REPUBLIC OF ZAMBIA

MINISTRY OF NATIONAL DEVELOPMENT PLANNING

CHILD POVERTY IN ZAMBIA

A MULTIPLE OVERLAPPING DEPRIVATION ANALYSIS

July, 2018

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FOREWORD

This report has been produced through the collaborative effort of various stakeholders. The Ministry of National Development Planning, the Central Statistical Office and UNICEF led the process of conceptualising the framework for the multi-dimensional child poverty analysis, taking into account internationally accepted methodological standards. The Sector ministries and other agencies primarily involved in the work around child development provided valuable technical and contextual input. A standard methodology which draws on the international framework of child rights was used to construct dimensions of child well-being in the domains of survival, development, protection and social participation.

The report provides a comprehensive analysis of both monetary and non-monetary child poverty in Zambia. It is the first time that national level monetary poverty and multidimensional child poverty for Zambia has been measured using the same data set. The estimates have been generated using the 2015 Living Conditions Monitoring Survey data set. With the child population accounting for 52% of the overall population, this is an important undertaking by Government and UNICEF. This analysis is an important step in understanding child poverty and child deprivation in Zambia. The analysis shall inform policy makers and programme managers with concrete and relevant evidence.

This approach to poverty measurement and analysis is responding directly to the Seventh National Development Plan's Key Result Area number 2 on poverty and vulnerability reduction, and provides key indicators for targeting and monitoring progress towards attainment of that critical development outcome.

Poverty remains our greatest challenge and Government remains committed to its reduction. It is undesirable that 60% of our children live in poor households and 40.8 per cent of the children are deprived in three or more dimensions. Government is committed to ensuring that our children have a better life than ourselves. This commitment is demonstrated by our increased investments in education, health and social protection as well as infrastructure development which supports unlocking of socio-economic opportunities.

The results contained in this report provide us with a great opportunity to refine current interventions and develop new interventions that better respond to the deprivations facing our children. The Government will endeavor to use the findings in the report to improve budget and human resource allocations to most deprived regions to ensure that no child, youth, woman or man is left behind.

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Hon. Alexander Chiteme, MP

Minister for National Development Planning

LUSAKA

February, 2018

ACKNOWLEDGEMENTS

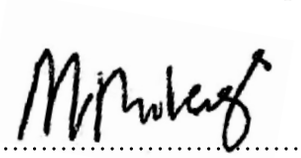
This report has been produced through collaboration by the Ministry of National Development Planning, the Central Statistical Office and UNICEF. The report was prepared following several consultations with national stakeholders to develop a Multi-Dimensional Overlapping Deprivation Analysis (MODA) methodology for Zambia. A key feature of the MODA methodology is its adaptability to the nature of child deprivations. MODA draws on the international framework of child rights to construct dimensions of child well-being in the domains of survival, development, protection and social participation. Multidimensional poverty is a key indicator in measuring the wellbeing of the population hence these child poverty results for Zambia are a baseline for the 2017-2021 National Monitoring and Evaluation framework which will also be used for Sustainable Development Goals (SDG) reporting.

The Ministry of National Development Planning wishes to acknowledge with great gratitude the participation of the national stakeholders in the child poverty consultative process. These include; the Ministry of Youth, Sport and Child Development, Ministry of Community Development and Social Services, Zambia Police Victim Support Unit, Zambia Institute for Policy Analysis and Research, Central Statistical Office, Civil Society For Poverty Reduction, Zambia Council for Social Development and Save the Children Zambia.

The lead authors of this report are Chris De Neubourg, Romina Safojan and Kekeli Adonu from Social Policy Research Institute, supported by Dr. Richard Banda, Prudence Kaoma, Frank Kakungu, Nkandu Chilombo, and Sam Muradzikwa. The report was peer reviewed by Matthew Cummins and Jean Dupraz from the UNICEF Social Policy and Research's - Eastern and Southern Africa Regional Office (ESARO). The team is commended for the quality product. I extend appreciation to Dr. Auxilia B. Ponga for her leadership during this process and for providing valuable guidance throughout the consultative process and review of key findings.

