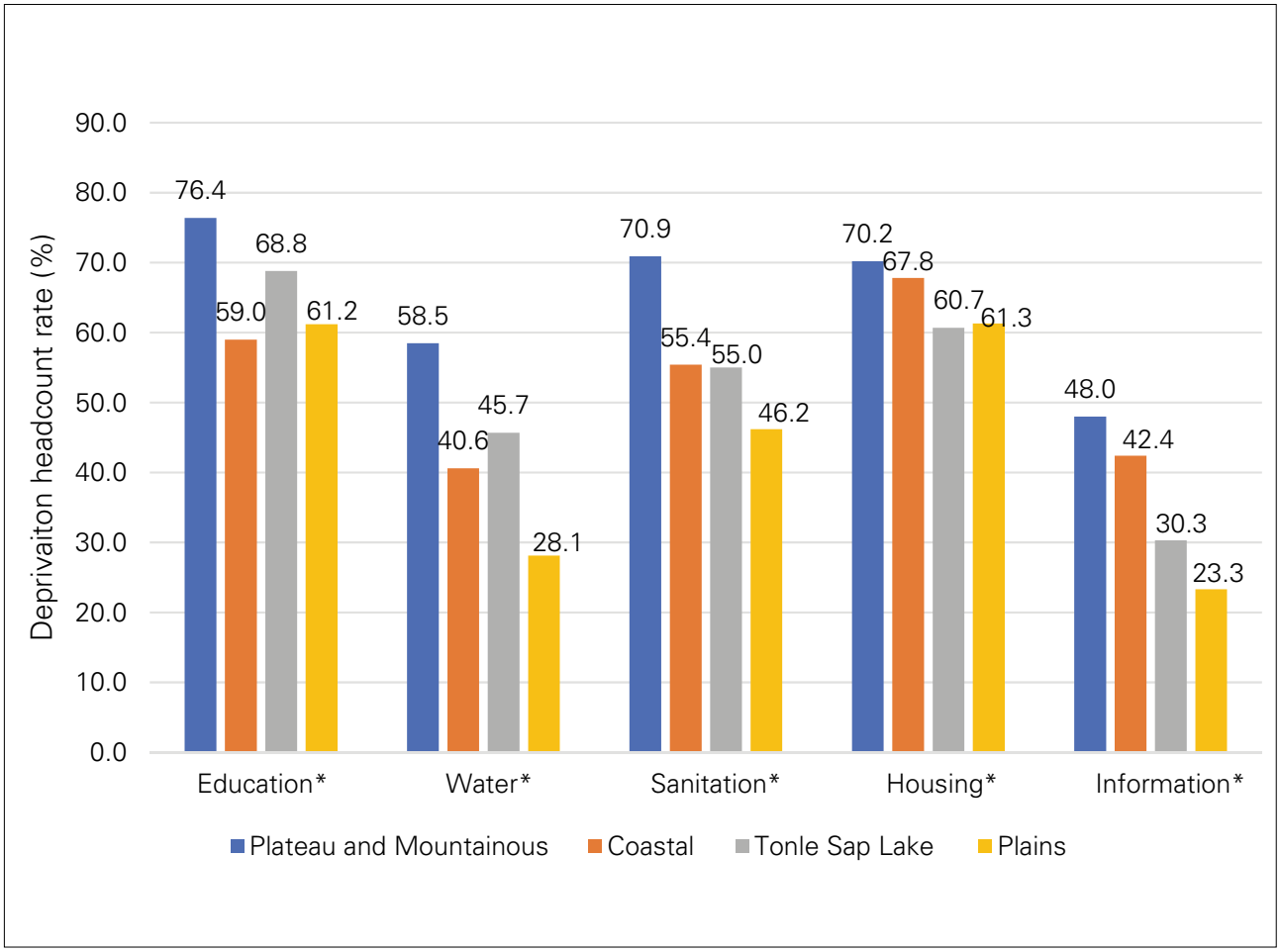
Consistent with results of the previous two age groups, children aged 15-17 years living in rural areas and in the Plateau and Mountainous zone have a higher rate of deprivation in each dimension compared to those in respectively urban areas and Plains (Figure 59, Figure 60). The highest discrepancies can be found in the water, sanitation and education dimensions, followed by information and housing. These results suggest that, like for the 5-14 age group, problems with access to services and infrastructure are concentrated in rural areas.

Figure 59: Deprivation headcount rate (%) by dimension and area, children aged 15-17 years



* An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.

Figure 60: Deprivation headcount rate (%) by dimension and geographical zone, children aged 15-17 years



** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

7.1.2 Who are the deprived children?

Figure 61 and Figure 62 show that the role of the child's mother has some association with deprivation status across all dimensions for children aged 15-17. Children living with a mother who has had at least a secondary education, and with a mother who is continuously employed and paid, have a much lower rate of deprivation in all dimensions than children with a less educated mother or those who are not continuously employed or paid. There is strong indication that the mother's education has a large role to play in the school retention and attendance of children aged 15-17. However, this may also be linked to the child's environmental conditions and the influence these have on the child's schooling. Children living with less educated and unemployed mothers are also more likely to live in unimproved water, sanitation and housing conditions in addition to being deprived in education, and it is likely that a combination of these factors influences their success in school. Interventions to improve education indicators for children must therefore be sensitive to the multiple sectors across which their schooling success is influenced.

Figure 61: Deprivation headcount rate (%) by dimension and mother's highest education, children aged 15-17 years

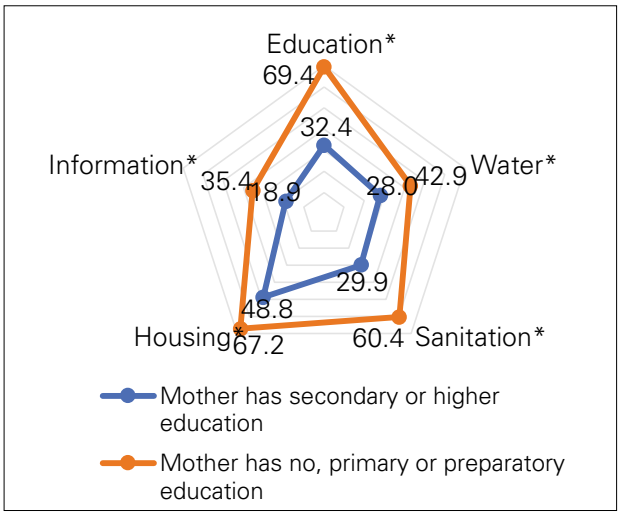
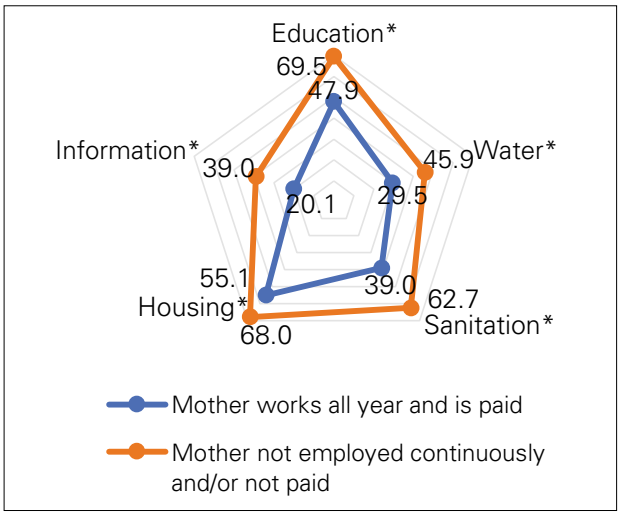


Figure 62: Deprivation headcount rate (%) by dimension and mother's employment, children aged 15-17 years



** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

Table 22 details additional individual and household characteristics that influence a child's deprivation across the analyzed dimensions. In summary, these results show:

- Like for previous age groups, living in a household with an instance of under-five child mortality, with more than three children, leads to a significantly higher instance of deprivation in nearly all dimensions.
- There is a higher rate of girls aged 15-17 years deprived in housing and information if they are anaemic.
- Nearly all girls (98.8 per cent) who are/were married before age 18 are deprived in the education dimension, compared to 59.7 per cent of never-married girls. This suggests a high likelihood of a marriage/schooling trade-off and that delaying marriage is critical for improving girls' education. Once married, girls are also more likely to be deprived in the housing dimension.
- Single or double orphans have a significantly higher rate of being deprived in the education, sanitation and information dimensions. Counterintuitively, children living without both parents are less likely to be deprived in nearly all dimensions than children living with a parent, but more likely to be deprived in the education dimension.
- Children with any level of mental or physical disability have a significantly higher education deprivation rate (80.7 per cent) than those without (65.5 per cent).

Further in-depth analysis on deprivation in education among children aged 5-17 in Cambodia can be found in Annex VI.

Table 22: Deprivation headcount (%) by dimension and child's characteristics, aged 15-17 years

Profile	Sample	Dimensions				
		Education	Water	Sanitation	Housing	Information
National	National	65.8	39.3	53.4	62.9	30.7
Area	Rural	69.7*	45.3*	60.3*	66.3*	34.2*
	Urban	43.0*	4.3*	13.5*	42.8*	10.7*
Sex of household head	Female	69.6*	36.5	55.3	60.0	30.1

Profile	Sample	Dimensions				
		Education	Water	Sanitation	Housing	Information
	Male	64.7*	40.1	52.9	63.7	30.9
Mother's education	Mother has secondary or higher education	32.4*	28.0*	29.9*	48.8*	18.9*
	Mother has no, primary or preparatory education	69.4*	42.9*	60.4*	67.2*	35.4*
Mother works	Mother works all year and is paid	47.9*	29.5*	39*	55.1*	20.1*
	Mother not employed continuously and/or not paid	69.5*	45.9*	62.7*	68*	39*
Under-five mortality in the household	Child lives household with at least one child mortality in past 5 years	88.4*	42.6	64.9*	87.8*	40.3
	Child lives in household with no child mortality in past 5 years	70.0*	40.7	53.5*	71.9*	33.5
Median children in household	3+ children in household	72.5*	43.2*	57.1*	75.3*	35.1*
	1-2 children in household	58.5*	35.1*	49.4*	49.2*	25.7*
Household has labour constraint	Labour-constraint household	68.8*	46.2	58.0	67.3	33.5
	Not a labour-constraint household	65.7*	39.0	53.2	62.7	30.7
Girl's anaemia	Girls is not anaemic	62.9	38.1	47.2	53.8*	22.9*
	Girl has any anaemia	63.1	44.5	50.7	63.6*	30.0*
Living arrangements: Living without any parents	Lives without parents	73.4*	27.3*	38.3*	57.1*	24.4*
	Lives with one or both parents	64.8*	40.9*	55.4*	63.6*	31.5*
Orphan status	Single/double orphan	79.1*	41.0	60.2*	62.9	35*
	Both parents alive	63.9*	39.1	52.5*	62.9	30.2*
Disability	Has difficulty	80.7*	40.2	54.1	54.4	33.7
	No difficulty	65.5*	39.3	53.4	63.0	30.7
Girl's early marriage	Girl has been or is married	98.8*	40.7	56.1	68.6*	36.5
	Girl is not married	59.7*	38.6	49.3	57.5*	26.8
Zones	Plateau and Mountainous	76.4*	58.5*	70.9*	70.2*	48.0*
	Coastal	59.0*	40.6*	55.4*	67.8*	42.4*
	Tonle Sap Lake	68.8*	45.7*	55.0*	60.7*	30.3*
	Plains	61.2*	28.1*	46.2*	61.3*	23.3*

** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

7.2 Multiple deprivation analysis

This study expands on the deprivation rates in each of the sectors by concentrating on children's joint experience of deprivations. The MODA methodology follows a child-sensitive method and for that reason starts by counting the number of deprivations per child. Based on the total number of deprivations for each child, a distribution of these deprivations gives an indication on the depth of multidimensional deprivation across the society. Understanding how certain dimensions overlap and are experienced further allows for identifying the most vulnerable groups of children.

7.2.1 Distribution of deprivations: How many deprivations do children have?

The deprivation distribution in Figure 63 shows that the majority of children aged 15-17 suffer from multidimensional deprivations. Only one in 10 children has no deprivations. Children living in rural areas are far more likely than urban children to have multiple deprivations (Figure 64). The deprivation distribution for children living in rural areas shows the mean of the deprivation distribution of children living in rural areas is much further to the right of the distribution mean of children living in urban areas. The deprivation distribution of children living in rural areas peaks at three deprivations (25.2 per cent), compared to only 6.9 per cent of children living in urban areas with three total deprivations. The majority of children living in urban areas are deprived in one or no dimensions (Figure 64). As seen in previous age groups, Figure 65 shows the deprivation distribution of children according to their geographical zone, with a higher chance of multiple deprivations for those living in the Plateau and Mountainous zone compared to those in Plains.

Figure 63: Deprivation distribution at the national level for children aged 15-17 years

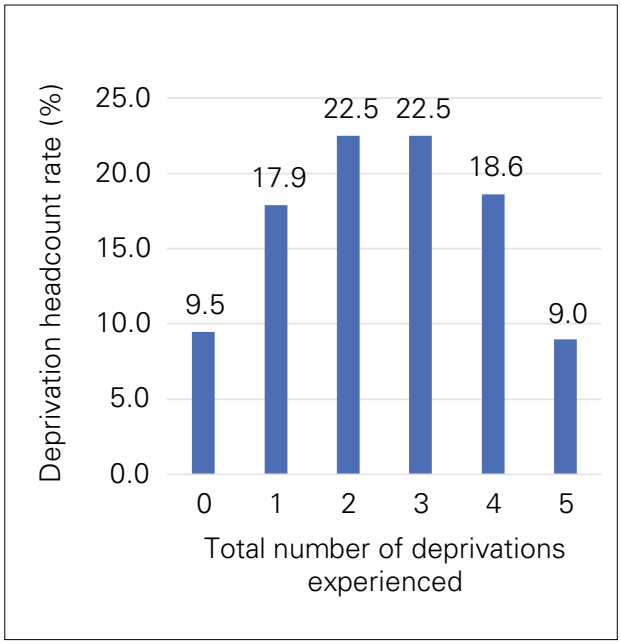
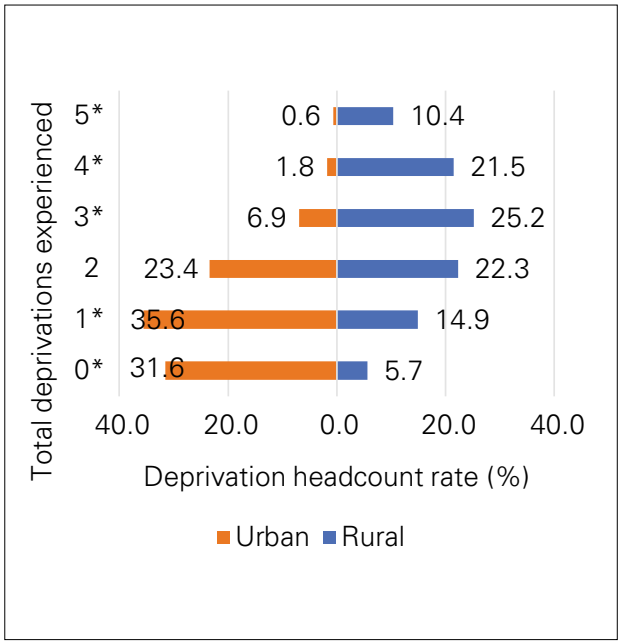
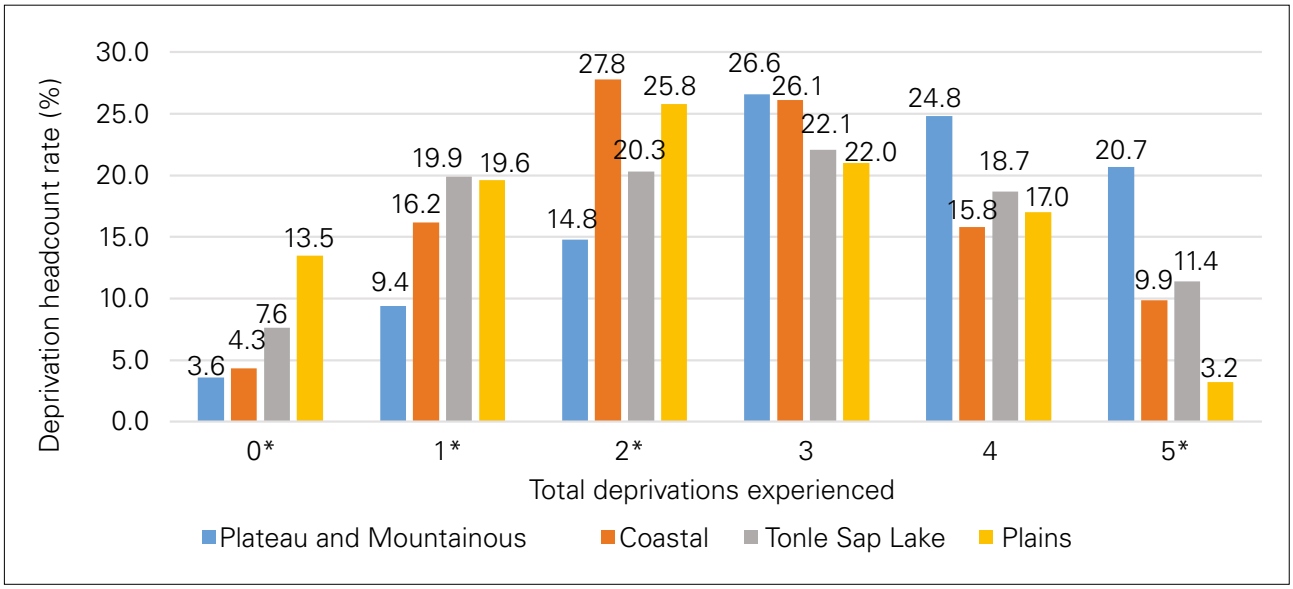


Figure 64: Deprivation distribution at the Cambodia level for children aged 15-17 years, by area



** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05*

Figure 65: Deprivation distribution at the Cambodia level for children aged 15-17 years, by geographical zone



** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

Figure 66 shows the deprivation distribution of girls aged 15-17 according to marital status. Girls who are or have been married are all deprived in at least one dimension at a time, compared to 11.9 per cent of girls who have never been married who are deprived in zero dimensions. Of girls who have ever been married, 16.4 per cent are deprived in all five measured dimensions, compared to only 7.1 per cent of never-married girls. The mother's level of education plays an important role in the deprivation distribution of children of all age groups. Children with a mother who attended secondary or higher education levels face less simultaneous deprivations than children whose mother has lower education levels (Figure 67). Additional individual and household characteristics associated with higher levels of deprivation severity in terms of the deprivation distribution are detailed in Table 23.