Further, sincere appreciation goes to UNICEF for the financial and technical contribution to the production of this report.

The Ministry of National Development Planning will take necessary actions to ensure that multidimensional poverty for children, men and women is regularly measured, monitored and reported on during the period of implementation of the 7th National Development Plan and subsequent plans.



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Permanent Secretary

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February, 2018

EXECUTIVE SUMMARY

Poverty reduction has been Zambia's development priority since gaining independence. This highlights the relevance of conducting a comprehensive study of child poverty. The main purpose of this study is to measure and analyze national child poverty in Zambia using a multidimensional deprivations approach. Using the Multiple Overlapping Deprivation Analysis (MODA) methodology, the analysis identifies who are the most vulnerable children and their characteristics, studies the overlap between different forms of poverty (i.e. monetary and deprivation) and between the various dimensions of deprivation. Exploring the multiple deprivations simultaneously and their relationship allows to capture the multi-faceted and interrelated aspect of child's experience of deprivations.

MODA methodology is applied to Zambia-specific context, customizing the methods of measurement of child deprivations to the national context to allow a more accurate and in-depth analysis of child deprivation in Zambia. The definition of child poverty in MODA methodology is anchored in the Convention of the Rights of the Child (UN, 1989) and identifies children as poor if they are deprived in basic goods and services that are crucial for them to survive, develop, and thrive. Also, this study includes, whenever was feasible, main rights and needs of children that are considered essential according to key country stakeholders and sectoral experts in Zambia, in collaboration with the Social Policy Research Institute (SPRI).

The methodology places children at the center of the analysis to capture intra-household reallocation. Moreover, this approach uses a life-cycle approach to measure poverty, recognizing the fact that children's needs are age-specific and depend on different life stages. Thus, three age groups are considered for Zambia's N-MODA analysis: 0 to 4, 5 to 13, and 14 to 17 years old.

Sectorial and multiple deprivations are measured and discussed for the age groups listed above. In this study, child multidimensional poverty is defined as the deprivation in three to six of dimensions: *Nutrition*, *Health*, *Information*, *ChildProtection*, *Education*, *Housing*, *Sanitation*, and *Water*. Deprivations are captured by the deprivation in dimension-specific indicators of child well-being. Complementing this analysis, the study also identifies monetary poor children and compares these two forms of poverty to better identify the different needs of children in Zambia and understand the relationship between these two forms of poverty. In addition, the analysis generates profiles in terms of geographical and socio-economic characteristics of the (multiple) deprived children contributing to an equity analysis with the identification of the characteristics of the most vulnerable children in each age group.

MODA analysis for children age 0-17 years in Zambia shows that child deprivation is high and severe: 41% of children suffer from at least three deprivations at a time, experiencing four deprivations on average. Differences in deprivation rates across areas of residence are significant. While 60% of children living in rural areas are deprived in three or more simultaneous dimensions, this magnitude represents only a 10% in urban areas. Monetary poverty rate is even higher among children, with a 60% identified as poor considering the national poverty line. In line with results on deprivation, poverty is significantly higher and deeper in rural areas with poverty rates of 80.5% compared with a 25% in urban areas. Overall, a significant share of Zambian children is either poor or deprived (64%) and most of the deprived children are also poor, even if there is a significant share of Zambian children that is monetary poor only.

In a sector-by-sector type of analysis, sanitation represents a big issue for children in Zambia (more

than 60% of deprivation) mainly driven by the lack of an improved toilet facility in the household. For children age 0 to 4 years, deprivation in *Nutrition* dimension is also very high (61.7%). Explaining the incidence of deprivation in this dimension, inappropriate breastfeeding and infant feeding frequency are key determinants since only 40% of children in this age group access to a minimum feeding practice. For school-age children, the deprivation level in *Education* is high. Primary school attendance is high, Secondary school attainment for children age 14-17 years is low (43% deprived). Grade for age deprivation level increases across age groups, from 31.3% of children age 7-13 years below two years the grade corresponding to the age to more than half of children 14-17 years deprived. Independently of the dimension of well-being analyzed and the age group, rural areas have significantly higher deprivation headcount rates.

A multidimensional analysis of deprivations in Zambia shows that younger children tend to be deprived in more dimensions simultaneously than older ones: 54% (0-4 years) vs 36% (5-13 years) and 40% (14-17 years). Even the likelihood of being multidimensional deprived in Zambia is higher for younger children, the intensity of deprivation is quite similar among the children deprived. The contribution of the adjusted multidimensional deprivation ratio of each dimension varies considerably depending on the area and the province of residence. The comparison of the deprivation rates using different profiling variables shows that children well-being is not only driven by household wealth but also by other individual and household characteristics such as mother's characteristics (education, age at birth, marital status), household's head characteristics (education, gender), and household composition (number of children under 18 years).

To summarize, MODA analysis has explored the profile of the most vulnerable children in Zambia by locating them both geographically and socially. The analysis of simultaneous deprivations of each child has contributed to the understanding of how the different deprivations by sector overlap to inform which deprivations may need to be addressed simultaneously and inform equity-based public policy responses to child deprivation. It also highlights the deprivation coincidences that need further theoretical and empirical elaboration.

Overall, this report provides a baseline based on official survey data that allows to monitor child poverty and assess the progress in the Sustainable Development Goal (SDG) 1.2 on poverty reduction in all its dimensions for children, and to give an insight on the evolution of SDG 1.1 in terms of poverty for children. Results in the analysis indicate that to improve the poverty condition of children in Zambia it is necessary to develop multi-sectoral policies responses and not only to focus on one dimension of well-being, calling for a continuous communication between some ministries in Zambia. Understanding child poverty and child deprivation is important to be able to analyze the situation of children in a society. The evidence provides support to the prioritization of children's needs in the 7th National Development Plan (2017-2021). This analysis contributes to inform policies and interventions to enhance children's sustainable development and well-being by providing concrete and relevant evidence.

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List of Abbreviations

CRC	Convention on the Rights of the Child
DPT	Diphtheria Pertussis Tetanus
ECD	Early Childhood Development
FGT	Foster-Greer-Thorbecke
LCMS	Living Conditions Monitoring Survey
MDG	Millennium Development Goals
MODA	Multiple Overlapping Deprivation Analysis
SDG	Sustainable Development Goals
SPRI	Social Policy Research Institute
UNICEF	United Nations Children's Fund
Z-MODA	Zambia Multiple Overlapping Deprivation Analysis

1 INTRODUCTION

This study aims to examine the situation of children in Zambia: whether they are deprived in any of the multiple dimensions that impede their survival and development,and which are those dimensions. The main objective is to identify the extent to which children in Zambia are deprived from adequate: **a) nutrition; b) health; c) child protection; d) education; e) information; f) housing; g) sanitation; and h) water**, and to identify the most vulnerable groups of children.

The analysis consists of an in-depth examination of the above mentioned wide range of dimensions related to the deprivations that children face in Zambia, utilizing up-to-date techniques in themultidimensional deprivation analysis such as the *Zambia Multiple Overlapping Deprivation Analysis* (Z-MODA). The deprivations that a child experiences are multifaceted and interrelated, which makes highly likely to observe children with deprivations in more than one basic need or service. Hence, along with monetary based approaches, MODA provides a more comprehensive picture of child well-being. The report presents an analysis for all children in Zambia age 0-17 years old and, since needs differ depending on their age, it shows the variations in deprivations across **three age groups: 0-4 years, 5-13 years, and 15-17 years**.