Figure 66: Deprivation distribution by girl's marital status for girls aged 15-17 years

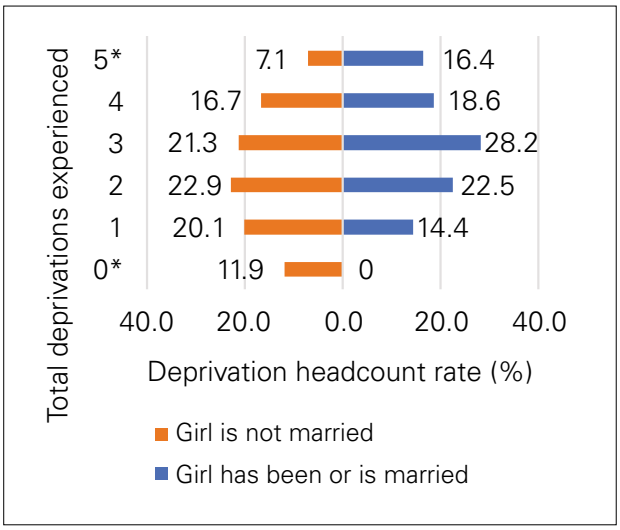
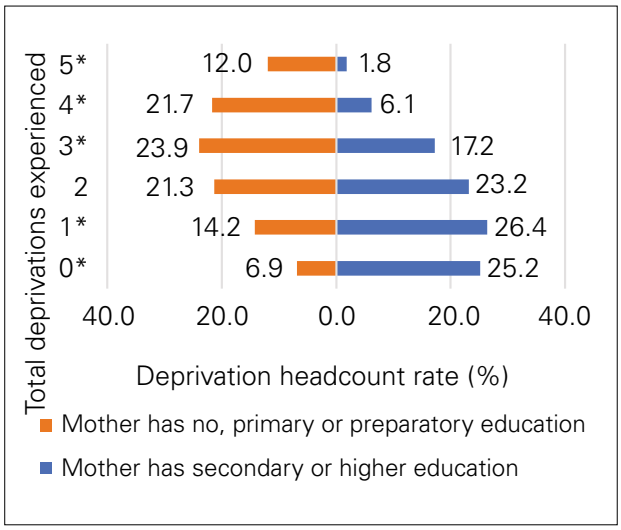


Figure 67: Deprivation distribution by mother's level of education for children aged 15-17 years



** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

Table 23: Deprivation distribution by child's characteristics for children aged 15-17 years

	Sample	Total number of deprivations					
		0	1	2	3	4	5
National	National	9.5	17.9	22.5	22.5	18.6	9
Area	Rural	5.7*	14.9*	22.3	25.2*	21.5*	10.4*
	Urban	31.6*	35.6*	23.4	6.9*	1.8*	0.6*
Sex of household head	Female	9.1	18.8	21.9	23.4	18	8.8
	Male	9.6	17.7	22.6	22.3	18.8	9.1
Mother's education	Mother has secondary or higher education	25.2*	26.4*	23.2	17.2*	6.1*	1.8*
	Mother has no, primary or preparatory education	6.9*	14.2*	21.3	23.9*	21.7*	12*
Mother works	Mother works all year and is paid	20*	22.7*	23.6	17.3*	12.2*	4.2*
	Mother not employed continuously and/or not paid	5.4*	13.3*	20.6	25.6*	22*	13.1*
Under-five mortality	Child lives hh with at least one child mortality in past 5 years	0	8.7	25.2	19.2	27.5	19.5
	Child lives in hh with no child mortality in past 5 years	6.4	16.4	22.9	21.8	20.6	11.9
Median children in household	3+ children in household	5.3*	14.2*	22.1	23	23.2*	12.2*
	1-2 children in household	14.1*	22*	22.9	21.9	13.6*	5.5*
Household has labour constraint	Labour-constraint household	4.9	20.8	17.2	27.3	20.6	9.1
	Not a labour-constraint household	9.6	17.8	22.7	22.3	18.6	9
Anaemia	Not anaemic	11.4	21.2	25	22.2	14.1*	6.1
	Any anaemia	9.1	19.7	21.5	19.3	20.8*	9.6
Sex of the child	Girl	10.2	18.7	22.7	22.4	18.1	7.8*
	Boy	8.8	17.3	22.2	22.6	19.1	10*
Living arrangements: Living without any parents	Lives without parents	9.2	26.1*	27.3	17.8*	14.7	4.9*
	Lives with one or both parents	9.5	16.9*	21.8	23.1*	19.2	9.5*
Orphan status	Single/double orphan	3.8*	18.1	22.6	23.6	20.1	11.8
	Both parents alive	10.3*	17.9	22.4	22.4	18.5	8.6
Disability	Has difficulty	5.4	18.5	18.2	32.6	17.5	7.8

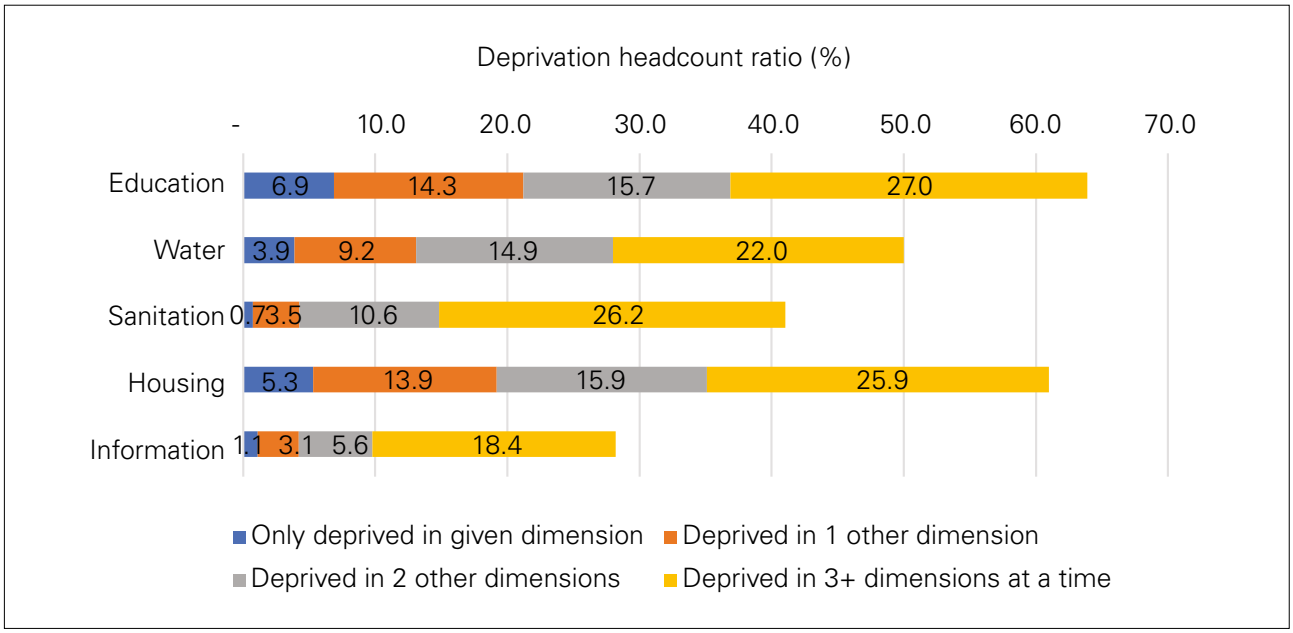
	Sample	Total number of deprivations					
		0	1	2	3	4	5
	No difficulty	9.5	17.9	22.6	22.3	18.7	9
Early marriage	Girl has been or is married	0*	14.4	22.5	28.2	18.6	16.4*
	Girl is not married	11.9*	20.1	22.9	21.3	16.7	7.1*
Living arrangements and orphan status	Lives without parents but not orphan	11.6	24.1*	26.5	18.5	15.2	4.1*
	Living with one/both parents	9.3	17.4*	22.1	22.9	19.0	9.4*
Living arrange-ments: Living with-out one parent	Lives without one or both parents	8.1	19.2	24.1	21.8	18.0	8.8
	Lives with both parents	10.0	17.5	21.8	22.8	18.9	9.1
Zones	Plateau and Mountainous	3.6*	9.4*	14.8*	26.6	24.8	20.7*
	Coastal	4.3*	16.2*	27.8*	26.1	15.8	9.9*
	Tonle Sap Lake	7.6*	19.9*	20.3*	22.1	18.7	11.4*
	Plains	13.5*	19.6*	25.8*	21.0	17.0	3.2*

** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

7.2.2 Deprivation overlap by single dimensions

The deprivation overlap analysis reveals to what extent deprivation in a single dimension is experienced together with other deprivations. For children aged 15-17, none of the dimensions are likely to be uniquely experienced deprivations (Figure 68). Around 7 per cent or less are deprived in only the specified dimension, while around 24-42 per cent of children who are deprived in any of the specified dimensions are deprived in at least two additional dimensions.

Figure 68: Single dimension deprivation overlap, children aged 15-17 years



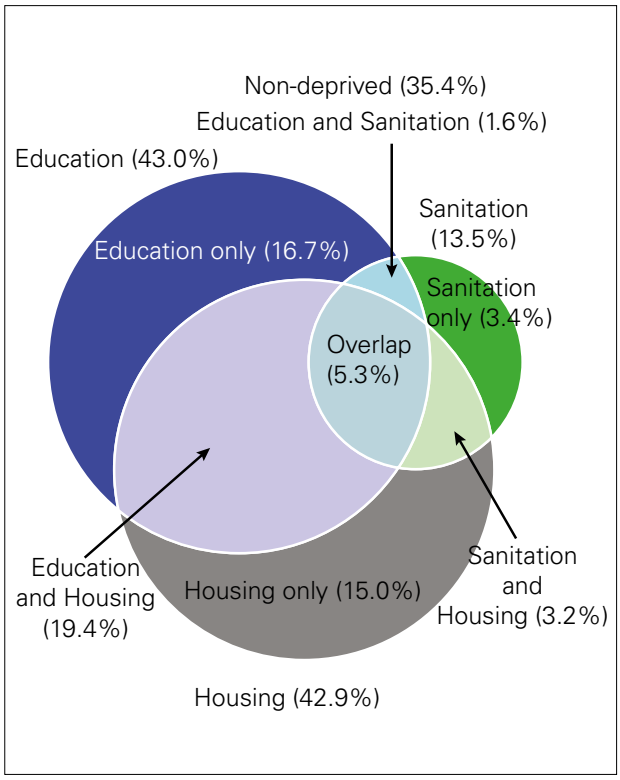
7.2.3 Three-way overlap of deprivations

The combination of education, sanitation and housing has the largest overlap (32.0 per cent) of all possible combinations of three dimensions for children aged 15-17. As in the previous two age groups, all three-way deprivation overlap analysis results are driven largely by rural-level results. In this age group, 36.5 per cent of children in rural areas are deprived in education, sanitation and housing at the same time, compared to only 5.3 per cent of children in urban areas (Figure 69). These figures clearly show the large extent to which multidimensional poverty is a problem in rural areas – not only is the incidence of deprivation in each of these dimensions larger in rural areas, more children deprived in any of these dimensions is likely to be deprived in at least one of the other two dimensions as well. Policies targeting deprivation in any of these dimensions must therefore be attuned to relevant inter-sectoral approaches. In urban areas, 19.4 per cent of children are deprived in both education and housing, meaning that most children who are deprived in education in urban areas will also be deprived in housing. Therefore, inter-sectoral interventions across these two sectors will be most high impact in relieving children's deprivations.

According to Figure 70, in rural areas, 24.5 per cent of children aged 15-17 are simultaneously deprived in water, sanitation and housing, whereas only 1.9 per cent of children living in urban areas face deprivations in all three dimensions analyzed. Furthermore, a higher proportion of children living in urban areas are not deprived in any of the three dimensions compared to children living in rural areas (51.3 per cent versus 12.9 per cent).

Figure 69: Three-way deprivation overlap for the combination of education, sanitation and housing dimensions for children aged 15-17 years, by area

Urban



Rural

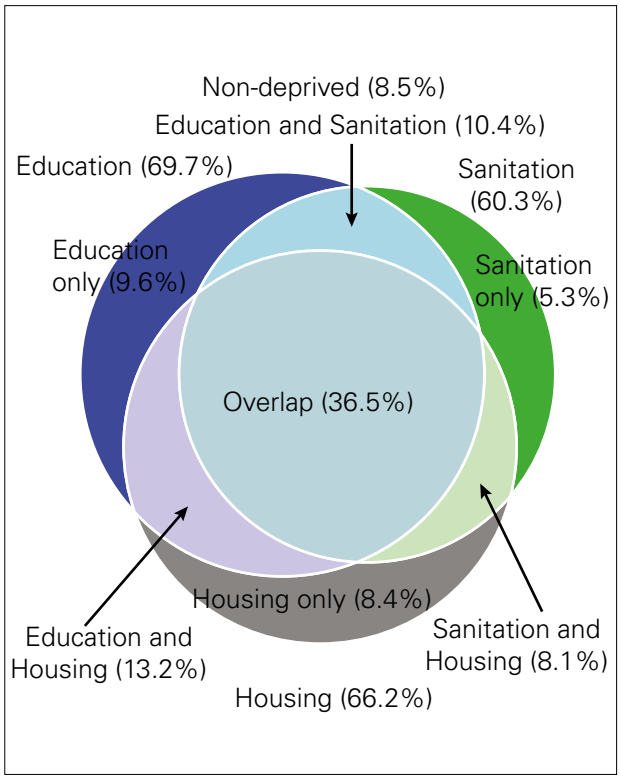
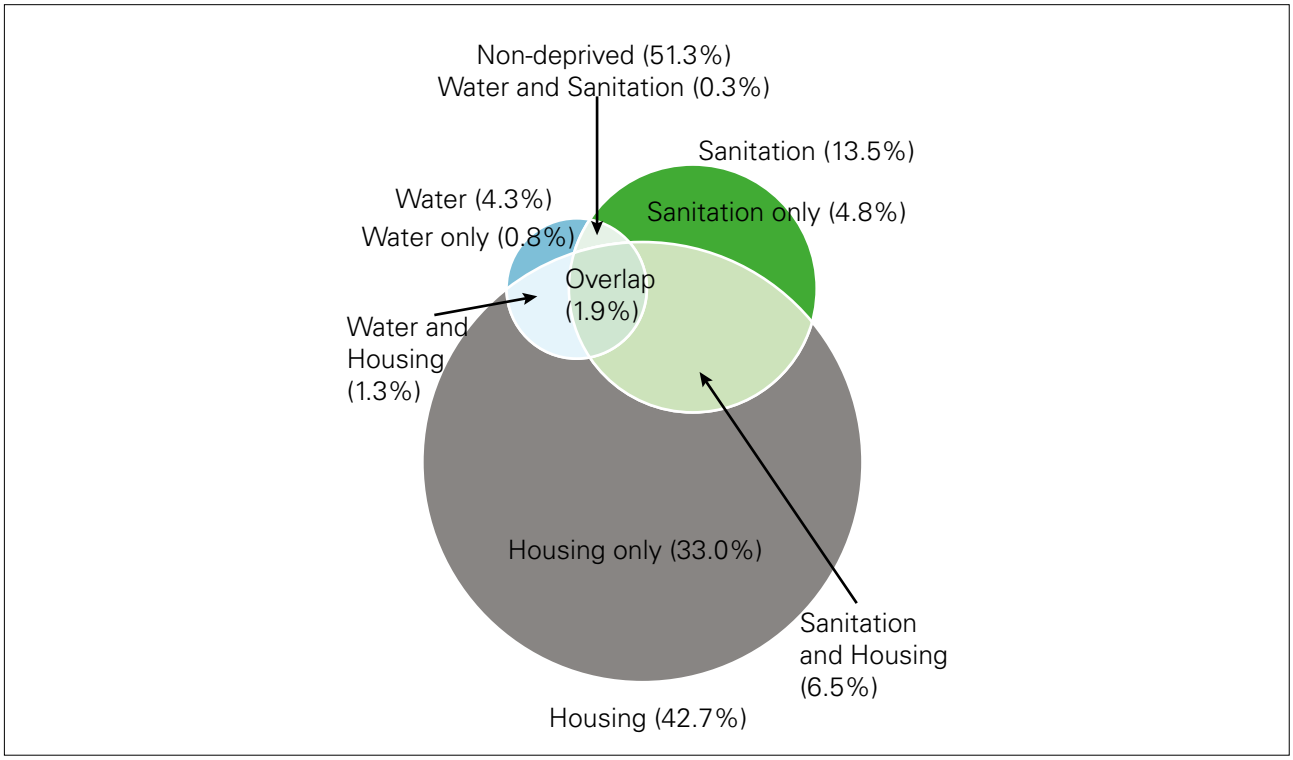
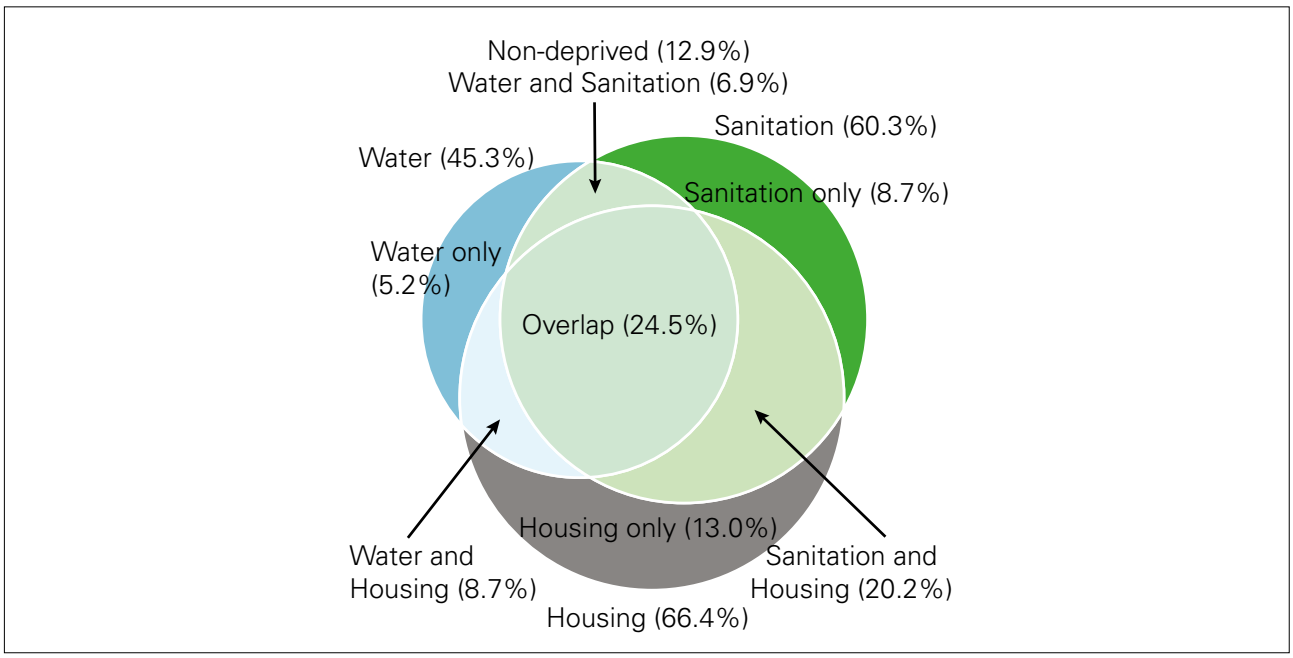


Figure 70: Three-way deprivation overlap for the combination of water, sanitation and housing dimensions for children aged 15-17 years, by area

Urban



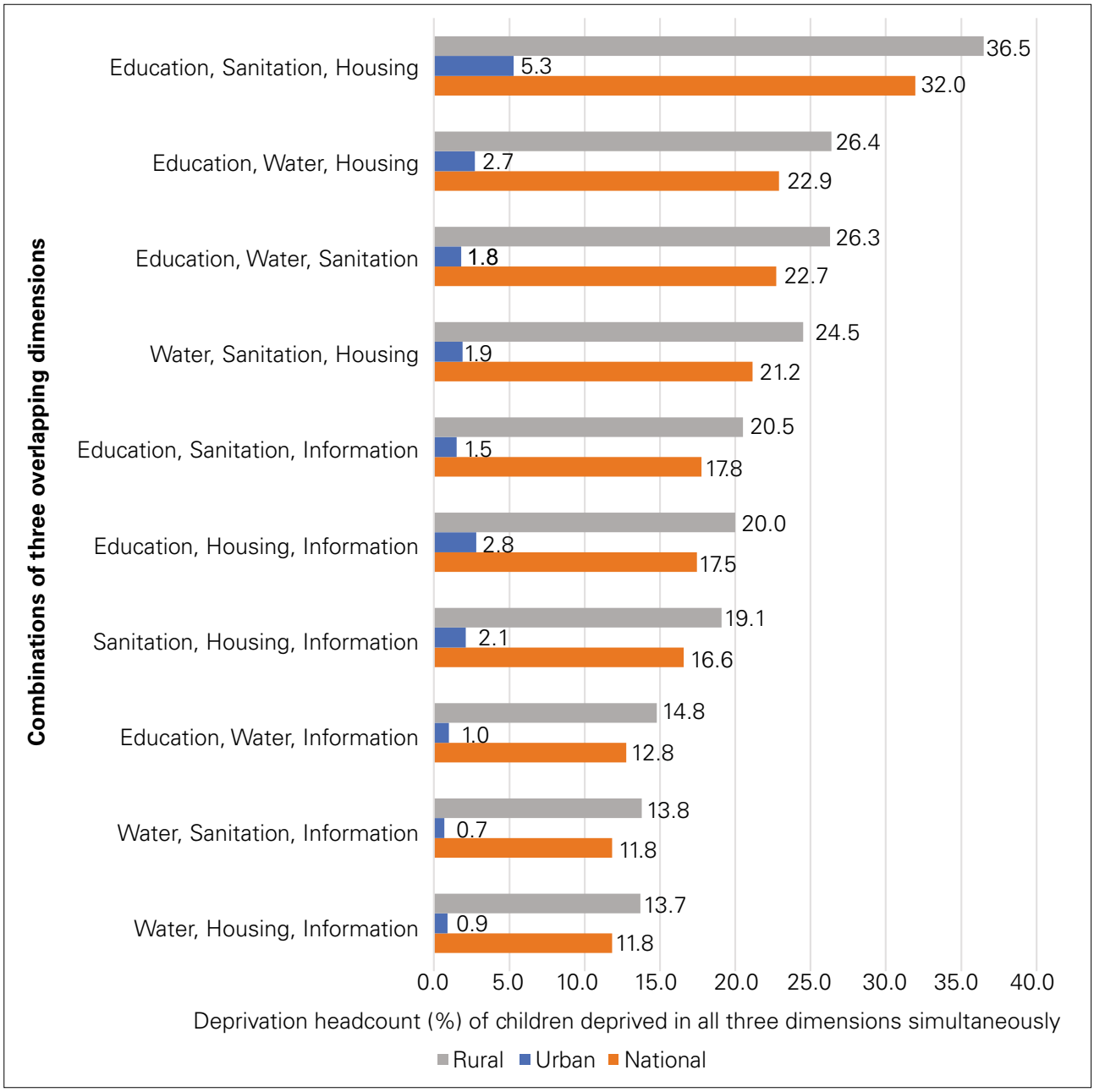
Rural



As consistently seen throughout the analysis, large differences can be observed in the extent of overlap between combinations of three dimensions based on a child's area of residence (urban vs. rural). Figure 71 presents the headcount rate of children who are simultaneously deprived in all three specified dimensions for each possible permutation of three dimensions. The results are disaggregated at the national, urban and rural levels and clearly show the extreme extent to which nation-

al-level results are driven by rural-level rates. This figure provides a general picture of the extent to which certain overlapping deprivations are a problem for children aged 15-17 in Cambodia.

Figure 71: Headcount of children simultaneously deprived in three dimensions at the national, rural and urban levels, children aged 15-17 years



7.2.4 Multidimensional deprivation indices

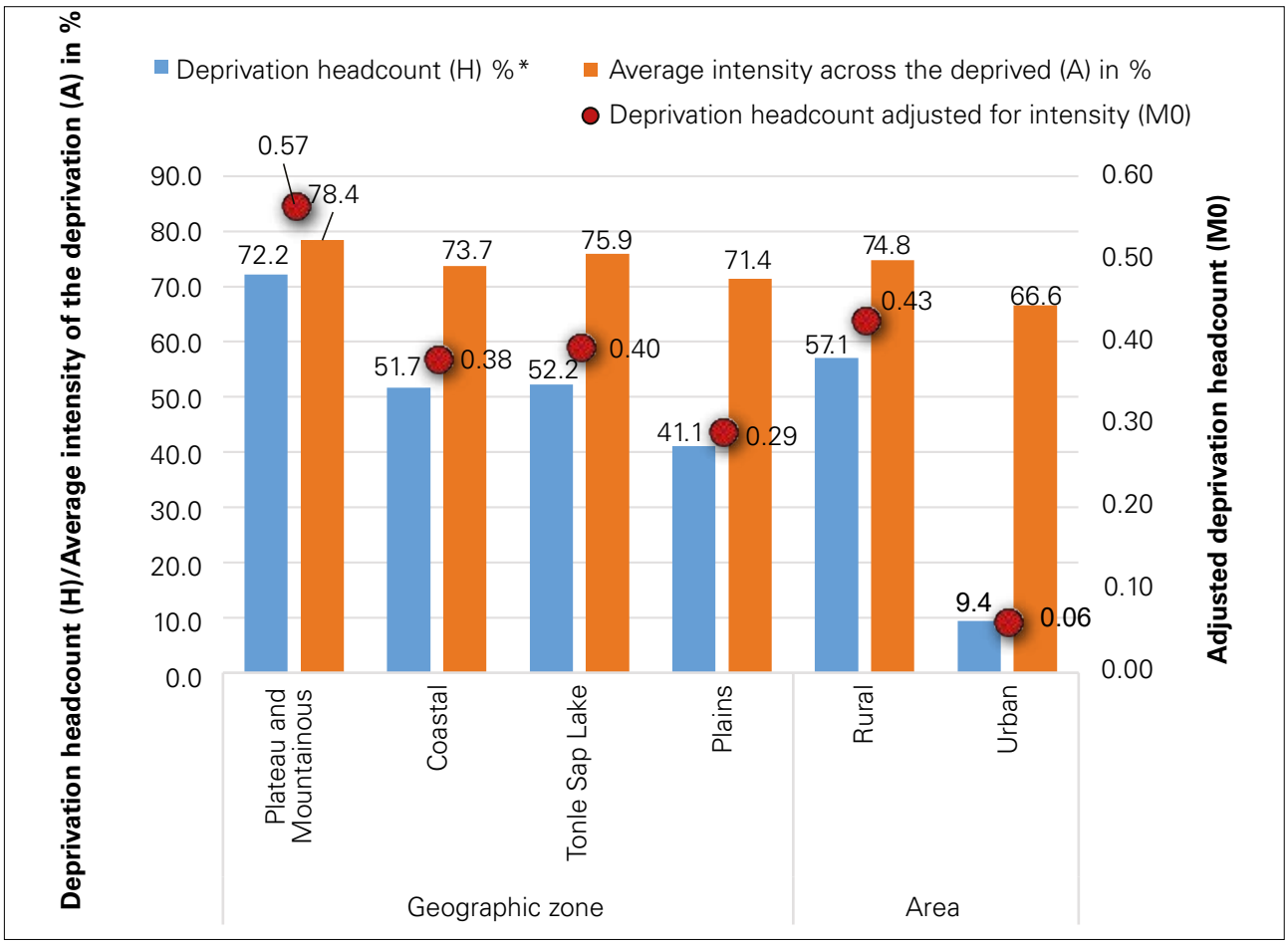
The multidimensional deprivation indices complement the analysis on the distribution and overlap of deprivations, by indicating the overall incidence and intensity of deprivation among children. Table 24 shows the indices H, A and M0 for all children aged 15-17. For example, when using the deprivation cut-off point k=3, 50.2 per cent of all children are defined as multidimensionally deprived. On average these children are deprived in 3.7 deprivations at a time, or 74.6 per cent of all possible deprivations.

Table 24: Multidimensional deprivation indices at the national level for children aged 15-17 years

	Multidimensional deprivation headcount (H), %	Average no. of deprivations among the deprived (A)	Average intensity among the deprived (A); %	Adjusted multidimensional deprivation headcount (M0)
1-5 deprivations	90.5	2.8	55.2	0.50
2-5 deprivations	72.6	3.2	63.9	0.46
3-5 deprivations	50.2	3.7	74.6	0.37
4-5 deprivations	27.6	4.3	86.5	0.24
5 deprivations	9.0	5.0	100.0	0.09

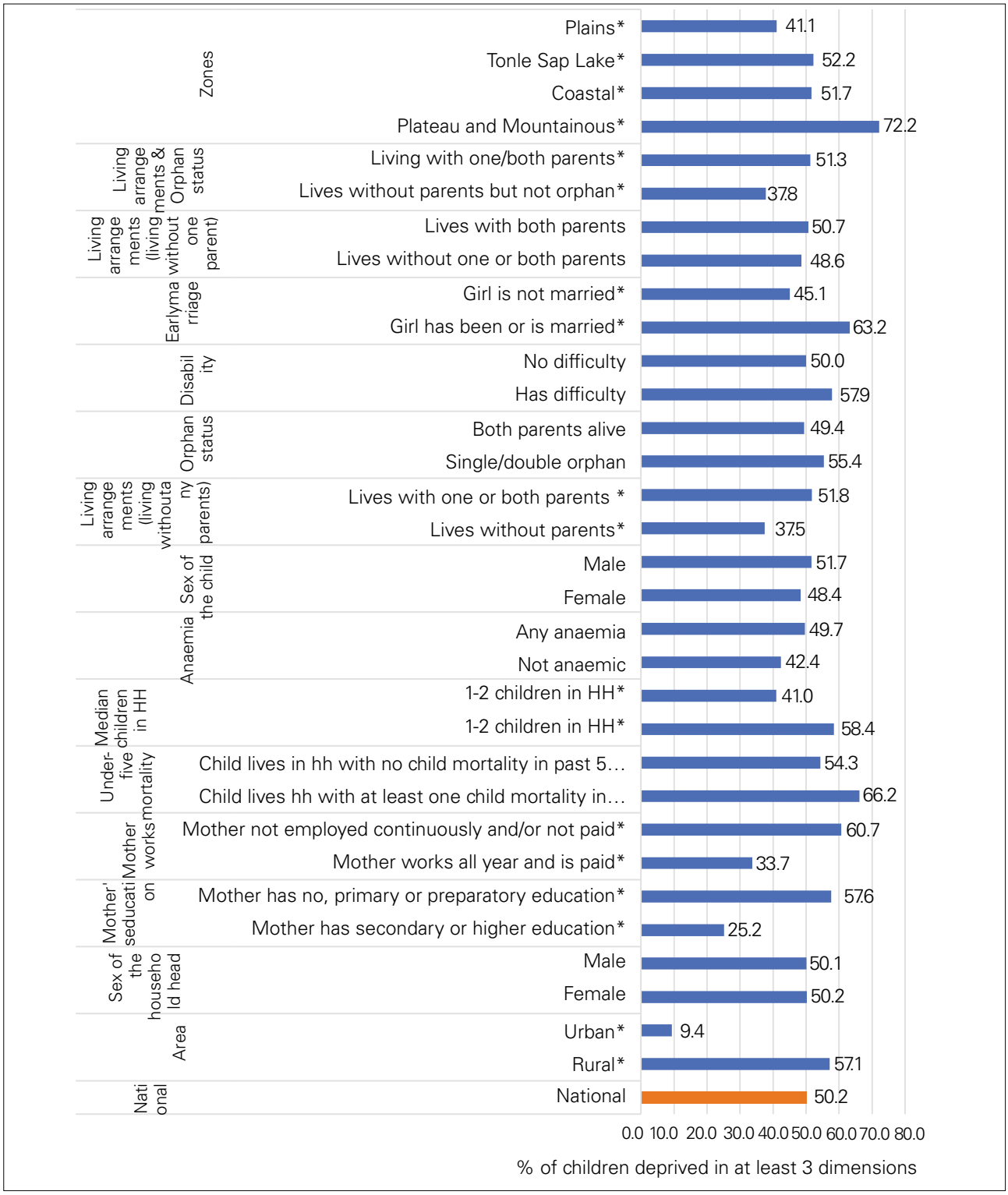
Figure 72 decomposes H, A and M0 at the area and geographic zone levels. The adjusted multidimensional deprivation headcount, M0, as the product of H and A, provides a summary measure of the overall deprivation situation of children deprived in two to five dimensions (both incidence and intensity of deprivation). This measure shows that, on average, children living in rural areas (M0=0.43) are significantly worse off in terms of multidimensional poverty than children in urban areas (M0=0.06), and children in the Plateau and Mountainous zone rank far worse (M0=0.57) compared to children in Plains (M0=0.29). Deprivation headcount rates for children deprived in three to five dimensions profiled by the household and socio-economic characteristics of the child are also illustrated in Figure 73.

Figure 72: Multidimensional deprivation indices (H, A and M0) for children aged 15-17 years deprived in at least three dimensions (k=3), by geographical zone and area



The results demonstrate that higher rates of multidimensional deprivation are closely associated with the following individual and household characteristics: the education level and employment of the mother; being in a household with more than three children; being in a household with an instance of under-five mortality; being a girl that has been or is married. In contrast, gender of the child, labour constraints, girl's anaemia, sex of the household head, disability status and orphanhood do not seem to significantly affect the likelihood that he/she is multidimensionally deprived.

Figure 73: Multidimensional deprivation headcount, H, for children deprived in at least three dimensions (k=3) by children's characteristics



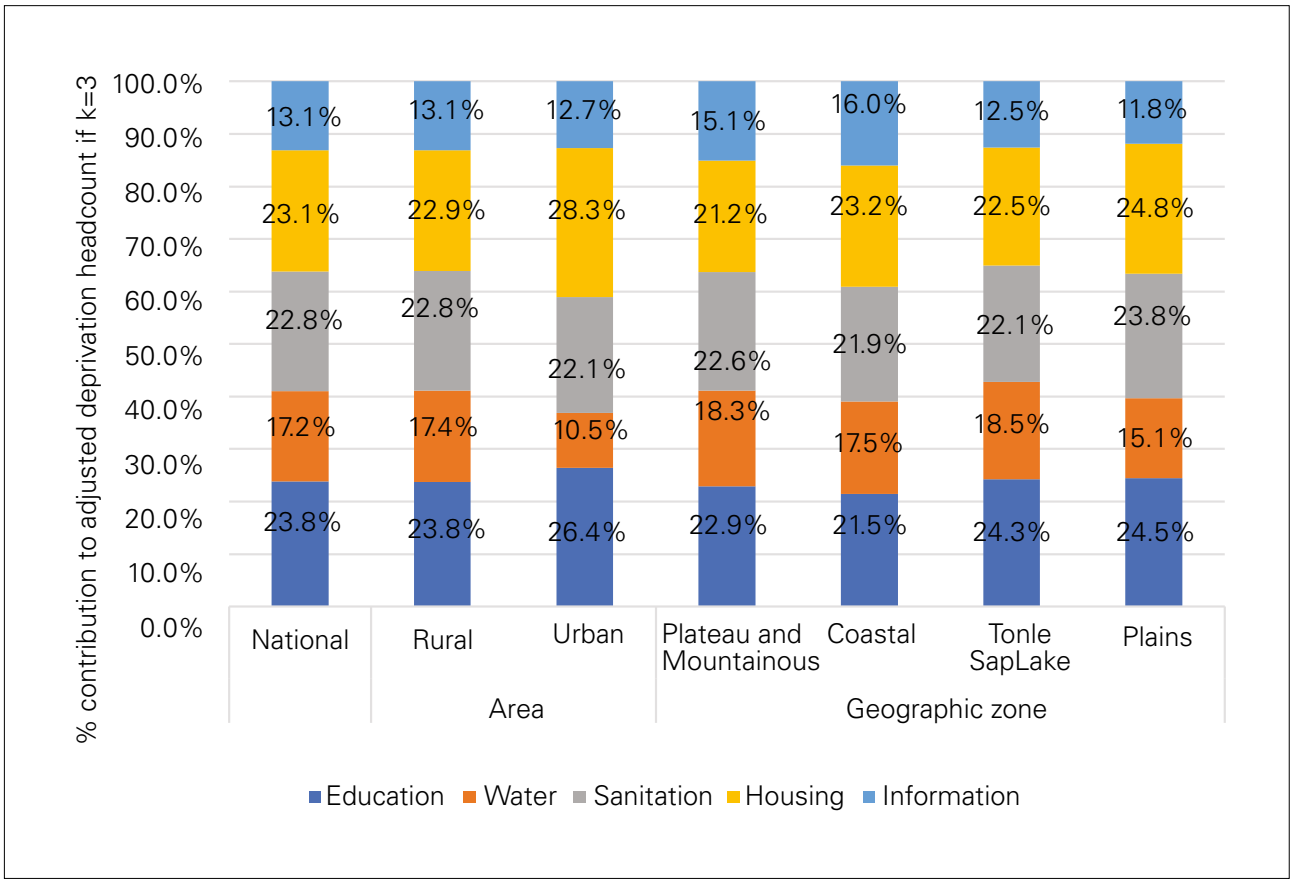
** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

7.2.5 How does each dimension contribute to overall deprivation incidence and intensity?

Figure 74 shows the adjusted deprivation headcount (M0) decomposed to determine which of the dimensions is contributing more to the overall deprivation level in Cambodia among children aged 15-17. This index captures both the headcount and intensity of deprivation. This decomposition is shown in Figure 74 at national, area and geographic zone level.

The education, sanitation and housing dimensions contribute the most, by around 22-28 per cent, to deprivation levels at specified geographic levels, while information contributes the least (varying between 13-16 per cent). All dimensions contribute at similar rates across all geographic levels specified. Housing contributes slightly more to deprivation in urban areas (28.3 per cent) compared to rural areas (22.9 per cent), while water contributes significantly less in urban areas (10.5 per cent) compared to rural areas (17.4 per cent).

Figure 74: Decomposition of the adjusted multidimensional deprivation ratio (M0) for children with at least three deprivations (k=3), by dimensions, 15-17 years



8

Policy recommendations & conclusion

8. Policy recommendations & conclusion

The results of the monetary and multidimensional poverty analyses demonstrate that to achieve the well-being of children in Cambodia, both forms of poverty must be addressed. This speaks to the achievement of both sub-goals of SDG 1.2 – halving, by 2030, the rate of both monetary poverty and poverty "in all its forms" for children, using national definitions (Table 25). Eliminating either monetary or multidimensional poverty alone is likely to leave behind a group of children who is poor according to both or either definition. This point is made most clearly by the difference between the deprivation headcount rate of children aged 0-17 in Cambodia who have at least three or more deprivations at a time (49 per cent), which far exceeds the poverty headcount rate of children living below the poverty line (16 per cent). This means that even if monetary poverty is eradicated by 2030, a significant proportion of children would still lack access to basic services and have unfulfilled needs essential to their growth and development and essential to the sustainable, long-term socio-economic development of Cambodia. In other words, a child living above the poverty line may still not have access to education or improved water if these services simply do not exist in their vicinity, in which case financial resources become irrelevant to the child's well-being.

Moreover, for children, a comprehensive national poverty reduction strategy should aim to make a difference in multiple sectors of a child's well-being, and at the same time. A child deprived in both nutrition and sanitation, even if they receive access to adequate sanitation, will still have significant developmental setbacks if their nutrition problem is not also addressed. These findings call for a better integrated, multisectoral approach to addressing the needs of children. Especially for certain subgroups, like children living in rural areas or children who are stunted, coordinated multisectoral strategies will be crucial to solving these overlapping deprivations. The profiling analyses presented, which identify the most vulnerable child subgroups, give some indication for how to design more effective targeting mechanisms.

Table 25: Reference rates for SDG 1.2.1 and SDG 1.2.2, for children under age 18 in Cambodia

				2015	2030
SDG	Category	SDG indicator	Poverty line	Poverty rate	
				Baseline	Target
1.2.1	Monetary poverty (national definition)	% of children living below the national poverty line	National Cambodia poverty line = KHR 4,984/day	16.0%	8.0%
1.2.2	Multidimensional poverty (national definition)	% of children who are multidimensionally deprived according to national definitions	Deprivation in at least 3 dimensions of child well-being	48.7%	24.4%

The achievement of all 17 SDGs is interrelated and interdependent when it comes to creating a healthy world of equal opportunities for children. These analysis results reflect this fact, as they cover a broad range of sectors that contribute to child well-being, which are also represented in all 17 SDGs and which all fit into the overarching poverty eradication goal of SDG 1. This gives greater value to the contribution of the baseline values for the SDG 1.2.1 and SDG 1.2.2 indicators proposed in Table 25, which can be used for the purpose of target setting and for monitoring and evaluating progress on the achievement of SDG 1 by 2030.

Policy recommendations

The analysis has explored profiles of the most vulnerable Cambodian children by locating them both geographically and socio-economically. Moreover, it facilitates the understanding of how different deprivations by sector overlap to inform which dimensions need to be addressed simultaneously through equity-focused public policies.

Reducing child poverty in all its forms

This research considers both monetary and multidimensional aspects of child poverty. Building an understanding of the nature of child poverty and children's deprivations is essential to addressing the needs of children through suitable programmes and policies. As children are not typically decision-makers or primary income earners in a household, their access to household-level income does not always lead to proportional improvements in their well-being. In addition, children's needs are unique and specific at different stages of childhood development, and these needs are not necessarily met solely by increased access to income. Multidimensional poverty analyses help to complement existing studies on monetary-based poverty.

Investing in the most relevant dimensions of a child's well-being in Cambodia

- Enhancing the provision of improved water supply and sanitation facilities, especially in rural areas, followed by north-east regions and the Plateau and Mountainous zone. These dimensions vitally underpin the environmental conditions in which a child lives. Even if a child is successful in school and has access to adequate nutrition, persisting weaknesses in WASH and housing infrastructure keep children exposed to health and safety hazards that jointly impact well-being. It is necessary to support capacity development of provincial and local-level government to develop action plans to implement the national rural WASH strategies to effectively deliver improved facilities.
- Improving access to early childhood education or preschool programmes in rural areas for children under 5 years old in addition to improving the sophistication of early childhood education programmes to invest in higher-quality integrated early childhood education systems. It is important to recall what is actually measured in this study. For example, the ECD indicator only indicates whether or not a child is attending an early childhood education programme and provides no information about the quality of these programmes. This means that, given the widespread lack of early childhood education take-up, and the lack of sophistication of the existing early childhood education infrastructure, these results need to be interpreted and translated

into policy with care – improving ECD performance for children as a whole will require much more than simply ensuring that children are attending an ECD programme.

- Encouraging early initiation of nutrition-focused interventions to improve nutrition and physical development indicators for the youngest children, at the earliest possible stage of life. Interventions should target both the mother and the child and include those that are both focused exclusively on nutrition indicators, such as improving exclusive breastfeeding rates in urban areas, educating caretakers and improving their access to improve meal frequency and food diversity for infants and young children, along with those that are nutrition-sensitive such as baby-WASH improvement interventions, birth spacing for mothers, improved micronutrient intake in children and reduced rates of underweight children.
- Implementing school programmes to promote timely enrolment in school, reduce early drop-outs, support gender equality and improve the quality of education to improve both access to schools and enhance the experience of learning while children are in school, allowing them to advance to higher levels of education at the correct rate.
- Reducing rates of overcrowded housing and a focus on household composition in policy interventions to reduce child poverty. Housing plays a complex role in children's well-being. More than 60 per cent of children in all three age groups are deprived in the housing dimension, which is largely driven by the overcrowding indicator. Crowded living conditions increase the risk of the spread of infectious diseases. Although the analysis does not include a more direct measure of children's exposure to protection violations, children living in overcrowded housing further risk increased opportunities for violence and other protection violations. A strong, cross-cultural body of literature links household size and overcrowding as push factors for family separation, institutionalization and neglect among other protection violations (G. Evans, S. Lepore and B. Shejwal; Bartlett; Evans, Lepore and Allen; Vega-López, González-Pérez and P. H. Ana Valle; Jewkes, Levin and Penn-Kekana; McLoyd; Youssef, Attia and Kamel; Ferguson, Cassells and MacAllister; Isaranurug, Nitirat and Chauytong). This further calls for a multisectoral approach to reducing children's deprivations in Cambodia, as housing issues, along with other sector-specific issues that exacerbate caretakers' stressors, can also cross into the policy field of child protection. Investments in housing infrastructures are needed as well as educational ways to minimize the effects of crowding when planning the living environment.
- Building the capacity of local stakeholders to ensure these basic services and facilities are available, affordable and appropriate, and that they remain operational over the long term.

Improving the effectiveness of policies by adopting a multisectoral approach

The majority of children in Cambodia experience multiple deprivations at a time. Tackling various issues through combined policies will minimize the programme costs (administration, targeting, etc.) and reduce child poverty more efficiently. In Cambodia, coordinated policy packages need to be installed. An example of potential combinations of deprivations:

- Children aged 0-4 years: Nutrition, ECD, sanitation and housing
- Children aged 5-14 years: Education, water and housing
- Children aged 15-17 years: Education, sanitation and housing

It must be noted that these sector-level recommendations, as drawn directly from the results of this child poverty study, are limited by the data as used in the study. This means that, while adolescent

nutrition is globally recognized as an important priority, it was not possible to include it as a dimension of well-being and/or a possible area for intervention here, given that the CDHS data did not collect data on adolescent nutrition. This report nevertheless recommends a multisectoral approach, across programming and policy divisions, across all areas of child well-being, for children of all ages.

Targeting the most vulnerable children in Cambodia

This study also helps identify the poorest among all children in order to guide policies towards the ones most in need. Therefore, the implementation of social protection systems demand a focus and prioritization of the most vulnerable children in Cambodia. Universal programmes need to be installed to tackle extreme poverty.

- Attention is needed for children living in rural areas, the north-east region and the Plateau and Mountainous zone, since they are doing worst in all dimensions of non-monetary poverty and are most likely to experience multidimensional deprivation.
- Children living with lower educated parents need extra stimulation and support to mitigate the higher chance of falling into poverty. Education is a vital aspect in order to break the intergenerational transmission of poverty.
- Lack of birth registration is a key issue in rural Cambodia as many families are not aware of the importance of getting a birth certificate for their children. Therefore, policies need to implement programmes highlighting the value of a birth certificate and facilitating birth registration.
- The existing focus on supporting stunted children needs to be further strengthened given that non-stunted children are better off. Considering the joint effects of the probability of deprivation in all dimensions, reducing deprivation in nutrition, water and sanitation will have the largest impact on reducing the probability of stunting in rural areas. In urban areas, the highest impact on reducing the probability of stunting would be through reducing the probability of being deprived in nutrition and housing.