The report consists of three core parts. Firstly, section 2 briefly explains the methodology, data and limitations in order to better understand the results of the study. The third section consists of three main parts. The analysis begins by providing a full picture of the proportion of children that are **deprived** in Zambia and the proportion that are **monetary poor**. This part of the study not only provides an analysis in all its dimensions and profiles children's poverty situation in Zambia, it also compares and looks at the overlap between the two concepts of poverty. All in all, this analysis identifies children who are the deprived and/or monetary poor children in Zambia and how household financial constraints and children deprivations are related. The next part of this section shows the main findings in the analysis of child deprivation in Zambia, by examining this phenomenon based on two conceptual and technical axes of which Z-MODA consists: **single deprivations** and **multiple overlapping deprivations**. This analysis provides a background of the situation of children in Zambia and highlights main areas and challenges that need to be addressed to improve well-being of children. Section 3 concludes and illustrates in a succinct manner the areas to be addressed by policy makers.

2 MEASURING MONETARY AND MULTIDIMENSIONAL CHILD POVERTY

2.1 Methodology

Understanding child poverty and child deprivation is important to be able to analyse the situation of children in a society and to contribute to inform policies and interventions by concrete and relevant evidence. This ultimately enables to enhance children's sustainable development and well-being.

Traditionally, most poverty studies use the monetary poverty approach, identifying poor children as children living in households with an income or expenditure lower than a given poverty line. While financial constraints are one of the most important determinants of child deprivation, **not all monetary poor children are deprived nor are all deprived children monetary poor**. Having adequate income at the household level may not translate directly into proper levels of well-being of its household’s members. This is especially important for children since they are not thedecision-

makers in the household and,also, because they have specific needs of goods and services that are not necessarily fulfilled by a high household income (see de Neubourg et al., 2014).

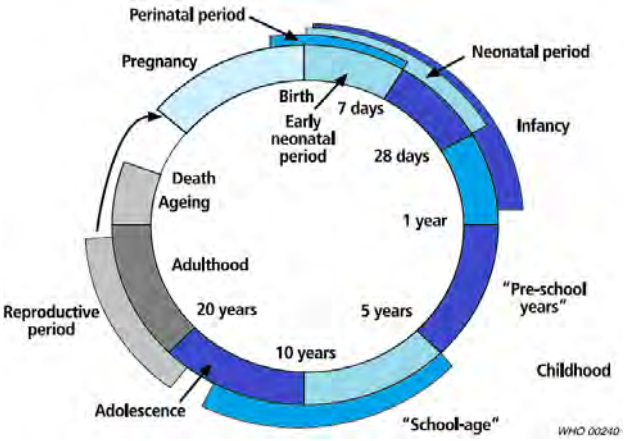
This study uses the **Multiple Overlapping Deprivation Analysis (MODA)** methodology for measuring child poverty, developed by UNICEF. This is a child-centered multidimensional approach that was developed in order to complement traditional income-based measures of poverty with multidimensional deprivation analysis to generate quality evidence on child poverty, simultaneous deprivations, and disparities among children. While monetary poverty measures a household's lack of financial means to provide its members with the basic goods and services deemed necessary for their survival and development, deprivations measure the individual access to each of the dimensions considered as crucial for his survival and development. Thus, MODA methodology makes a distinction between these two main concepts of poverty jointly analyzing and comparing them at the child level, whenever data allows it, and identifying in an overlap analysis the children who are poor and deprived simultaneously.

MODA recognizes that a child's experience of deprivations is multi-faceted and interrelated, and that such multiple and overlapping deprivations are more likely to occur and with greater adverse effects in socio-economically disadvantaged groups. The simultaneous analysis of deprivations of each child in the many dimensions of interest contributes to the identification of the most vulnerable children, with higher number of deprivations, and to understand to which extent the different deprivations are related.