Future research

Further research on child poverty in Cambodia, in both monetary and multidimensional terms, is recommended to better understand the state of poverty and deprivation among children and to respond to gaps in research in this study. The quality of future research will be heavily dependent on the availability and quality of data. Recommendations are therefore summarized as follows:

- The CDHS 2014 survey has limited individual, child-level data on child protection-related issues. The dataset includes modules on domestic violence asked to women, but was only implemented in the subsample of households selected for the men's survey, which was in turn only implemented in a subsample consisting of one third of selected households. The final data sample resulted in a very limited ability to study a nationally representative incidence of household-level exposure to violence (using women's exposure to domestic violence as a proxy) among children in Cambodia. In order to be able to consider child protection as a measurable dimension of deprivation for children in Cambodia, given existing external sources pointing to the prevalence of child-protection related issues such as domestic violence, child care, and neglect, future surveys such as the CDHS should include questionnaire modules on

psychological and physical violence as well as child care, ideally surveying all children in the household at the individual level. These modules exist in standard iterations of the demographic and health survey and should be adapted to the context of Cambodia and administered to all children living in households.

- The available CDHS 2014 data did not include data on child labour. This means that, in addition to domestic violence, the incidence of child labour – a crucial angle of child protection – could not be included in this study. Given the high rate of education-related deprivations among children aged 5-17, it would be useful to understand to what extent the incidence of child labour is related to education-related deprivations as well as household wealth in order to better understand appropriate policy interventions to reduce child poverty. Expanding future surveys to include modules on the face of child protection as experienced by children in Cambodia should also include modules on children's experience of child labour in terms of, at minimum, hours and/or type of paid or unpaid work. The standard demographic and health survey makes existing templates for these modules publically available. In order to be useful for a similar study on child poverty in the future, however, survey modules on child labour must be implemented for all children in the household (or, at minimum, all children aged 5-14 in the household), instead of for one child per household, as is commonly practiced.
- The 2014 CDHS survey collected anthropometric data for all children under age 5 in a subsample of two thirds of the survey households, measuring children's weight and height. This data was used in our study to calculate rates of stunting, wasting and underweight to study the state of children's deprivation in nutrition and multidimensional deprivation. Given this survey design, not all children under age 5 in the survey households were included in this module, making it likely that this study presents underestimates of these measures of children's nutritional status. The recommendation is thus to implement the anthropometric module for all children in survey households, rather than only those in a subsample of the survey households. Furthermore, limiting anthropometric and nutrition-focused survey modules to only children younger than 5 restricts the analysis of nutritional status to only these youngest children. It is important to study the likelihood of ongoing problems with nutritional status among older children and adolescents who are otherwise unacknowledged in the survey's nutrition module. To enable further research on the nutritional status of older children and adolescents and thus guide policy design and programming to address a more complete picture of these children's needs, it is recommended to administer nutrition-focused and anthropometric modules to all children under age 18.
- The CDHS 2014 and CSES 2014 datasets do not make it possible to study the overlap of monetary and multidimensional poverty among children, as studied separately in this report. In order to discern to what extent children who are multidimensionally poor are also monetarily poor, and thus devise appropriate policy measures to alleviate child poverty, the entire study on multidimensional and monetary poverty must be carried out on the same nationally representative sample of households and children. The existing datasets did not include unique identifiers that allow for data of individual children in the CSES survey to be matched to individual children in the CDHS survey, and statistical matching estimates, such as through propensity score matching, would leave high room for error and bias. Recommendations for future research therefore leave several options that revolve around a better integration of the two surveys:

1. Carry out CDHS and CSES surveys in the future, taking into account the recommendations listed in this section, during the same year and on the same sample of households and children. Ensure that unique identifier variables are created for matching children from both samples at the individual and household levels.
2. Expand existing surveys (either CDHS or CSES) to include the key modules necessary for a future study on child poverty as produced and recommended for improvement in this report. The result should be a nationally representative dataset that includes individual-level data on children that is sufficient to carry out both a monetary and multidimensional poverty study on the same sample of children. An example would be to expand the current CDHS questionnaire to include a module on household consumption that allows for the creation of some welfare aggregate, which could be used to estimate the level of monetary poverty experienced by the child and his/her household.
3. Construct a new survey that is nationally representative at the individual child level, which is designed to be optimal for the study of child poverty as outlined and recommended for improvement in this report, combining modules of both the CDHS and CSES survey as necessary.

- The sample design of the CDHS prevents a representative analysis at the provincial level. This means that further geographical decompositions of the analysis beyond the urban/rural and zonal levels was not possible, limiting the ability to geographically locate and inform targeting mechanisms and priority areas for intervention with precision. Future surveys should ensure that sample design is also representative at the province level, at minimum. This would also allow for detailed study of the picture of rural child well-being, as multidimensional deprivation is highest among children living in rural areas, while the majority of the Cambodian population (around 80 per cent) is concentrated in rural areas. Furthermore, it would allow for more detailed study of the picture of urban poverty among children, especially given the high rate of consumption inequality in urban areas as evidenced by the CSES. Combining both individual child level data with household consumption data, it would be useful to better understand the state of child well-being among urban-poor communities.
- An analysis of changes in child poverty over time would be helpful in better understanding the situation of monetary and multidimensional child poverty and to develop possible responses to certain time-sensitive interventions over the previous years. However, the comparability of such an analysis over time is also limited due to the amendments to the definition of the monetary poverty line made over the last years, as well as due to the availability of representative and suitable data. It is recommended to carry out this study on children's multidimensional and monetary poverty on a regular basis to improve monitoring and evaluation capacity of the state of child poverty and policy interventions, taking into account the improvements for further research listed in this section.

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10 Annexes

Annex I: Guidelines for selecting dimensions and indicators

Defining 'deprivation' assists in setting the objective(s) of the analysis and choosing the appropriate dimensions. For country-specific studies (i.e., National-MODA), national norms and/or internationally agreed definitions can be used, while cross-country studies (i.e., Cross-Country-MODA) require a definition that is accepted across countries.

MODA prefers to use international standards as guiding principles for choosing the most relevant dimensions of child well-being. The Convention on the Rights of the Child (CRC) (1989), in combination with the World Summit on Social Development (1995) and the Millennium Development Goals (2000; 2003) can serve as a basis for the construction of a core set of dimensions that are essential to any child's development irrespective of their country of residence, socio-economic status or culture. See Figure 75 for an example of guiding dimensions based on the CRC.

These dimensions can further be complemented by aspects of well-being that are particularly relevant in a country-specific context. National norms, standards or legislation; regionally agreed deprivation definitions; theories written by scholars, researchers and academia; explicit or implicit assumptions about what people value or should values; public 'consensus'; and empirical evidence regarding what children (or others) value most as elements of well-being[15] can be used for defining those supplementary dimensions.

Indicators are measurement tools that, independently or as a set, are able to report on the well-being of a child for each of the selected dimensions. In each dimension, a combination of indicators and respective thresholds determines the level of deprivation of the child in that dimension. By the union approach, children are determined to be deprived in a dimension if they are deprived in at least one of the dimensions' indicators.

Examples of indicators are, for instance, adequate feeding practices (diets) for the nutrition dimension or school attainment for the education dimension. The choice of indicators should be conceptually sound with the definition of the dimension and is furthermore driven by data availability and data quality. De facto, MODA exercises are mostly data-driven unless one has the time and resources to design a survey specifically to produce a child deprivation analysis. The choice of indicators is subject to various considerations – see the seven main technical criteria used to select indicators below.

15 This option requires that an empirical assessment of what children (or others) consider as important elements of their well-being is available or can be made. These elements are very subjective and context specific and therefore can reflect the specific conditions of childhood well-being in a particular country. Moreover, it gives weight to UNICEF's position that children should be given a voice in defining what is important in their life. It is also clear that this voice is more easily given to children above a certain age and that the elements of well-being for (very) young children have to be defined by others.

Table 26: Dimensions and categories of child well-being based on the 1989 Convention on the Rights of the Child

Categories	Dimension	Source
Survival	Food, nutrition	CRC Art. 24
	Water	CRC Art. 24
	Health care	CRC Art. 24
	Shelter, housing	CRC Art. 27
	Environment/pollution	CRC Art. 24
Development	Education	CRC Art. 28
	Leisure	CRC Art. 31
	Cultural activities	CRC Art. 31
	Information	CRC Art. 13, 17
Protection	Exploitation; child labour	CRC Art. 32
	Other forms of exploitation	CRC Art. 33-36
	Cruelty, violence	CRC Art. 19, 37
	Violence at school	CRC Art. 28
	Social security	CRC Art 16, 26, 27
	Birth registration; nationality	CRC Art. 7, 8
Participation	Birth registration; nationality	CRC Art. 7,8
	Information	CRC Art. 13, 17
	Freedom of expression, views, opinions; being heard; freedom of association	CRC Art. 12-15

Source: Selection of authors (de Neubourg et al., 2012) from CRC

Some dimensions may not apply to the entire child population for reasons including empirical consistency and data constraints. For instance, the education dimension only covers school-aged children (ages 5-17), while the sanitation dimension covers children of all age groups. In fact, the water, sanitation and housing dimensions are based on household-unit data and therefore apply to all age groups.

Seven main criteria are used to select indicators:

1. Relevance: The indicators selected should be relevant for indicating levels of child well-being and child deprivation. Outcome indicators are preferred but not always available or meaningful. To identify the meaningful dimensions to be covered, the CRC can be used as a guiding principle.
2. Attribution to dimensions: To enhance the policy relevance of the indicators, it is recommended to use indicators that can be interpreted as deprivations originating in a particular policy domain. This is not always possible. Stunting, for instance, even though widely used for mea-

suring malnutrition outcomes, can be attributed to many more sectors than nutrition (e.g., quality of housing, water, sanitation, access to health care). Due to its inter-sectoral nature, it may be meaningful to use stunting as a profiling variable if it fits the purpose of the analysis and can be attributed to a dimension of interest.

3. Variance: Analyzing overlapping deprivations requires variance; for every indicator there must be a number of children who are deprived and non-deprived according to that indicator. Indicators that almost all or the vast majority of children are deprived of in a particular country are potentially very important, but not very useful in an overlap analysis. Lacking a birth certificate, for instance, is potentially important as an indicator as being registered is a child's right with many consequences for access to services; it may, however, not be very useful as a deprivation indicator as there may be a lack of variance in this indicator (e.g., most children registered or not registered, depending on the efficiency of public administration).
4. Coverage: The very objective of identifying children with overlapping deprivations has important implications for the indicator choice. Indicators should cover all children and be constructed from data that is available for all children. For example, constructing indicators for a specific age group of children using information not available for all children in this age group would distort the results. Meaningful indicators available in the datasets sometimes cannot be used because they are available only for a limited number of children in the age groups chosen for the analysis.
5. Free from measurement bias: This may be especially important for variables that rely on underlying administrative definitions such as the definition of a 'live birth', or on differences in the public administration such as for the birth registration. It may also apply to variables that assume judgment that is culturally biased such as the perception of tolerance or accepted levels of violence. These types of measurement bias problems are usually more common in internal comparative studies but may be relevant also in countries with large ethnic and cultural diversity or multi-ethnic societies.
6. Scalability: The aggregation of dimensions implicit in the construction of the deprivation ratios requires a certain degree of scalability (internal consistency) of the dimensions. Dimensions that considerably reduce the scalability may be dropped from the analysis.
7. Parsimony and internal consistency: For a MODA type of analysis, it is important that children analyzed have a similar probability of being deprived or non-deprived in each of the dimensions studied. Thus, it is advisable to avoid including different numbers of indicators across dimensions and giving different weights to the dimensions used in the analysis. In the Cross-Country-MODA, for instance, it has been decided to use two indicators per dimension (and no more than two) wherever possible in order not to distort the probability of being deprived across dimensions and to avoid weighting problems.

When choosing indicators it is also important to take into account that:

- The indicators should reflect actual deprivation instead of possible causes of deprivation. For instance, the distance to school influences the probability of children not being in school. However, in itself it does not report an actual deprivation (children living far from school may nevertheless attend school if transportation needs are met). With regards to a deprivation in

education, indicators such as "being enrolled in school" and "attending school regularly" are more suitable.

- Missing values can distort the sample representativeness and with this the outcomes of the deprivation ratios. Since the direction of the bias is unknown, it is recommended to control for the percentage of missing values for each indicator and to select indicators with as low a percentage of missing values as possible.
- Deprivation indicators can be age- and/or gender-specific (e.g., vaccinations, education, and early pregnancy). The reference population for each indicator should be defined by specifying which age and which gender each indicator refers to. The reference population of an indicator on primary school attendance, for instance, should be all children of legally defined primary school age.
- Variables of interest that do not fulfil the criteria on attribution to the dimensions, coverage and/or scalability can still be included in the analysis, in the form of profiling variables. Using them as profiling variables provides the opportunity to study their interaction with deprivation.

A list of profiling variables proposed for National-MODA in Cambodia is found on the next page.

Profiling Variable	Relevant age group (years)			Subgroups
	0-4	5-14	15-17	
Region	x			South; North-east; West
Area	x	x	x	Urban; Rural
Sex of household Head	x	x	x	Household head is male; Household head is female
Stunting status	x			Child is stunted; Child is not stunted
Mother's education	x	x	x	Mother has achieved at least secondary education; Mother has achieved primary or no education
Mother's employment	x	x	x	Mother works all year and is paid; Mother is not employed continuously and/or is not paid for her work
Under-5 mortality	x	x	x	A child under 5 years old has died in the household; No child under 5 years old has died in the household
No. of children in the household	x	x	x	Household has 1-2 children under age 18; Household has 3 or more children under 18
Birth certificate	x			Child has birth registration or certificate; Child does not have birth registration or certificate
Labour constraint	x	x	x	Child is living in a labour-constraint household (if: There is no one adult aged 15-59 years or the dependency ratio is greater than 3); Child is not living in a labour-constraint household

Profiling Variable	Relevant age group (years)			Subgroups
	0-4	5-14	15-17	
Sex of child	x	x	x	Child is female; Child is male
Orphan status	x	x	x	Child is single or double orphan; Both parents of the child are alive
Living arrangements	x	x	x	Child is living with at least one parent; Child is living with no biological parent, but is not a double orphan; Child is a double orphan
Disability		x	x	Child experiences any level of difficulty in any domain of physical disability ("Has difficulty"; "No difficulty"). These include problems with vision, hearing, walking/climbing, remembering/concentrating, self-care/communicating
Early marriage			x	Girl has been or is married; Girl is not married

Annex II: Regional disaggregation

As the DHS data was not representative at the regional level, in order to extract some regional specificity from the data, the 19 different regions indicated in the survey data were disaggregated into three geographical regions – north-east, west and south – based on a map provided by the UNICEF nutrition unit. The map and table below explain how these regions were disaggregated for children aged 0-59 months only.

Figure 75: Map of Cambodia and three geographical regions

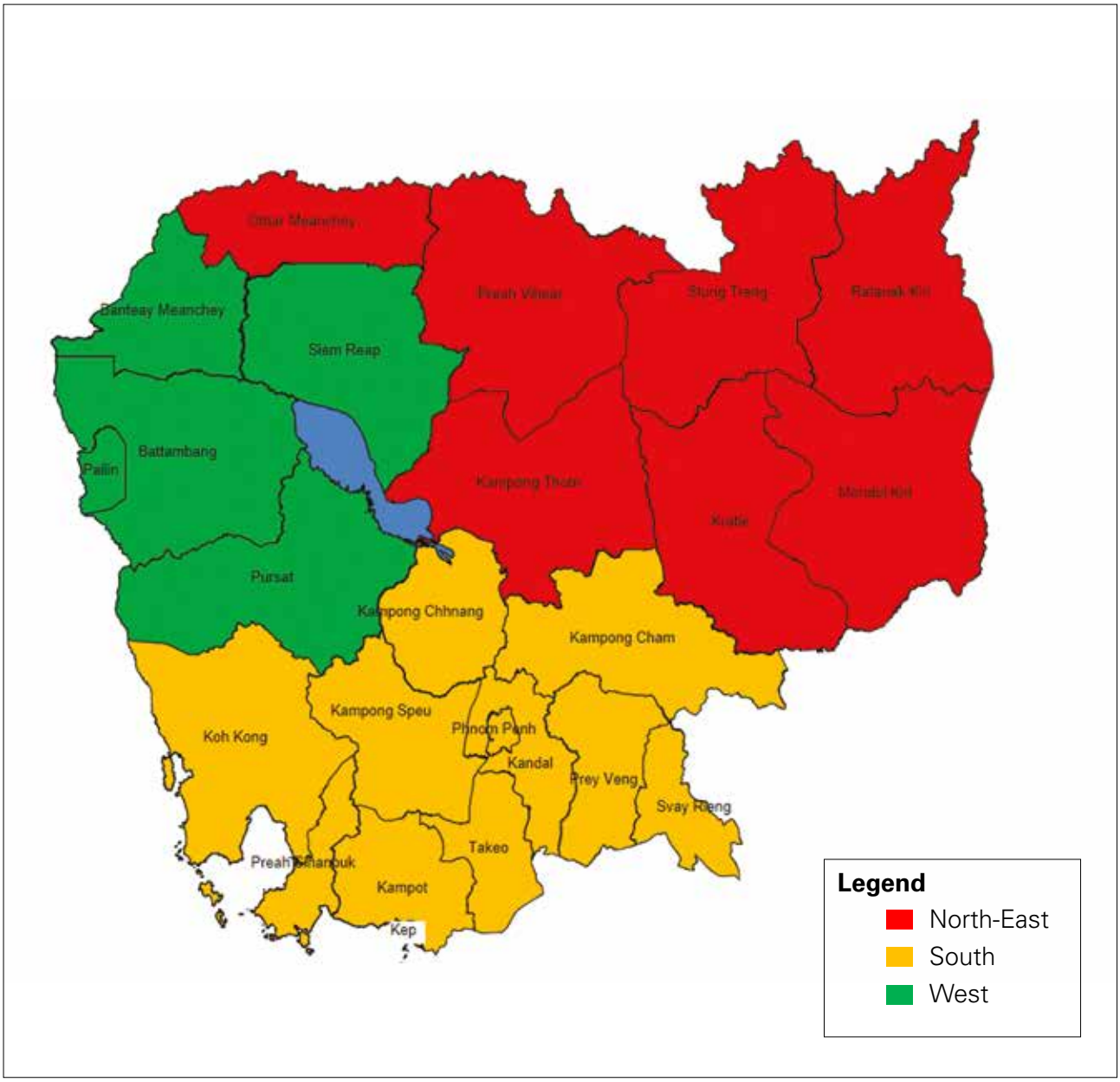


Table 27: Disaggregation of geographical regions

North-East region	West region	South region
Kampong Thom	Banteay Meanchey	Kampong Cham
Kratie	Pursat	Kampong Chhnang
Otdar Meanchey	Siem Reap	Kampong Speu
Preah Vihear and Steung Treng	Battambang and Pailin	Kandal
Mondul Kiri and Ratanak Kiri		Phnom Penh
		Prey Veng
		Svay Rieng
		Takeo
		Kampot and Kep
		Preah Sihanouk and Koh Kong

Cambodia by zone/region	Province
Plains	Kampong Cham
	Tbong Khmum *
	Kandal
	Phnom Penh
	Prey Veng
	Svay Rieng
	Takeo
Tonle Sap Lake	Banteay Meanchey
	Battambang
	Kampong Chhnang
	Kampong Thom
	Pursat
	Siem Reap
	Otdar Meanchey
	Pailin
Coastal	Kampot
	Koh Kong
	Preah Sihanouk
	Kep
Plateau and Mountainous	Kampong Speu
	Kratie
	Mondul Kiri
	Preah Vihear
	Ratanak Kiri
	Stung Treng

Source: National Institute of Statistics-agriculture census 2013

* Note: This province is separated from Kampong Cham Province and is designated as a new province in the TS-agriculture census of 2013, but is not represented separately in the CDHS 2014 dataset.

Annex III: Monetary Poverty Profile – Additional Tables and Figures

Figure 76: Distribution of per capital total monthly consumption at national, rural and urban levels

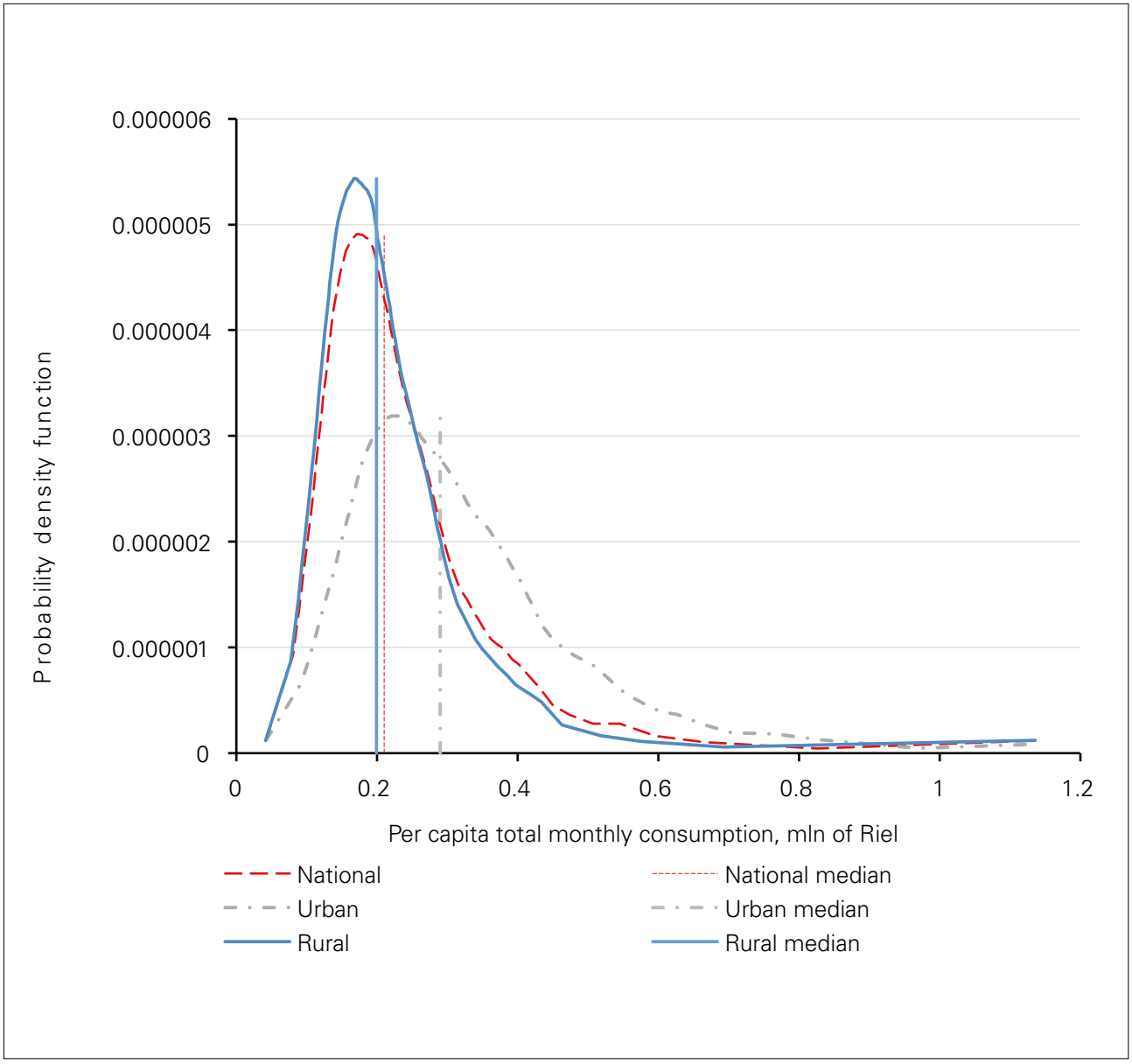


Table 28: Mean and median per capita consumption expenditure, growth and the Gini coefficient

	Mean	Median	Gini coefficient	Frequency
Urban	337,597.3	289,630.1	29.0	4,942
Rural	227,882.6	199,027.2	25.8	13,350
Total	247,611.8	210,016.9	27.9	18,292

Table 29: Distribution of the population across wealth quintiles

	Quintiles of per capita monthly consumption				
	Q1	Q2	Q3	Q4	Q5
Data1					
Urban	8.1	10.2	15.3	22.9	43.5
Rural	22.6	22.1	21.0	19.4	14.9
Total	20.0	20.0	20.0	20.0	20.0

Table 30: Mean and median per capita consumption and the Gini coefficient across sub-national zones

	Mean	Median	Gini coefficient
Cambodia zones for children aged 0-17			
Plains	269,690.0	225,991.1	28.9
Tonle Sap Lake	233,339.2	201,772.3	26.6
Coastal	233,129.5	200,678.6	25.8
Plateau and Mountain-ous	220,336.7	194,971.4	26.3
Total	247,611.8	210,016.9	27.9

Table 31: Headcount ratio by sub-national zones

	Poverty headcount rate	Distribution of the poor	Distribution of population
	Data1	Data1	Data1
Cambodia zones for children aged 0-17			
Plains	15.5	42.8	44.1
Tonle Sap Lake	15.7	34.4	35.1

	Poverty headcount rate	Distribution of the poor	Distribution of population
Coastal	15.5	7.2	7.4
Plateau and Mountainous	18.7	15.7	13.4
Total	16.0	100.0	100.0

Table 32: Poverty gap measure by sub-national zones

	Poverty gap	Contribution to overall poverty	Distribution of population
	Data1	Data1	Data1
Poverty line = povline			
Cambodia zones for children aged 0-17			
Plains	2.9	48.0	44.1
Tonle Sap Lake	3.0	31.8	35.1
Coastal	2.6	5.8	7.4
Plateau and Mountainous	3.7	14.4	13.4
Total	3.0	100.0	100.0

Table 33: Squared gap measure by sub-national zones

	Squared poverty gap	Contribution to overall poverty	Distribution of population
	Data1	Data1	Data1
Cambodia zones for children aged 0-17			
Plains	0.9	57.2	44.1
Tonle Sap Lake	0.9	27.2	35.1
Coastal	0.6	4.0	7.4
Plateau and Mountainous	1.1	11.6	13.4
Total	0.9	100.0	100.0

Table 34: Atkinson measures and generalized entropy measures

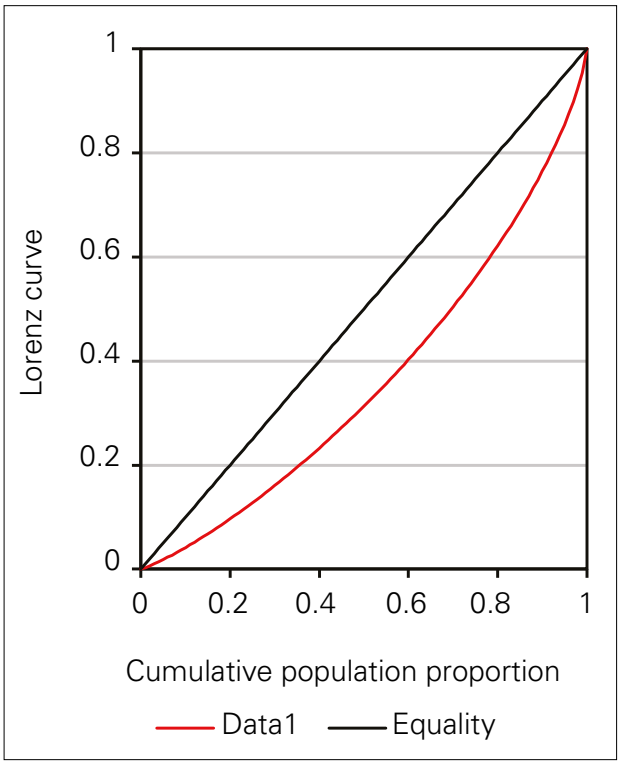
	Atkinson index			Generalized entropy measures		
	A(1/2)	A(0)	A(-1)	GE(0)	GE(1)	GE(2)
Total	6.4	11.9	20.9	12.7	14.1	19.1

Table 35: Elasticity of FGT indices to per capita consumption

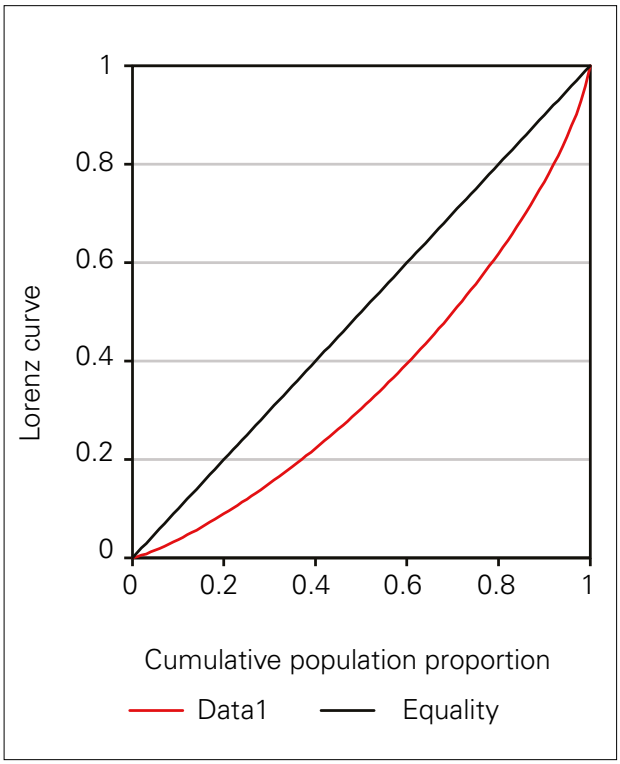
	Poverty headcount rate	Poverty gap	Squared poverty gap
	Data1	Data1	Data1
Urban	-2.76	-3.16	-3.46
Rural	-3.08	-3.52	-3.85
Total	-3.01	-3.44	-3.76

Figure 77: Lorenz curves at the national, urban and rural levels

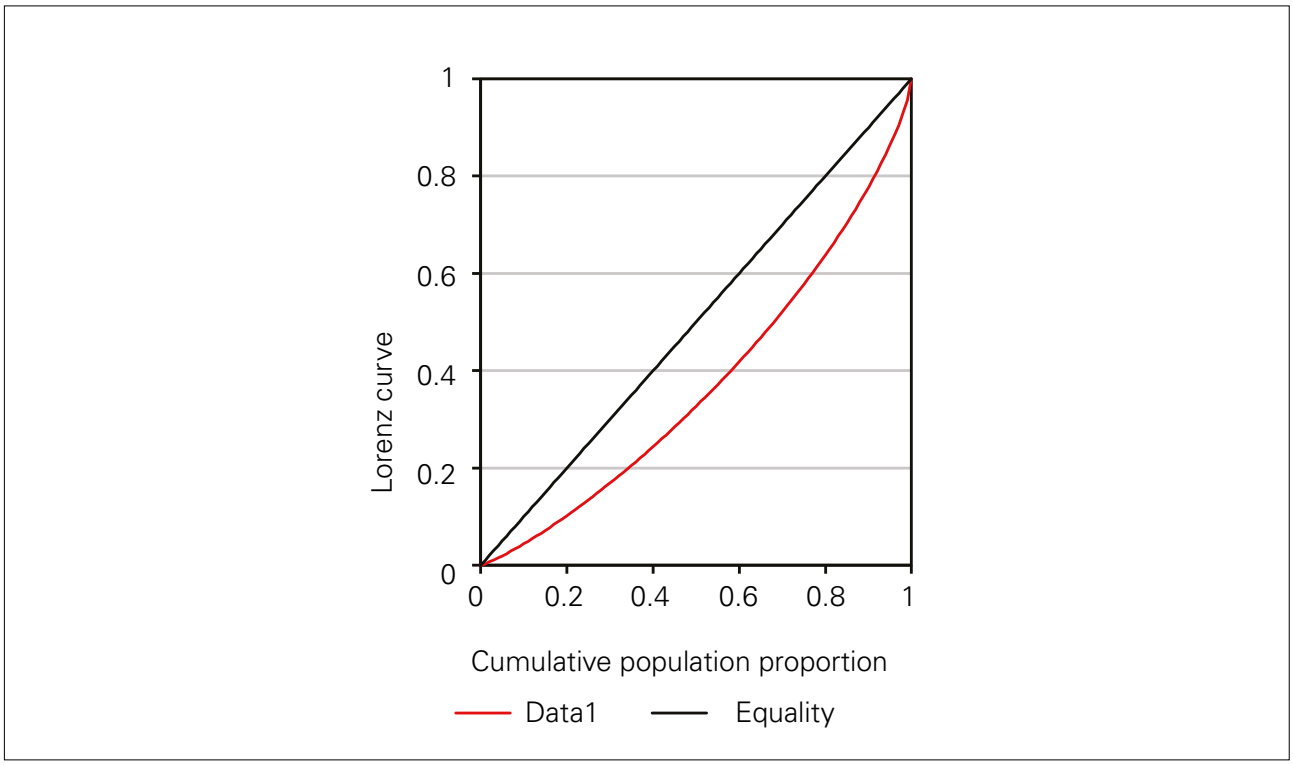
National



Urban



Rural


1
0.8
0.6
0.4
0.2
0
Lorenz curve
0
0.2
0.4
0.6
0.8
1
Cumulative population proportion
Data1
Equality

Annex IV: Stunting Analysis - Additional Tables & Figures

Table 36: Average marginal effects of the probability of not being deprived in more than three dimensions at a time, controlling for individual and household characteristics, at the national level

VARIABLES	(1) Stunted - National	(2) Stunted - Urban	(3) Stunted - Rural
Not deprived in 3 or more deprivations	-0.159***	-0.163***	-0.155***
	(0.0148)	(0.0474)	(0.0164)
Mother has no or primary education	0.00375	0.0146	0.00134
	(0.0163)	(0.0366)	(0.0183)
Mother's age at first birth is under 18	0.00144	-0.0298	0.00549
	(0.0228)	(0.0598)	(0.0247)
Mother's height is under 145 cm	0.196***	0.205*	0.195***
	(0.0316)	(0.105)	(0.0333)
Child is a boy	0.0126	0.0260	0.0109
	(0.0136)	(0.0328)	(0.0149)
Child's age	0.0493***	0.0295**	0.0524***
	(0.00473)	(0.0120)	(0.00514)
No. of children aged 0-4 years in the household	-0.000744	-0.00506	0.000795
	(0.0111)	(0.0247)	(0.0124)
No. of children aged 5-14 years in the household	0.0225***	0.0337**	0.0207***
	(0.00642)	(0.0152)	(0.00707)
No. of children aged 15-17 years in the household	-0.0203	-0.00493	-0.0239
	(0.0167)	(0.0365)	(0.0185)
No. of adults aged 18-59 years in the household	-0.00171	-0.0115	0.00172
	(0.00525)	(0.00979)	(0.00612)

VARIABLES	(1) Stunted - National	(2) Stunted - Urban	(3) Stunted - Rural
No. of adults over age 60 in the household	0.00801	0.0392*	0.00174
	(0.0120)	(0.0231)	(0.0137)
North-east region	0.0485***	0.0202	0.0514***
	(0.0188)	(0.0592)	(0.0199)
Observations	4,389	1,195	3,194

Standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.1*

Table 37: Average marginal effects of the probability of being deprived in single and multiple dimensions, at the national level

VARIABLES	Nutrition	Health	ECD	Water	Sanitation	Housing	All dimensions
Not deprived in nutrition	-0.261***						-0.255***
	(0.0135)						(0.0136)
Not deprived in health		-0.0650***					-0.0343**
		(0.0169)					(0.0160)
Not deprived in ECD			-0.0332**				-0.00226
			(0.0165)				(0.0162)
Not deprived in water				-0.0457***			-0.0235*
				(0.0147)			(0.0142)
Not deprived in sanitation					-0.0859***		-0.0501***
					(0.0153)		(0.0156)
Not deprived in housing						-0.0594***	-0.0353**
						(0.0149)	(0.0149)
Mother has no or primary education	0.0379**	0.0403**	0.0453***	0.0443***	0.0258	0.0405***	0.00940
	(0.0150)	(0.0158)	(0.0157)	(0.0156)	(0.0163)	(0.0157)	(0.0160)
Mother's age at first birth is under 18	0.00359	0.00367	0.0101	0.00779	0.00529	0.0106	-0.00410
	(0.0223)	(0.0232)	(0.0233)	(0.0233)	(0.0232)	(0.0233)	(0.0220)

VARIABLES	Nutrition	Health	ECD	Water	Sanitation	Housing	All dimensions
Mother's height is under 145 cm	0.172***	0.203***	0.203***	0.200***	0.196***	0.199***	0.166***
	(0.0308)	(0.0319)	(0.0320)	(0.0320)	(0.0319)	(0.0319)	(0.0307)
Child is a boy	0.0189	0.0129	0.0130	0.0139	0.0138	0.0113	0.0191
	(0.0132)	(0.0138)	(0.0138)	(0.0138)	(0.0137)	(0.0138)	(0.0132)
Child's age	0.0629***	0.0477***	0.0456***	0.0470***	0.0478***	0.0480***	0.0633***
	(0.00463)	(0.00481)	(0.00487)	(0.00482)	(0.00480)	(0.00481)	(0.00470)
No. of children aged 0-4 years in the household	-0.0105	0.00965	0.00879	0.0123	0.00902	0.0102	-0.0173
	(0.0108)	(0.0112)	(0.0114)	(0.0112)	(0.0112)	(0.0112)	(0.0110)
No. of children aged 5-14 years in the household	0.0267***	0.0255***	0.0269***	0.0272***	0.0269***	0.0232***	0.0220***
	(0.00625)	(0.00651)	(0.00650)	(0.00649)	(0.00647)	(0.00658)	(0.00634)
No. of children aged 15-17 years in the household	-0.00837	-0.0210	-0.0186	-0.0196	-0.0144	-0.0214	-0.00984
	(0.0164)	(0.0169)	(0.0169)	(0.0169)	(0.0169)	(0.0168)	(0.0163)
No. of adults aged 18-59 years in the household	-0.00901*	-0.00877*	-0.00765	-0.00820	-0.00321	-0.00983*	-0.00475
	(0.00501)	(0.00523)	(0.00531)	(0.00525)	(0.00534)	(0.00524)	(0.00518)
No. of adults over age 60 in the household	0.00279	0.00556	0.00409	0.00326	0.0112	0.00142	0.00704
	(0.0116)	(0.0121)	(0.0121)	(0.0121)	(0.0122)	(0.0121)	(0.0117)
North-east region	0.0624***	0.0517***	0.0660***	0.0601***	0.0595***	0.0585***	0.0422**
	(0.0184)	(0.0194)	(0.0193)	(0.0193)	(0.0191)	(0.0192)	(0.0185)
Observations	4,389	4,389	4,389	4,389	4,389	4,389	4,389

Standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.1*

Table 38: Average marginal effects of the probability of being deprived in single and multiple dimensions, in urban areas

VARIABLES	Nutrition	Health	ECD	Water	Sanitation	Housing	All dimensions
Not deprived in nutrition	-0.242***						-0.230***
	(0.0367)						(0.0371)
Not deprived in health		-0.0872					-0.0470
		(0.0545)					(0.0500)
Not deprived in ECD			-0.0634*				-0.0203
			(0.0362)				(0.0350)
Not deprived in water				-0.0477			0.0117
				(0.0676)			(0.0574)
Not deprived in sanitation					-0.107**		-0.0234
					(0.0532)		(0.0483)
Not deprived in housing						-0.105***	-0.0793**
						(0.0365)	(0.0370)
Mother has no or primary education	0.0365	0.0488	0.0411	0.0539	0.0375	0.0282	0.000769
	(0.0343)	(0.0361)	(0.0367)	(0.0362)	(0.0367)	(0.0364)	(0.0360)
Mother's age at first birth is under 18	-0.0142	-0.0395	-0.0287	-0.0301	-0.0310	-0.0310	-0.0185
	(0.0617)	(0.0586)	(0.0602)	(0.0599)	(0.0600)	(0.0598)	(0.0613)
Mother's height is under 145 cm	0.182*	0.214**	0.232**	0.227**	0.229**	0.219**	0.166*
	(0.101)	(0.107)	(0.107)	(0.107)	(0.106)	(0.105)	(0.0983)
Child is a boy	0.0197	0.0179	0.0205	0.0185	0.0203	0.0186	0.0208
	(0.0318)	(0.0331)	(0.0331)	(0.0332)	(0.0331)	(0.0329)	(0.0316)
Child's age	0.0507***	0.0266**	0.0231*	0.0250**	0.0258**	0.0285**	0.0527***
	(0.0121)	(0.0123)	(0.0121)	(0.0122)	(0.0122)	(0.0122)	(0.0121)

VARIABLES	Nutrition	Health	ECD	Water	Sanitation	Housing	All dimensions
No. of children aged 0-4 years in the household	-0.0118	0.00342	-0.000496	0.00667	0.00413	0.00427	-0.0215
	(0.0239)	(0.0248)	(0.0250)	(0.0247)	(0.0246)	(0.0246)	(0.0247)
No. of children aged 5-14 years in the household	0.0410***	0.0387**	0.0386**	0.0409***	0.0388**	0.0369**	0.0340**
	(0.0145)	(0.0153)	(0.0153)	(0.0153)	(0.0152)	(0.0152)	(0.0148)
No. of children aged 15-17 years in the household	-0.00717	-0.0115	-0.00675	-0.0107	-0.00659	-0.0177	-0.00755
	(0.0356)	(0.0367)	(0.0370)	(0.0368)	(0.0365)	(0.0374)	(0.0359)
No. of adults aged 18-59 years in the household	-0.0149	-0.0142	-0.0133	-0.0151	-0.0123	-0.0145	-0.0123
	(0.00932)	(0.00988)	(0.00989)	(0.00988)	(0.00990)	(0.00977)	(0.00951)
No. of adults over age 60 in the household	0.0385*	0.0345	0.0411*	0.0370	0.0396*	0.0297	0.0357
	(0.0225)	(0.0234)	(0.0236)	(0.0235)	(0.0234)	(0.0234)	(0.0227)
North-east region	0.0345	0.0327	0.0317	0.0316	0.0232	0.0220	0.0205
	(0.0591)	(0.0615)	(0.0613)	(0.0617)	(0.0603)	(0.0599)	(0.0574)
Observations	1,195	1,195	1,195	1,195	1,195	1,195	1,195

Standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.1*

Table 39: Average marginal effects of the probability of being deprived in single and multiple dimensions, in rural areas

VARIABLES	Nutrition	Health	ECD	Water	Sanitation	Housing	All dimensions
Not deprived in nutrition	-0.262***						-0.258***
	(0.0146)						(0.0147)
Not deprived in health		-0.0585***					-0.0314*
		(0.0179)					(0.0170)