MODA methodology builds on existing approaches of multidimensional poverty measurement such as the UNICEF's Global Study on Child Poverty and Disparities (see Gordon et al.,2003; UNICEF, 2007) and Oxford Poverty and Human Development Initiative's (OPHI) Multidimensional Poverty Index (see Alkire and Santos, 2010; Alkire and Foster, 2011). However, some specific features distinguish MODA methodology in the measurement of child deprivation:

- It is child-centered, with **the child as the unit of analysis**, rather than the household, since children experience poverty differently from adults especially regarding developmental needs;
- It underlines the **use of individual level data** when possible so that any differences across gender, ages and/or within households may be observed;
- It adopts a **life-cycle approach**(Figure 1), including differentdimensions and indicatorsfor each age group to capturechildren's age-specific needs at different life stages: early childhood, primary childhood, and adolescence;

Figure 1.*Life Cycle Approach*



Source: Claeson& Waldman (2000)

- It applies a whole-child oriented approach **by measuring the prevalence and the depth of deprivations** each child experiences simultaneously, revealing the most vulnerable children;
- It broadens the scope of sector-based approaches through **overlapping deprivation analyses and generating profiles** in terms of the geographical and socio-economic characteristics of the (multiple) deprived children, thereby highlighting areas of concern for effective and better targeted policy design; and
- It combines **multidimensional deprivations and monetary poverty analysis simultaneously** for each child whenever the data used has information on both.[1]

UNICEF's MODA is a flexible methodology that adapts to different input factors. N-MODA (National-MODA) is an application of the MODA methodology to specific national context with customized choices of age groups, indicators, dimensions, thresholds and profiles. It often allows using richer information available from national survey datasets to include in the analysis additional dimensions of interest. With a focus on producing country-specific analyses, N-MODAaims to: (i) capture national values and objectives concerning child development; (ii) explore the profile of deprived children to identify them both geographically and socially;[2] (iii) understand the overlap of the different deprivations by sector 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 Z-MODA: Data and Peculiarities

Multidimensional child poverty analysis in Zambia is a country-specific application of the MODA methodology: **Zambia Multiple Overlapping Deprivation Analysis (Z-MODA).** Thus, the methods of measurement of child deprivation were customized to the national context to allow a more accurate and in-depth analysis of children'sdeprivations in Zambia.

The Z-MODA analysis was performed for the total population of children age 0-17 years using a survey sample of households and children representative for Zambia from the **2015 Living Conditions Monitoring Survey (LCMS 2015)**, as it is the most recent dataset with national representativeness, child-level individual data. These characteristics make this dataset especially suitable for its use in a national multidimensional poverty analysis for children.Furthermore, this dataset includes measures of monetary and subjective poverty for the same sample population, which contributes to the possibility of jointly analyzing child poverty from different approaches and to see in what extend they overlap, providing meaningful results with an added value.

The Zambia LCMS 2015 dataset covers a representative sample of about 12,251 non-institutionalized private households and 31,472 children under 18 years old residing in both rural and urban areas of the country (see Appendix A for more details on the sample). The survey design produces reliable estimates at national, provincial and rural/urban levels.[3]**The LCMS data covers different aspects of child well-being** including health, nutrition, access to water and sanitation, education, child protection and access to information, among others, making it very appropriate for a

[1] For more information on the MODA methodology; see the step-by-step guidelines to MODA (De Neubourg et al., 2012) and www.unicef-irc.org/MODA

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

[3]Even if analyzing child poverty by district may be of particular interest to inform policy design as many policies in Zambia are implemented at the district level, the dataset is not representative of the population at this level of disaggregation.

child deprivation analysis for Zambia. Based on this dataset, the analysis of the type, level, and overlap of deprivations that children face in Zambia in 2015 provides additional information to inform the design of policies, notably regarding expansion of the social protection system.