VARIABLES	Nutrition	Health	ECD	Water	Sanitation	Housing	All dimensions
Not deprived in ECD			-0.0147				0.00257
			(0.0189)				(0.0183)
Not deprived in water				-0.0372**			-0.0249*
				(0.0155)			(0.0150)
Not deprived in sanitation					-0.0745***		-0.0504***
					(0.0168)		(0.0170)
Not deprived in housing						-0.0411**	-0.0255
						(0.0168)	(0.0165)
Mother has no or primary education	0.0298*	0.0276	0.0353**	0.0333*	0.0193	0.0324*	0.00880
	(0.0170)	(0.0179)	(0.0177)	(0.0177)	(0.0182)	(0.0177)	(0.0178)
Mother's age at first birth is under 18	0.00460	0.00821	0.0141	0.0119	0.00967	0.0145	-0.00235
	(0.0240)	(0.0251)	(0.0252)	(0.0251)	(0.0250)	(0.0252)	(0.0238)
Mother's height is under 145 cm	0.170***	0.199***	0.198***	0.196***	0.193***	0.195***	0.165***
	(0.0324)	(0.0335)	(0.0336)	(0.0336)	(0.0336)	(0.0336)	(0.0324)
Child is a boy	0.0186	0.0120	0.0119	0.0130	0.0129	0.0106	0.0195
	(0.0144)	(0.0150)	(0.0151)	(0.0151)	(0.0150)	(0.0151)	(0.0144)
Child's age	0.0649***	0.0513***	0.0502***	0.0507***	0.0514***	0.0513***	0.0653***
	(0.00502)	(0.00522)	(0.00530)	(0.00522)	(0.00521)	(0.00522)	(0.00511)
No. of children aged 0-4 years in the household	-0.00967	0.0120	0.0132	0.0144	0.0113	0.0128	-0.0153
	(0.0120)	(0.0125)	(0.0127)	(0.0124)	(0.0124)	(0.0125)	(0.0123)
No. of children aged 5-14 years in the household	0.0245***	0.0243***	0.0258***	0.0257***	0.0254***	0.0228***	0.0204***
	(0.00687)	(0.00716)	(0.00715)	(0.00713)	(0.00712)	(0.00726)	(0.00701)

VARIABLES	Nutrition	Health	ECD	Water	Sanitation	Housing	All dimensions
No. of children aged 15-17 years in the household	-0.00899	-0.0237	-0.0214	-0.0224	-0.0177	-0.0226	-0.0101
	(0.0182)	(0.0187)	(0.0187)	(0.0187)	(0.0187)	(0.0187)	(0.0182)
No. of adults aged 18-59 years in the household	-0.00482	-0.00358	-0.00309	-0.00316	0.00120	-0.00484	-0.00179
	(0.00590)	(0.00614)	(0.00621)	(0.00616)	(0.00624)	(0.00617)	(0.00606)
No. of adults over age 60 in the household	-0.00290	0.00271	0.000351	-0.000555	0.00683	-0.00144	0.000629
	(0.0133)	(0.0139)	(0.0139)	(0.0139)	(0.0139)	(0.0139)	(0.0134)
North-east region	0.0631***	0.0518**	0.0657***	0.0609***	0.0615***	0.0607***	0.0463**
	(0.0195)	(0.0206)	(0.0204)	(0.0204)	(0.0203)	(0.0204)	(0.0198)
Observations	3,194	3,194	3,194	3,194	3,194	3,194	3,194

Standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.1*

Source: Author's calculations, CDHS 2014

Table 40 presents the results of a multivariate logistic regression analysis focusing on being stunted as the dependent variable and being deprived in less than three deprivations as the independent variable, controlling for the effects of various individual and household characteristics. The table presents an attempt to estimate the probability that stunting can be reduced by decreasing the child's multidimensional poverty (defined as being deprived in at least three deprivations), expressed as marginal effects. The findings of this table are also summarized in Figure 38. These results show how having a lower intensity of deprivations/ lowering the intensity of deprivations (to zero, one or two deprivations) will impact the probability of being stunted. At the national and rural levels, controlling for key individual and household characteristics, reducing deprivation intensity is associated with a statistically significant negative effect on the probability of becoming stunted. This suggests that, for example, at the rural level, reducing the number of deprivations is associated with a -15.1 percentage point change in the probability of becoming stunted. In urban areas, reducing the number of deprivations is associated with a -16.0 percentage point change in the probability of becoming stunted. Controlling for the effect of a lower deprivation intensity, living in the northeastern region has a statistically significant effect in rural areas but not in urban areas. Controlling for other factors, in rural areas, living in the north-east is associated with a 5.01 percentage point change to the probability of becoming stunted.

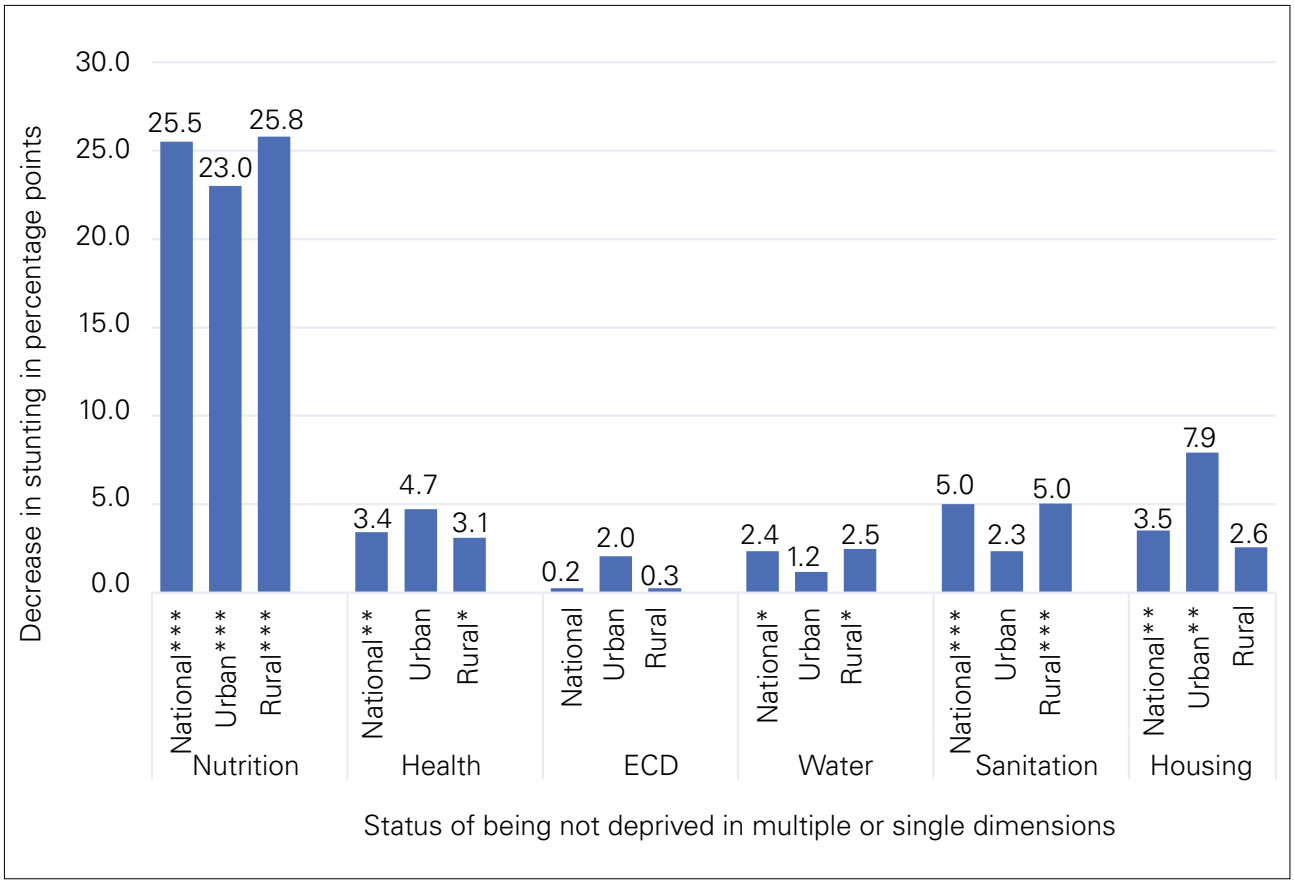
Table 40: Average marginal effects of the factors associated with the probability of being stunted

Variables	Category	(1) Stunted - national	(2) Stunted - urban	(3) Stunted - rural
Number of deprivations	Child has fewer than 3 deprivations	-0.159***	-0.163***	-0.155***
Mother's education	Mother has no or primary education	0.00375	0.0146	0.00134
Mother's age when giving first birth	Mother's age at first birth is under 18	0.00144	-0.0298	0.00549
Mother's height	Mother's height is under 145 cm	0.196***	0.205*	0.195***
Child's gender	Child is a boy	0.0126	0.0260	0.0109
Child's age	Child's age	0.0493***	0.0295**	0.0524***
Number of children in household	No. of children aged 0-4 years in the household	-0.000744	-0.00506	0.000795
	No. of children aged 5-14 years in the household	0.0225***	0.0337**	0.0207***
	No. of children aged 15-17 years in the household	-0.0203	-0.00493	-0.0239
No. of adults aged 18-59 years in the household	No. of adults aged 18-59 years in the household	-0.00171	-0.0115	0.00172
Number of adults aged 60+ in household	No. of adults over age 60 in the household	0.00801	0.0392*	0.00174
Region of residence	North-east region	0.0485***	0.0202	0.0514***
	Observations	4,389	1,195	3,194

*** p<0.01, ** p<0.05, * p<0.1
Sample: children age 0-59 months sampled for the anthropometric module.

Figure 78 shows, holding constant key characteristics, and holding constant non-deprivation in each single dimension, the effect of the health and housing dimensions becomes less significant and the effects of ECD become insignificant (not presented in the figure). The significant effect of reducing the probability of stunting by reducing deprivation in nutrition, water and sanitation remains robust both in terms of the magnitude of the effects and their statistical significance at national and rural levels. These results suggest that, considering the joint effects of the probability of deprivation in all dimensions, reducing deprivation in nutrition and sanitation will have the largest impact on reducing the probability of stunting in rural areas. In urban areas, the highest impact on reducing the probability of stunting would be through reducing the probability of being deprived in nutrition and housing.

Figure 78: Probability of reducing stunting through reducing deprivations in single dimensions, controlling for individual and household characteristics and deprivation in all single dimensions, at the national, urban and rural level, expressed as marginal effects



**** p<0.01, ** p<0.05, * p<0.1*

Annex V: Birth registration among children aged 0-4 years in Cambodia

Birth registration among children aged 0-4 years in Cambodia

Article 7 of the Convention on the Rights of the Child (CRC) recognizes the right of every child from birth to a registered name and nationality – a right that is well recognized and established (United Nations, 1989). However, a large proportion of children under age 5 globally are not registered at birth. No formal state recognition in the form of a birth registration or certificate limits children's ability to have their rights protected. Children in this situation often do not qualify for essential basic services and care including health care and education, along with other forms of social assistance, social protection, legal protection and political recognition. Children without a formal birth certificate face higher risks of entering high-risk activities and behaviours before the legal age, such as marriage or formal or informal labour markets. After legal age, individuals without formal birth certificates face higher hurdles engaging in these activities.

In our sample of children under age 5 years in the CDHS 2014 data, around one quarter (25.9 per cent) do not possess a formal birth certificate or registration (henceforth referred to as 'unregistered'). This chapter compares deprivation levels of children who have and do not have formal birth registration to better understand the indicators and dimensions of child well-being, as well as the intensity of child poverty, that are related to being unregistered.

Figure 79 shows that the highest rate of unregistered children are found in the north-east, with 41.4 per cent of children who are unregistered, followed by the western region with nearly one third of children (28.4 per cent) unregistered. In the southern region, 21.0 per cent of children are unregistered. Compared to children in urban areas, where still a high 14 per cent of children are unregistered, nearly one in every three children living in rural areas is not registered at birth (27.7 per cent).

Figure 80 shows that of all children who lack birth registration (25.9 per cent), these unregistered children are largely made up of those living in rural areas (23.9 per cent) and those who are living in the southern regions of Cambodia (12.8 per cent).

Figure 79: Percentage of children without formal birth registration in each geographic level

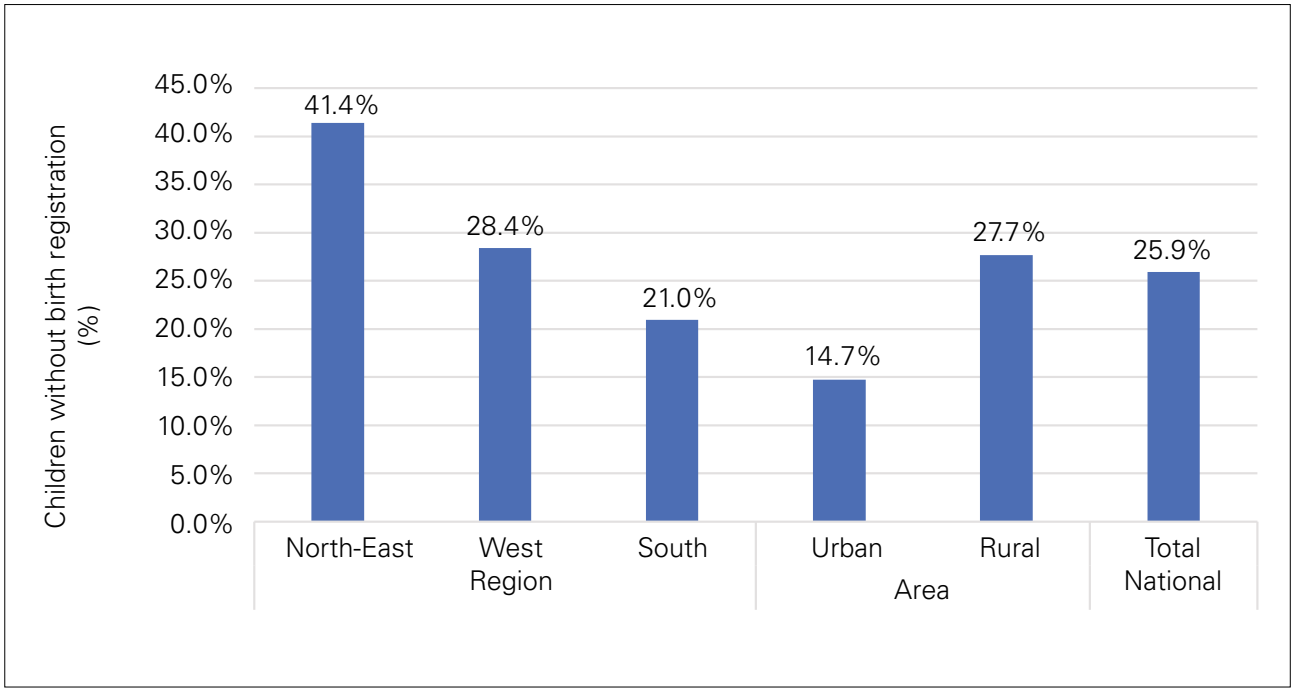
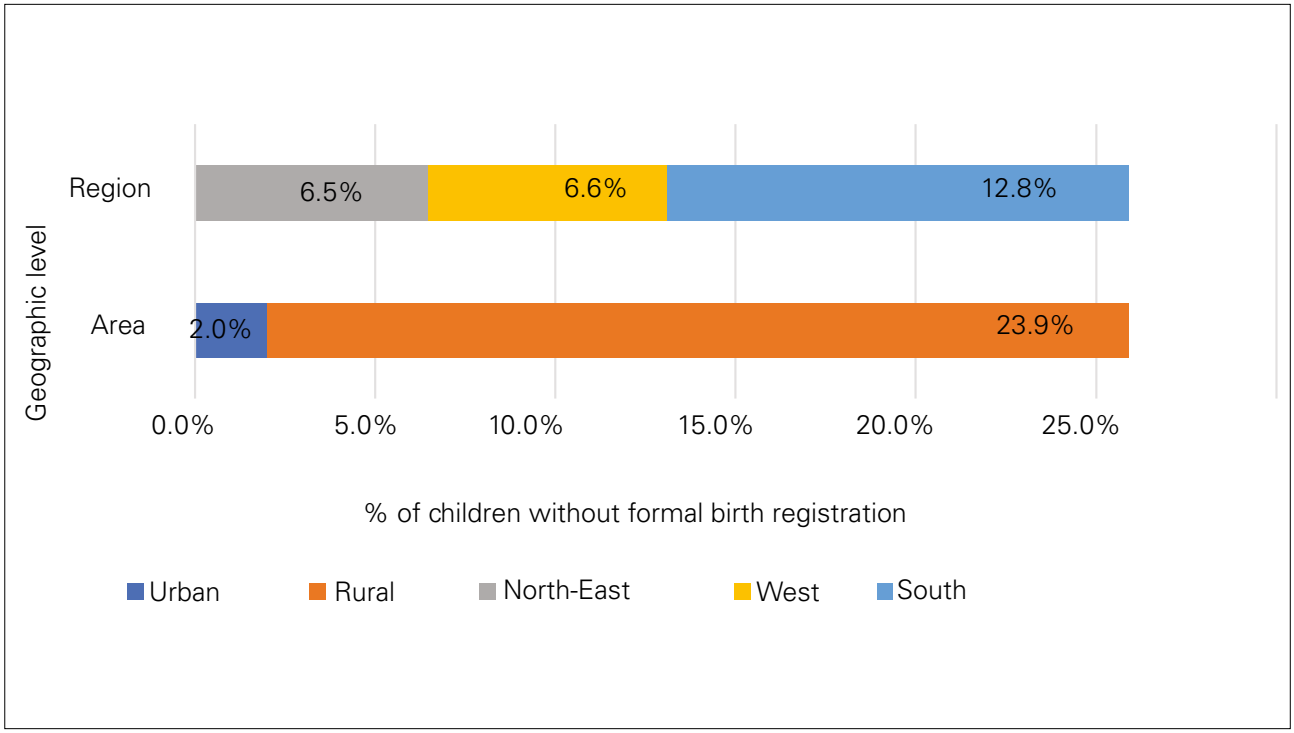


Figure 80: Decomposition of all unregistered children by geographic level



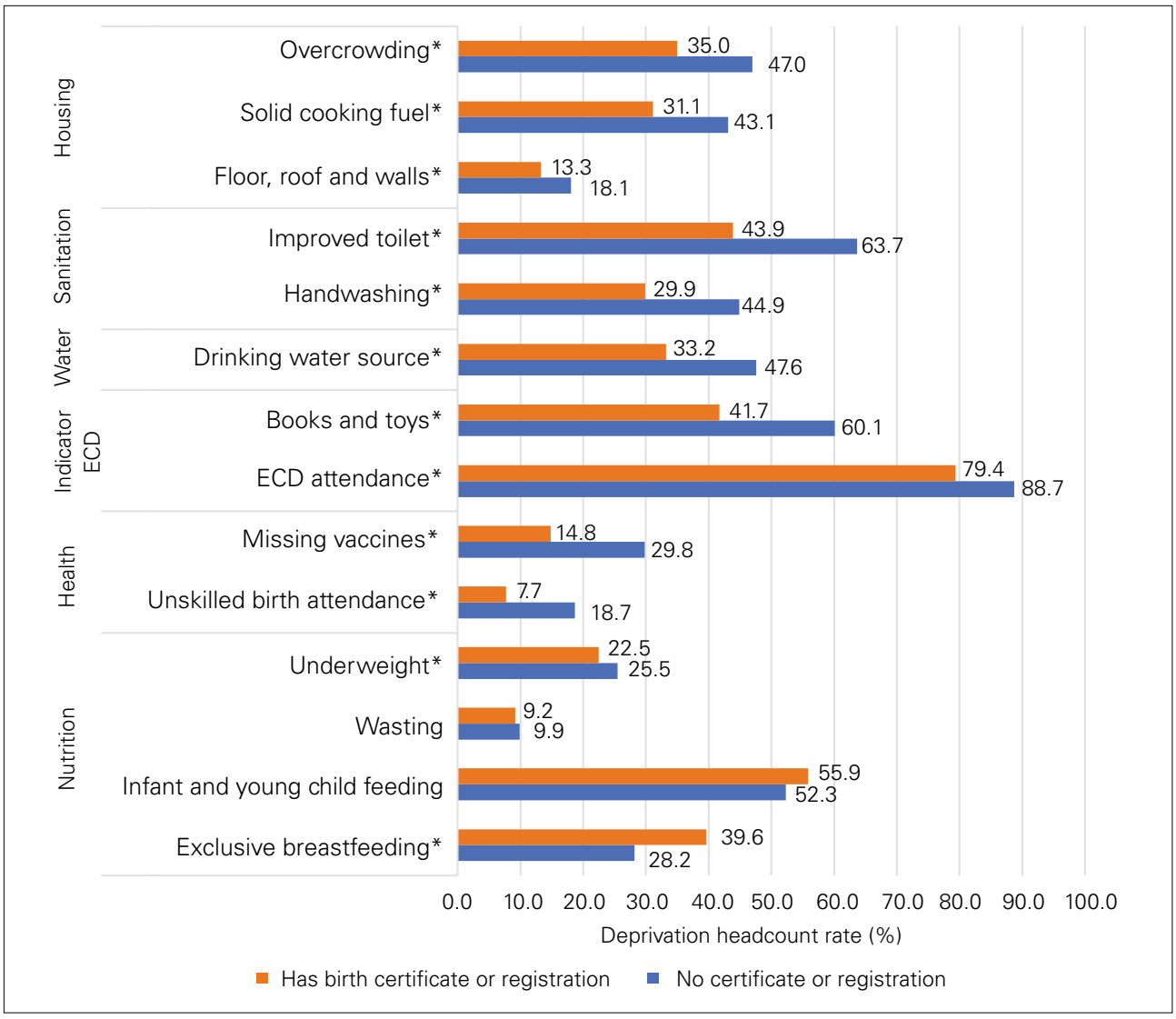
Single sector deprivations of registered and unregistered children

Unregistered children face statistically significant higher rates of deprivation than registered children in nearly all indicators and dimensions analyzed (Figure 81, Figure 82). The largest differences between children who are registered and those who are unregistered are seen in the indicators of the health, housing, sanitation and water dimensions. Notably, 38.7 per cent of children who are unreg-

istered are deprived in health, compared to only 20.2 per cent of registered children. This is driven by both the incidence of children who are unregistered and missing vaccines or whose mothers have had an unskilled birth attendant. While cause-effect cannot be established, it is possible that children delivered outside of health facilities or geographical reach of health facilities have a higher chance of both not being registered and/or administered essential vaccines, and relatedly not having easy access of other public services.

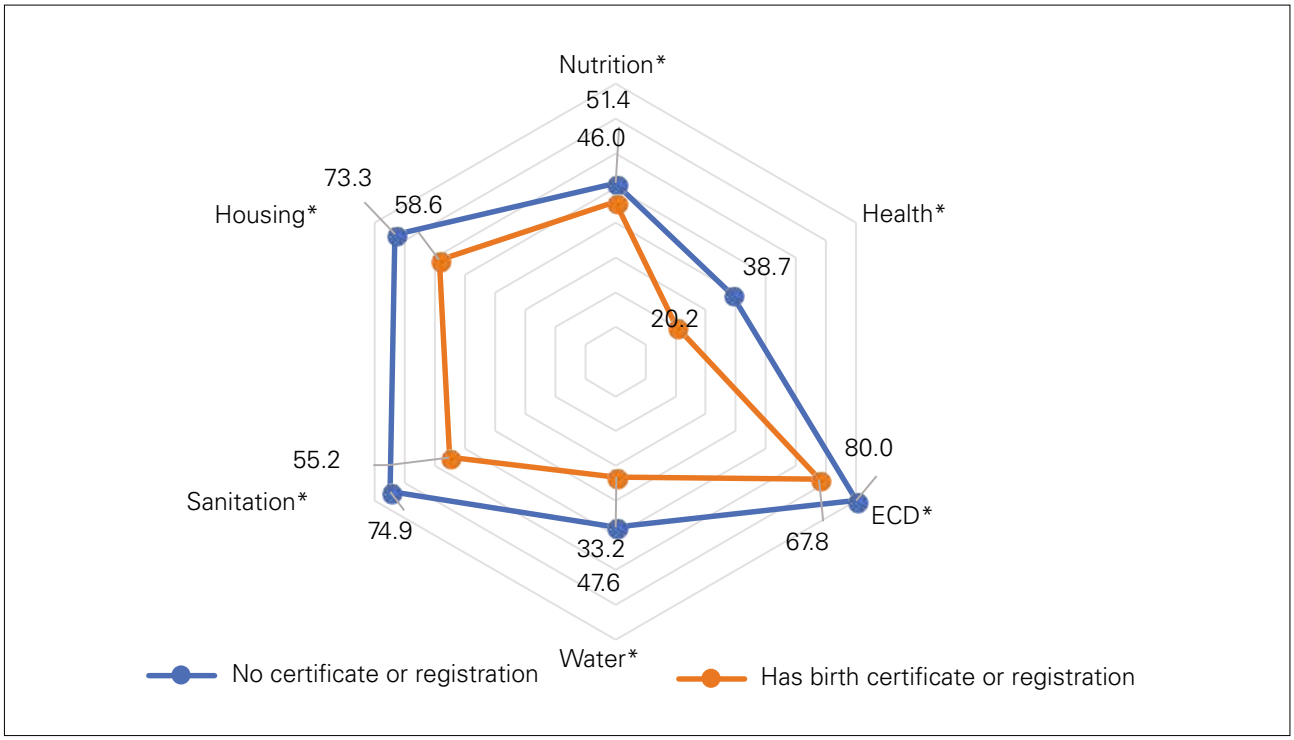
In the case of sanitation, Figure 82 shows 74.9 per cent of children without a birth certificate are deprived in sanitation, compared to 55.2 per cent of registered children. At the indicator level, the only instance where unregistered children have a lower deprivation incidence is in the 'exclusive breastfeeding' indicator, which shows that children with a birth certificate are more likely than children without to be non-exclusively breastfed. Along with the other indicators denoting the highest differences between registered and unregistered children, these are likely characteristics that are present in rural areas. Children in rural areas are most likely to lack adequate access to basic goods and services such as improved sanitation, full vaccination and birth registration. At the same time, children in rural areas are more likely to be exclusively breastfed than children in urban areas.

Figure 81: Deprivation headcount ratio (%) by indicator and birth registration status, children aged 0-4 years



** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

Figure 82: Deprivation headcount ratio (%) by dimension and birth registration status, children aged 0-4 years

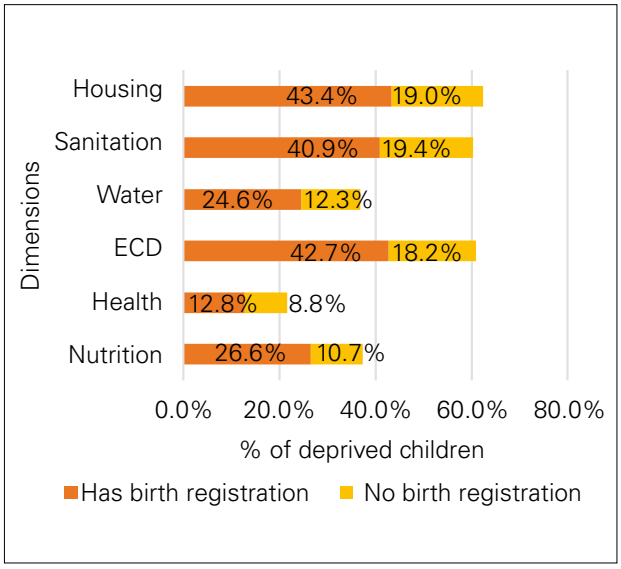


** An asterisk (*) denotes that differences between the deprivation rates of subcategories are statistically significant at the level of p<0.05.*

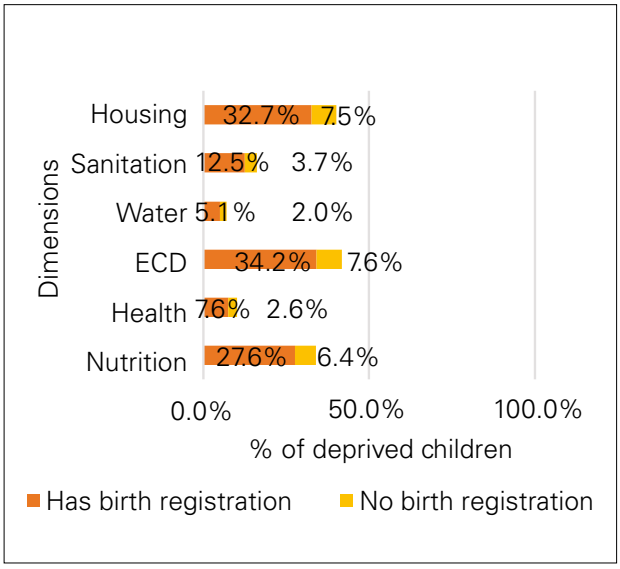
Figure 83 explains the proportion of children unregistered as a proportion of the percentage of children counted as deprived in each single dimension at national, urban and rural levels. For example, of all children deprived in the housing dimension in rural areas, 20.8 per cent do not have birth registration, compared to 45.1 per cent who do.

Figure 83: Composition of dimensional deprivations by registered and non-registered children, at national, urban and rural levels

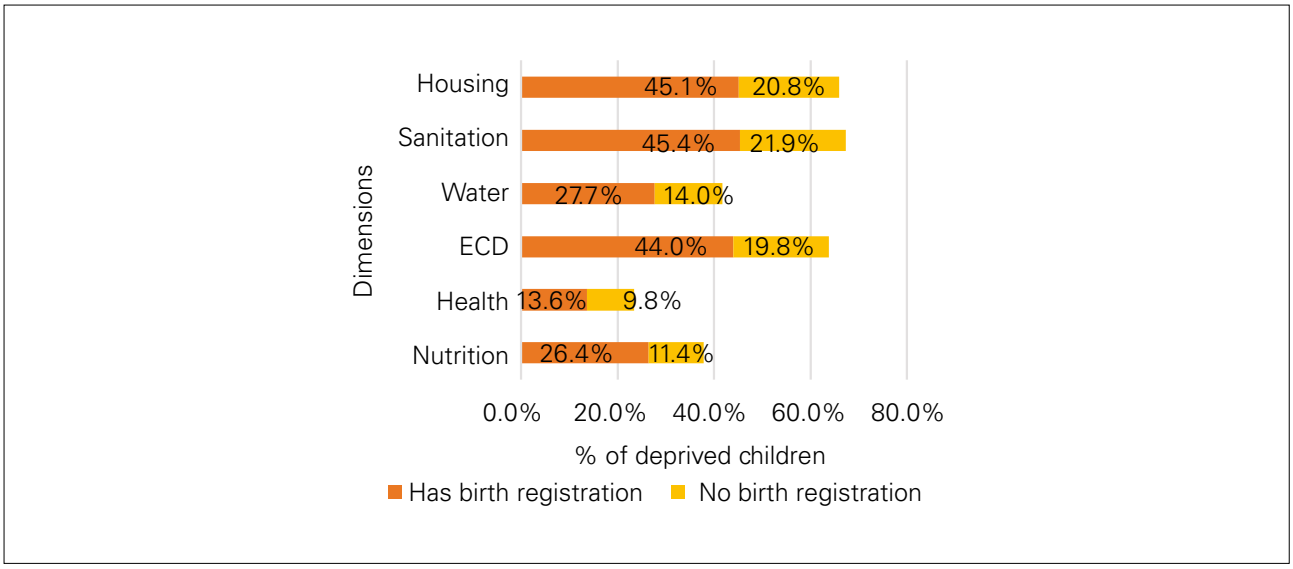
National



Urban



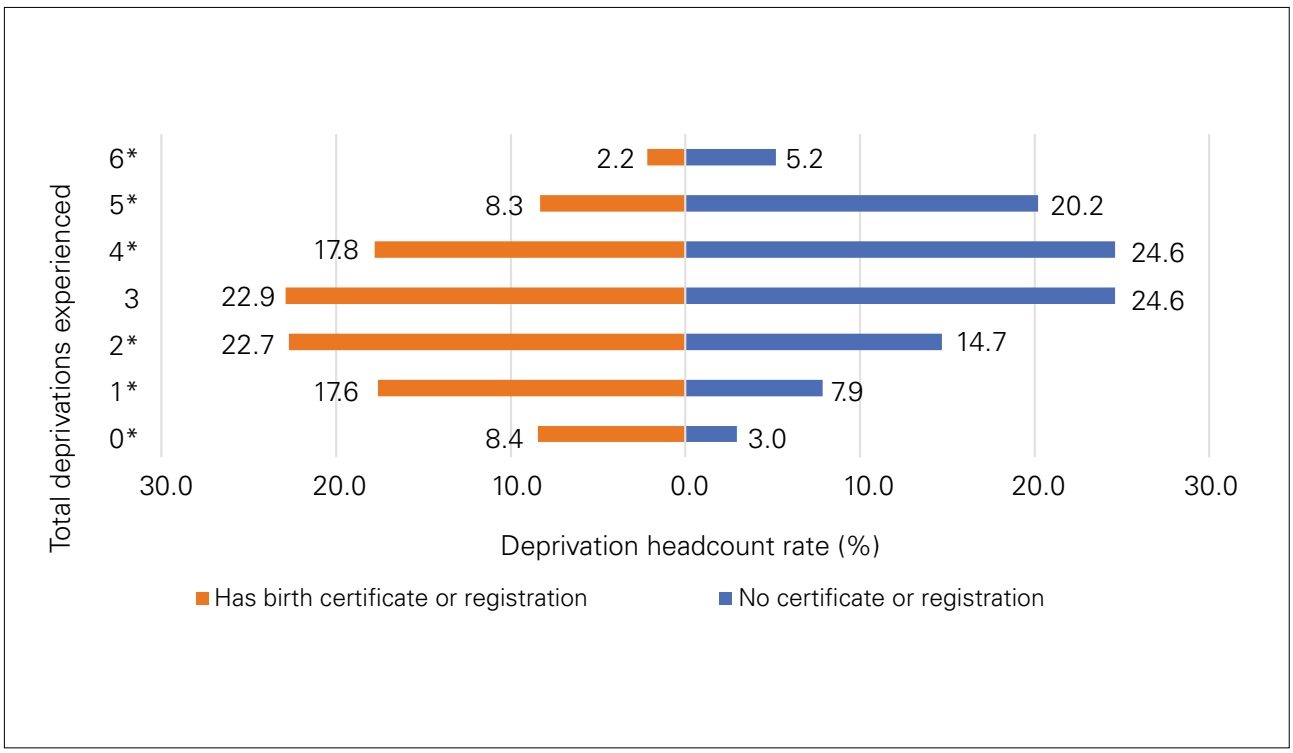
Rural



Deprivation distribution of registered and unregistered children

Figure 84 presents the difference between the deprivation distributions of registered and unregistered children. The figure shows that unregistered children have a higher rate of multidimensional poverty (more likely to be deprived in a higher number of dimensions) than registered children. The distribution of children who are not registered peaks at three to four deprivations experienced by half of unregistered children, compared to two to three deprivations experienced by just under half of registered children. Half of unregistered children have at least four deprivations at a time.

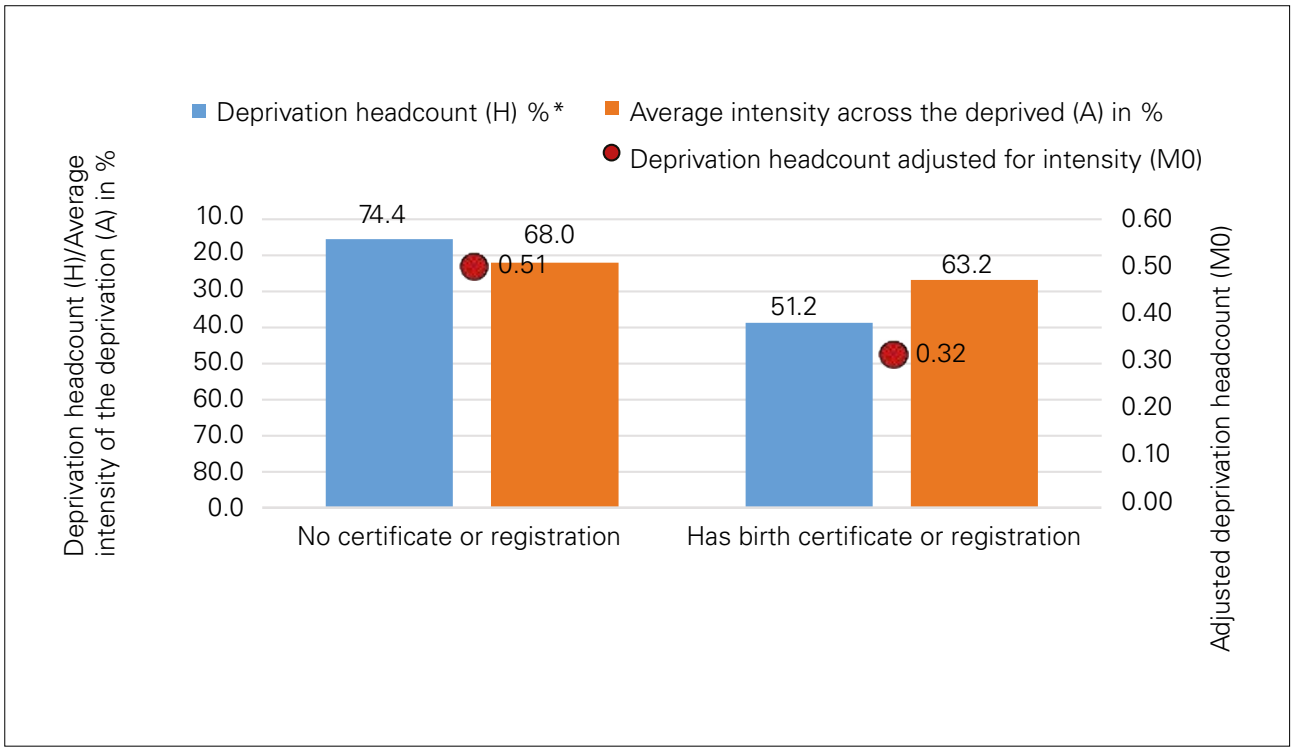
Figure 84: Deprivation distribution by birth registration status, children aged 0-4 years



Birth registration and multidimensional poverty

Figure 85 presents the results of the multidimensional poverty indices, H, A and M0 with a threshold of three or more deprivations defining the multidimensionally poor children. The figure shows that among children who have a formal birth registration, 51.2 per cent are multidimensionally poor, while nearly two thirds (74.4 per cent) of children who are unregistered are considered multidimensionally poor. The deprivation intensity is slightly lower for registered children (63.2 per cent) compared to 68 per cent of unregistered children. The M0 index shows that overall, children who do are not registered at birth are worse off in terms of both deprivation incidence and intensity than children who are registered. Multidimensional poverty is a common phenomenon among children who are both registered and not registered, but relatively more prevalent among those who are not registered.

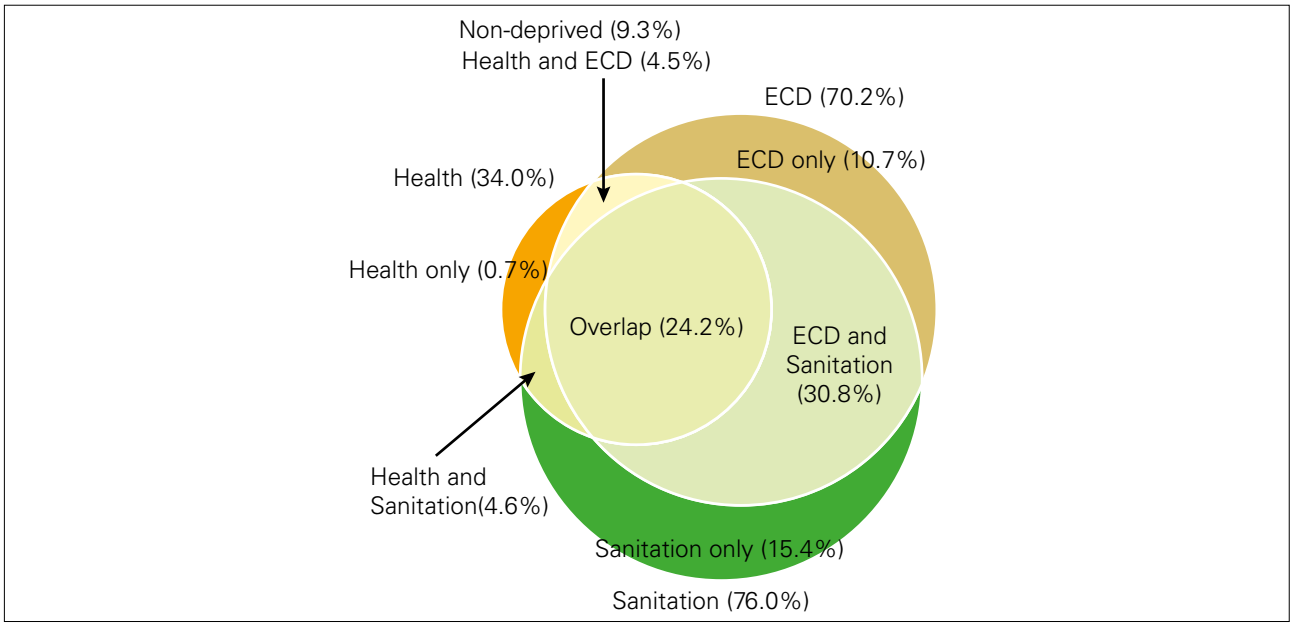
Figure 85: Multidimensional deprivation indices (H, A and M0) for children aged 0-4 years deprived in at least three dimensions (k=3), by birth registration status



Unregistered children are much more likely than registered children to have simultaneous and overlapping deprivations (multidimensional deprivations). For the combination of deprivation in the ECD, sanitation and health dimensions, Figure 86 shows that a far greater proportion of children (24.2 per cent) without birth registration are deprived in all three dimensions simultaneously, compared to 10.4 per cent of children do have birth registration. Most children who are unregistered and deprived in any of these three dimensions are likely to be simultaneously deprived in at least one of the others. This figure also supports the need for simultaneously implemented, cross-sectoral interventions given that children facing certain social policy challenges are likely to be multidimensionally poor. This points to a common lack of access to essential services, which may be related to the lack of access to services that would have ensured proper registration.

Figure 86: Three-way deprivation overlap for the combination of health, sanitation and ECD dimensions for children aged 0-4 years, by birth registration status

No birth registration



Has birth registration

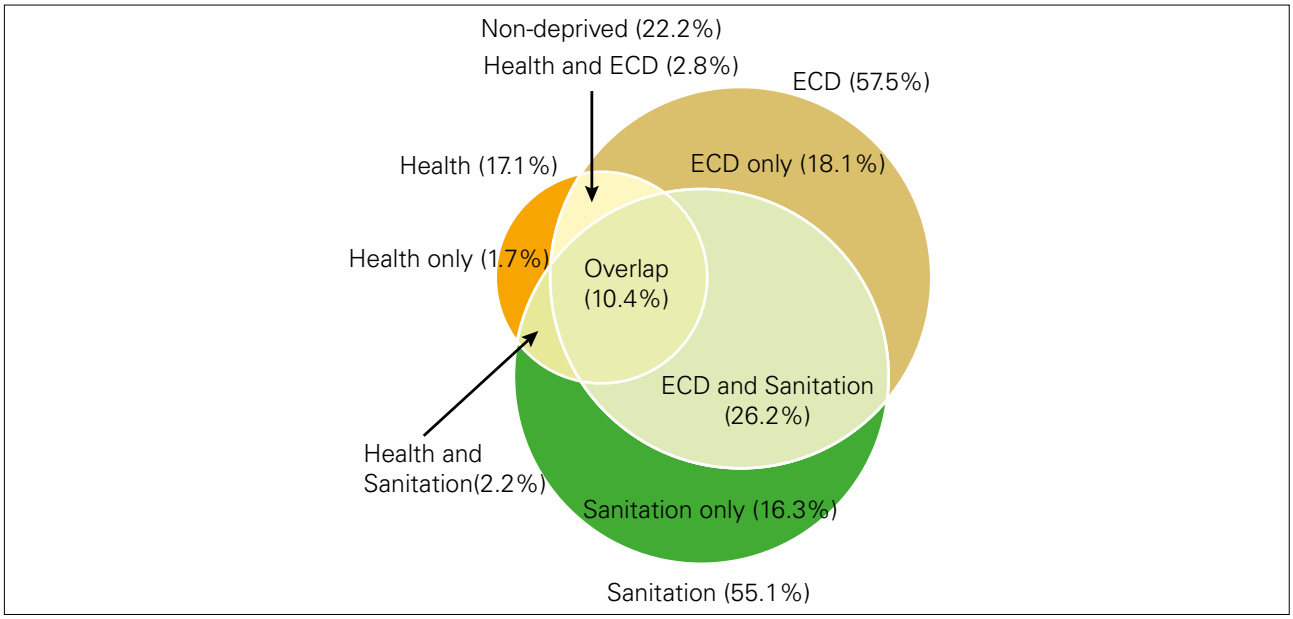


Figure 87 presents the rate of children who are deprived in all three of the listed dimensions, simultaneously, for every combination of three dimensions possible. The results are shown for children who are registered and those who are not. Children without formal birth registration have a significantly higher rate of simultaneous deprivation in all combinations of three dimensions. Combinations of dimensions, including health, all show around double the proportion of unregistered children being multidimensionally deprived, compared to registered children. This suggests the importance of ensuring the elimination of deprivation in the health dimension, through ensuring skilled birth attendance and full vaccination as a possible entryway for reducing registered children, or vice versa. The association between birth registration status and deprivation in the health dimension is further supported in the regression analysis in the next section.