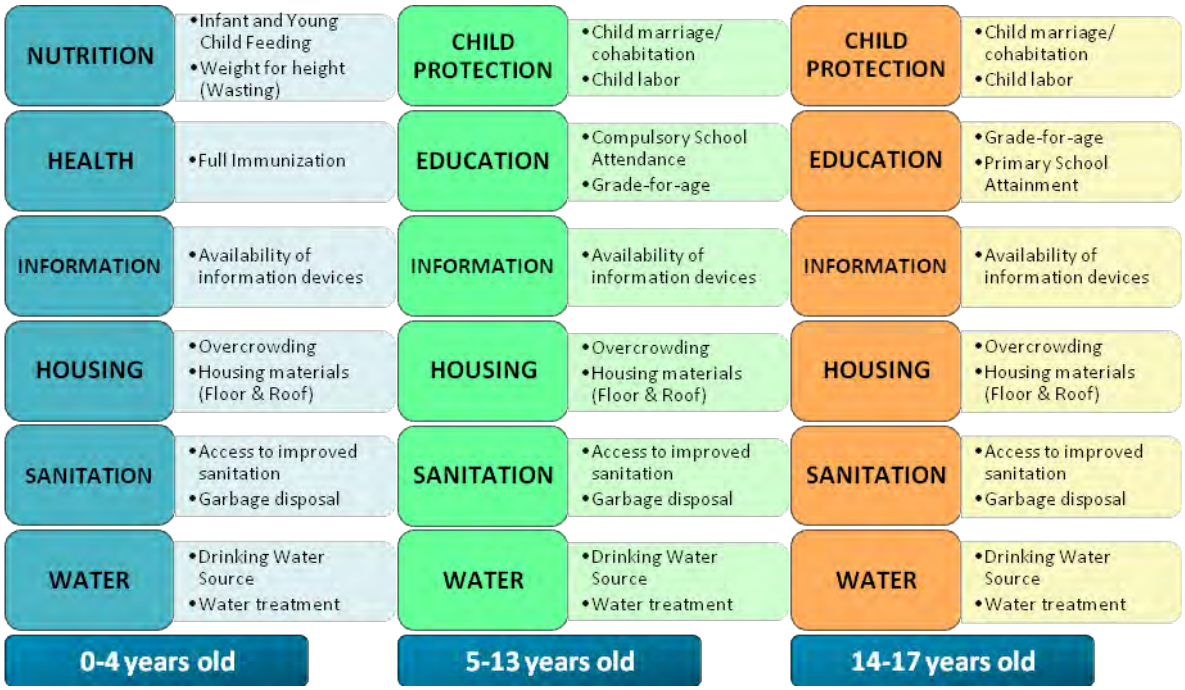
2.3 Dimensions, Indicators and Age Groups

The analysis of multiple and overlapping deprivations requires the definition of dimensions and indicators of child well-being, deprivations thresholds and age groups which were chosen to reflect and understand the specific context of Zambia. Children's rights enshrined in the Convention on the Rights of the Child (CRC) (1989), in conjunction with the World Summit on Social Development (1995) and the Millennium Development Goals (MDG) (2000), have guided the construction of a core set of dimensions that are critical to contribute to child's development irrespective of the country of residence, socio-economic status, or culture. Considering these internationally-agreed definitions of essential needs and human rights standards of the child, in collaboration with the Social Policy Research Institute (SPRI), the final choice of the dimensions, indicators and thresholds for Z-MODA analysis has followed the opinion of the key country stakeholders and sectoral experts in Zambia, national standards, research interests and data-driven feasibility assessments.

As previously described, **MODA methodology looks at the child as the unit of analysis and acknowledges the heterogeneity of children's needs and deprivations according to their age**. Following the life-cycle approach, the dimensions, indicators and thresholds used to assess deprivations of children in Zambia have therefore been defined for different age groups to reflect the different needs of early childhood, primary childhood, and adolescence (see Appendix B for details of these parameters).[4] The different age groups selected, dimensions and indicators for each of them are presented in the figure below.

[4]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 dimensions' indicators.