Figure 87: Headcount of children simultaneously deprived in three dimensions at the level of registered and unregistered children aged 0-4 years

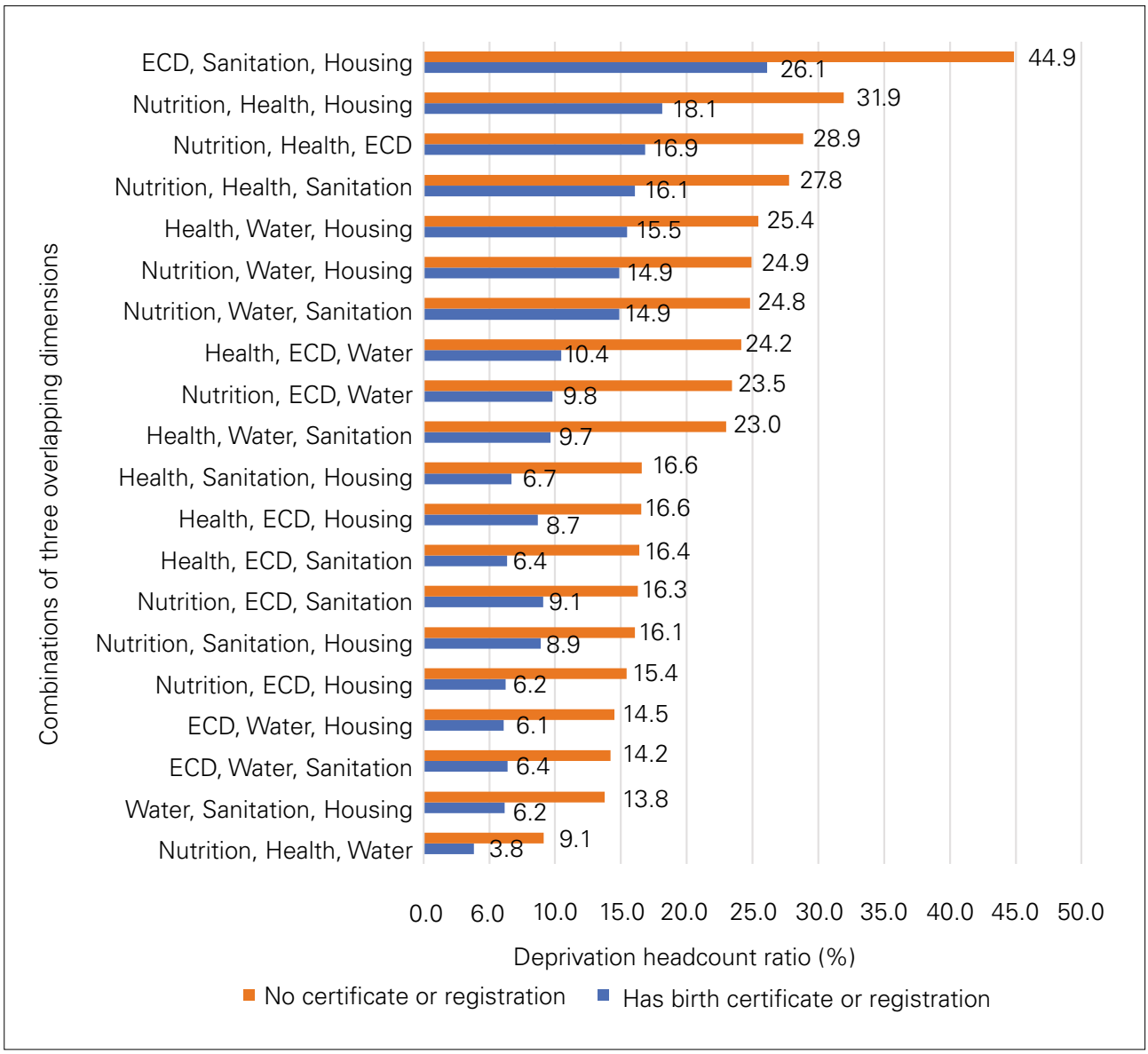


Table 41 shows the results of a multivariate factor analysis using logistic regression of various characteristics on the probability of having a birth certificate or registration. The results are presented as the average marginal effects, measuring how the probability of having no birth registration changes given a unit change (i.e., from 0 to 1 in the case of binary variables) in the independent variables, controlling for all other variables in the model. For example, the results show that holding constant all characteristics listed in the 'Variable' column, being in the poorest two wealth quintiles (as opposed to the reference category of being in the richest three quintiles), is positively associated with a statistically significant effect on the probability of having no formal birth certificate or registration.

Children in the poorest two wealth quintiles have a statistically significant 10.8 percentage point higher probability of not being registered, holding constant the control variables. In terms of the size of the average marginal effect, and controlling for all other variables, being in the poorest two wealth quintiles, living in rural areas (as opposed to urban areas), living in the north-east (as

opposed to in the south or western regions), having a mother whose age at first birth was under 18, and having a household head with no or primary education, are associated with the highest probabilities of being unregistered at birth. The number of adults over age 60 in the household, and being a boy, do not have a statistically significant average marginal effect on the probability of being unregistered at birth.

Table 41: Factors associated with the probability to have no formal birth certificate or registration, children aged 0-4 years

Variable	Category	Average marginal effects
Wealth quintiles	Poorest or poorer (ref. middle/ richer/richest)	0.108***
Education level of household head	No or primary education (ref. secondary /higher)	0.0697***
Mother's age when giving first birth	Under 18 (ref. 18+)	0.0702***
Mother's height	Under 145cm (ref. 145+cm)	0.0876***
Child's gender	Boy (ref. girl)	-0.00780
Child's age	Additional year	-0.0413***
Number of children in household	Additional child aged 0-4 years	0.0256***
Child's age	Additional child aged 5-14	0.0193***
Number of children in household Number of adults aged 18-59 in household Number of adults aged 60+ in household	Additional child aged 15-17	0.0450***
	Additional adult aged 18-59	0.00108
	Additional adult aged 60+	0.00344
Area of residence	Rural (ref. urban)	0.0787***
Region of residence	Northeast (ref. South, West)	0.123***
Observations		6,758

**** p<0.01, ** p<0.05, * p<0.1*

Source: author's calculations, CDHS 2014

Table 42 presents the summary findings of the regression output of a multivariate analysis of how the predicted probability of being unregistered changes given a unit change in each of the variables listed in the 'Variable' column, holding constant all other control variables denoting deprivation in single dimensions and other individual and household characteristics. The table shows the results at the national, urban and rural levels.

In rural areas, holding all other characteristics constant, being deprived in the sanitation dimension is strongly associated with a higher probability of being unregistered. Being deprived in sanitation, holding constant the control variables, increases the probability of being unregistered by 11.6 percentage points. Additional dimension predictors of a higher probability to be unregistered are being deprived in the health, ECD, water and housing dimensions. In terms of individual and household characteristics, predictors of a higher probability of being unregistered are living in the north-east region, having a mother who is under 145 cm tall, having a mother whose is younger than 18 at first birth, having a household head with no or primary education, having an addition child aged 5-14 years, having an additional child aged 15-17 years in the household, and having an additional individual aged 15-59 years in the household. Additional years of the child's age are associated with a lower probability of having birth registration or certificate. Being deprived in nutrition is associated with a 1.9 percentage point lower probability of being unregistered.

These results differ greatly for children in urban areas, where only being deprived in health, in ECD and additional units of the child's age are positively associated with a higher change to the probability of being unregistered. Altogether these results suggest:

- Numerous factors are associated with a higher probability of being unregistered in rural areas. These factors include both multiple and overlapping deprivations, particularly in the health, ECD, water, sanitation and housing dimensions. These deprivations are characteristic to the situation of multidimensional poverty in rural areas and point to an overall lack of access to necessary services and institutions ensuring that children's needs and rights are fulfilled, including the right to birth registration.
- In urban areas, these factors associated with a higher probability of being registered are not the same. However, positive associations of deprivation in the health and ECD dimension suggest that for those who remain unregistered in urban areas, they likely are also located in pockets of poverty where they lack adequate access to services and institutions servicing the well-being of children.
- Additional units of a child's age are negatively associated with the probability of being unregistered, suggesting that children are likely to obtain birth registration later in life, perhaps as they approach school age.

Table 42: Average marginal effects of the probability of being deprived in single dimensions on the probability of not having formal birth registration or certificate

VARIABLES	(1) National	(2) Urban	(3) Rural
Deprived in nutrition	-0.0131	0.0267	-0.0194*
	(0.0106)	(0.0244)	(0.0117)
Deprived in health	0.0955***	0.0712*	0.0988***
	(0.0129)	(0.0385)	(0.0139)
Deprived in ECD	0.0724***	0.0611***	0.0698***
	(0.0118)	(0.0235)	(0.0134)
Deprived in water	0.0444***	0.0644	0.0414***
	(0.0110)	(0.0481)	(0.0118)
Deprived in sanitation	0.109***	0.0134	0.116***
	(0.0119)	(0.0325)	(0.0129)
Deprived in housing	0.0390***	0.0221	0.0407***
	(0.0116)	(0.0245)	(0.0130)
Household head has no or primary education	0.0507***	0.0116	0.0570***
	(0.0118)	(0.0242)	(0.0133)
Mother's age at first birth is under18	0.0573***	-0.00538	0.0643***
	(0.0176)	(0.0434)	(0.0192)
Mother's height is under 145 cm	0.0826***	0.0419	0.0879***
	(0.0244)	(0.0608)	(0.0267)
Child is a boy	-0.00481	0.0279	-0.0105
	(0.0102)	(0.0218)	(0.0113)
Child's age	-0.0448***	-0.0348***	-0.0457***
	(0.00367)	(0.00866)	(0.00404)
No. of children aged 0-4 years in the household	0.00852	0.0125	0.00961
	(0.00842)	(0.0168)	(0.00944)
No. of children aged 5-14 years in the household	0.00972**	0.0155	0.00932*
	(0.00480)	(0.0102)	(0.00533)
No. of children aged 15-17 years in the household	0.0418***	-0.0189	0.0511***
	(0.0119)	(0.0274)	(0.0134)
No. of adults age 15-59 years in the household	0.00548	-0.00744	0.0102**
	(0.00402)	(0.00673)	(0.00470)
No. of adults over age 60 in the household	0.00475	-0.0132	0.00980
	(0.00894)	(0.0182)	(0.0100)
North-east region	0.101***	0.0679	0.106***
	(0.0148)	(0.0441)	(0.0159)
Observations	6,758	1,824	4,934

Standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.1*

Annex VI: Factors associated with Deprivation in the Education Dimension among children Aged 5-14 years and 15-17 years in Cambodia

Article 28 of the CRC (United Nations, 1989), as well as SDG 4 (United Nations, 2015), explicitly recognize the child's right to receiving equitable and high quality primary and secondary education. The high rate of children deprived in the education dimension presented in this report, 22.5 per cent for children aged 5-14 years, and 65.8 per cent for children of age group 15-17 years, is alarming. Deprivation in these dimensions, representing deficiencies in either basic school attendance, grade for age, and primary school attainment, point to areas of improvement in terms of both access to and quality of education in Cambodia. The high rate of deprivation therefore represents not only the unfulfillment of children's rights, but also risks to successful human capital development in Cambodia, as well as to the achievement of the SDGs.

This section details multivariate logistic regression analyses that aim to unpack the factors most strongly associated with being deprived in the education dimension. The analyses were done separately for children in the 5-14 age group and those aged 15-17 to establish whether the analyzed independent factors showed different results for children of primary and secondary school age.

Table 43 presents the summary findings of the regression output of a multivariate analysis estimating how the predicted probability of being deprived in the education dimension changes given a unit change in each of the variables listed in the 'Variable' column, holding constant all other control variables denoting deprivation in single dimensions and other individual and household characteristics. The probabilities are expressed as average marginal effects.

These results show that nearly all the factors associated with a higher probability of being deprived in education are the same for children in both age groups, though there are differences in the size of the average marginal effects. For children of both age groups, holding all other characteristics constant, having a household head with no or primary education and having some level of a mental or physical handicap have the highest average marginal effects that are strongly associated with the probability of being deprived in education. Having a household head with no or primary education is associated with a 12.6 percentage point and 22.4 percentage point higher probability of being deprived in education for children aged 5-14 and 15-17, respectively. Having a disability (anywhere from mild to high severity, any kind of mental or physical handicap), is associated with a 18.3-percentage-point higher probability of being deprived in education for children aged 5-14 years and with 11.5 percentage points for children aged 15-17.

Furthermore, for children of both age groups, living in the poorest two wealth quintiles, living in rural areas, being a boy, additional years of the child's age, additional children in the household, and additional adults in the household, are all significantly associated with a higher probability of being deprived in education, holding constant all other characteristics. However, for children aged 5-14, living in the north-east is associated with a 5.3 percentage point higher probability of being deprived in education, but has no statistically significant effect for children aged 15-17.

Table 43: Factors associated with the probability to be deprived in the education dimension

Variable	Category	Average marginal effects	
		Age group: 5-14 years	Age group: 15-17 years
Wealth quintiles	Poorest or poorer (ref. middle/richer/richest)	0.114***	0.168***
Education level of household head	No or primary education (ref. secondary /higher)	0.126***	0.224***
Child's gender	Boy (ref. girl)	0.0398***	0.0285**
Child's age	Additional year	0.0637***	0.0822***
Number of children in household	Additional child aged 0-4 years	0.0188***	0.0752***
	Additional child aged 5-14	0.0212***	0.0345***
	Additional child aged 15-17	0.0235***	0.0777***
Number of adults aged 18-59 in household	Additional adult aged 18-59	0.00376*	0.0153***
Number of adults aged 60+ in household	Additional adult aged 60+	-0.00581	-0.0235**
Area of residence	Rural (ref. urban)	0.0207**	0.122***
Region of residence	Northeast (ref. South, West)	0.0528***	0.0251
Disability status	Has some level of any mental or physical disability	0.183***	0.115**
Observations		16,317	3,963

*** p<0.01, ** p<0.05, * p<0.1

Table 44 presents the summary findings of the regression output of a multivariate analysis of how the predicted probability of being deprived in the education dimension changes given a unit change in each of the variables listed in the 'Variable' column, holding constant all other control variables denoting deprivation in single dimensions and other individual and household characteristics. The table shows the results at the national, urban and rural levels. The probabilities are expressed as average marginal effects. The results clearly show that national-level results are most strongly driven by rural-area results, and therefore only urban and rural-level results will be discussed, separately.

In rural areas, these results show that in terms of dimension-level deprivations, holding constant all other characteristics, being deprived in the water, sanitation, housing and information dimensions are all associated with a higher probability of being deprived in the education dimension, for children of both age groups. In rural areas, for example, being deprived in sanitation is associated with a 9.6-percentage-point higher probability of being deprived in education and a 12.0-percentage-point higher probability for children aged 15-17 years, holding constant all other factors.

In urban areas, the predictors for a higher probability to be deprived in education for children aged 5-14 years are – holding all other factors constant – being deprived in sanitation, being deprived in housing, having a household head with no or primary education, and additional years of the child's age. For children aged 15-17, these predictors are being deprived in water, being deprived in housing, having a household head with no or primary education, additional years of the child's age, and having an additional child in the household. Notably, for children aged 15-17, holding constant other characteristics including deprivation in dimensions, having a disability is associated with a very high – 39.4 percentage point – probability of being deprived in the education dimension, but only in urban areas. In rural areas, holding constant all other characteristics including deprivation statuses, having a disability has no statistically significant average marginal effect on the probability of being deprived in education.

Possible explanations for these findings include:

- A greater likelihood of substituting labour, caretaking of additional family members for education take-up and completion, the older that children are, especially among boys and among the poorest children who tend to be concentrated in rural areas.
- Poor access to adequate water, sanitation, housing and information points to a lack of access to existing and quality essential services and facilities, including schools.
- Poor educational quality holding children grades behind in school, or keeping children from completing school due to the nonexistence of higher levels of schooling.
- Children with any form of mental or physical disability may be kept from going to school either due to perception of inability to attend school, actual inability to attend school and without suitable alternative schooling, and/or inadequate support in existing school systems for children with disabilities.

While individual and household characteristics cannot be changed, there is room for intervention in the alleviation of deprivation in the water, sanitation, housing and information dimensions that may be associated with other factors that keep children out of school or from completing school. These factors might include poor health conditions resulting from unsanitary living environments or general lack of access to quality services. These interventions should largely target rural areas and be cross-sectoral in nature to address overlapping deprivations among children living here. In urban areas, interventions should aim to identify the pockets of vulnerable children deprived in sanitation, water and housing, and identify the extent to which these deprivations overlap. Furthermore, intervention in the education system itself, specifically in the accommodation of children in disabilities, is another entrypoint for intervention in reducing education-related deprivations for children aged 5-14 and for children aged 15-17 in urban areas.

Table 44: Average marginal effects on the probability of being deprived in the education dimension

VARIABLES	Age group: 5-14			Age group: 15-17		
	(1) NATIONAL	(2) Urban	(3) Rural	(4) NATIONAL	(5) Urban	(6) Rural
Deprived in water	0.0389***	0.0432	0.0401***	0.0804***	0.254**	0.0617***
	(0.00577)	(0.0274)	(0.00611)	(0.0148)	(0.102)	(0.0148)
Deprived in sanitation	0.0940***	0.0793***	0.0967***	0.126***	0.0168	0.120***
	(0.00601)	(0.0200)	(0.00651)	(0.0154)	(0.0584)	(0.0161)
Deprived in housing	0.0332***	0.0271*	0.0343***	0.0654***	0.163***	0.0433***
	(0.00624)	(0.0143)	(0.00688)	(0.0152)	(0.0431)	(0.0161)
Deprived in information	0.0508***	-0.00421	0.0563***	0.0599***	-0.0153	0.0629***
	(0.00591)	(0.0176)	(0.00632)	(0.0162)	(0.0626)	(0.0163)
Household head has no or primary education	0.124***	0.0962***	0.129***	0.236***	0.136***	0.243***
	(0.00590)	(0.0141)	(0.00651)	(0.0165)	(0.0408)	(0.0183)
Child is a boy	0.0407***	0.0126	0.0449***	0.0293**	0.0349	0.0296**
	(0.00539)	(0.0131)	(0.00587)	(0.0135)	(0.0379)	(0.0143)
Child's age	0.0638***	0.0462***	0.0664***	0.0824***	0.0498**	0.0900***
	(0.000850)	(0.00279)	(0.000892)	(0.00812)	(0.0228)	(0.00861)
No. of children aged 0-4 years in the household	0.0131***	-0.000312	0.0151***	0.0727***	0.0980***	0.0685***
	(0.00416)	(0.0103)	(0.00453)	(0.0131)	(0.0316)	(0.0143)
No. of children aged 5-14 years in the household	0.0182***	0.00932	0.0193***	0.0268***	0.0526***	0.0234***
	(0.00258)	(0.00642)	(0.00282)	(0.00650)	(0.0193)	(0.00682)
No. of children aged 15-17 years in the household	0.0204***	0.0150	0.0211***	0.0702***	0.124***	0.0574***
	(0.00487)	(0.0113)	(0.00534)	(0.0154)	(0.0315)	(0.0180)

VARIABLES	Age group: 5-14			Age group: 15-17		
	(1) NATIONAL	(2) Urban	(3) Rural	(4) NATIONAL	(5) Urban	(6) Rural
No. of adults age 15-59 years in the household	0.00138	0.00335	0.000864	0.00663	-0.00863	0.0146**
	(0.00226)	(0.00413)	(0.00261)	(0.00525)	(0.0116)	(0.00602)
No. of adults over age 60 in the household	-0.000604	-0.0111	0.00138	-0.0325***	-0.00931	-0.0322**
	(0.00507)	(0.0112)	(0.00562)	(0.0117)	(0.0310)	(0.0126)
North-east region	0.0560***	0.0311	0.0584***	0.0401**	-0.0209	0.0386**
	(0.00768)	(0.0260)	(0.00815)	(0.0193)	(0.0759)	(0.0194)
Has disability	0.190***	0.202**	0.192***	0.118***	0.394***	0.0511
	(0.0235)	(0.0785)	(0.0250)	(0.0450)	(0.0970)	(0.0534)
Observations	16,317	4,077	12,240	3,963	1,060	2,903

Standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.1*

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