Figure 2. ***Selected Age-groups, Dimensions and Indicators for Z-MODA***



As observed in this figure, all age-groups have included individual level indicators as well as household level indicators. Household level indicators have been used in the dimensions of *Housing*, *Sanitation*, *Information* and *Water* to measure child deprivation in the direct environment in which the child grows up, and therefore they apply to all age-groups.

Regarding the individual indicators, some dimensions may not apply to the entire child population for several reasons, including empirical consistency and data constraints. For instance, the *Education* dimension only covers school-age children (i.e. children age 7-17 years old). For infants (0-11 months) and children in their early childhood (12-59 months), age-specific indicators on *Nutrition* and *Health* have been selected. For children of compulsory school-age (7-13 years old), the analysis has included individual level indicators on child's education attainment and attendance to school, while for children beyond the compulsory school system's age (14-17 years old) indicators on *Education* dimension are related to the school level attainment. Indicators on child protection are included only for children 5 to 17 years old provided the variables that were used to capture deprivation in this dimension: child's marital/cohabitation status, and his engagement in an income generating activity or farming (i.e. child labor).[5]

In the analysis, for each dimension, a child is identified as deprived in a dimension if he/she is deprived in at least one of the indicators of the dimension. Thus, following the union approach[6], all the indicators included in a dimension are equally weighted as they are selected based on the assumption that they are equally important for child well-being. For example, a child with 0 to 5 months of age has been considered deprived in the *Nutrition* dimension if he/she is not exclusively breastfed or his/her weight for length Z-score is below minus two standard deviations from the

[5]Note that the threshold age for considering a child deprived in Child Labor indicator has been set up at 15 years of age since beyond that age Zambia's law allows child labor participation.

[6] MODA uses the union approach when combining indicators into dimensions to identify children deprived in any of the selected indicators, since the choice of more than one indicator in a dimension is done such that indicators complement each other in the identification of child's deprivation in the respective dimension. This approach is not sensitive, at this stage, to the severity of deprivation because it implies equal weight of indicators making deprivation in a dimension to be independent of the number of indicators a child is deprived in (De Neubourg et al, 2012).

median of the WHO reference population, considered thin (wasted) and acutely malnourished. The child is non-deprived in *Nutrition* only if he/she is exclusively breastfed and is not wasted. All indicators have been chosen on the basis that they all partly explain the realization (or not) of the child's rights. Moreover, since each of the selected dimensions reflects a basic right and need, they therefore have been considered with the same importance in the analysis.

For each age group, the study uses two ways of analyzing the deprivations that children experience: single-dimensional analysis and multidimensional analysis, comprising:

a) **Sector specific (single deprivation):**the percentage of children deprived in each dimension, and in each indicator, has been calculated to give a first insight into which deprivations are particularly important for children of the different age groups;

b) **The distribution of the number of dimensions children are deprived in:**the 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 (i.e. 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 combinations of deprivations that are experienced simultaneously and has calculated the number of children suffering from these deprivations at the same time;

d) **Multidimensional deprivation indices:**several multidimensional deprivation indices have been calculatedto provide different summary statistics: (i) the headcount ratio *(H*) to look at the incidence of deprivation in the various dimensionssimultaneously[7]; (ii) the average intensity (*A*) to look at the number of deprivation a deprived child experiences as a percentage of all possible deprivations; and (iii) the adjusted deprivation headcount (M_0) to capture both the incidence and depth of deprivation.

This paper captures the most striking results of the analysis of the multiple overlapping deprivation among children in Zambia. A deprivation profile of the children is also provided.

3 WHAT DO THE RESULTS FOR ZAMBIA TELL US?

This section presents the main findings of the multidimensional child deprivation analysis for Zambia. The results are first presented for all children (0-17 years old) in order to provide a baseline figure of poor and deprived children in Zambia and to understand the overlap between these two forms of poverty. The analysis for each age groups separately is presented in subsections 2 and 3. The second subsection shows the results of the single deprivation analysis by dimension and indicator. The third subsection presents the results of the multiple overlapping deprivation analysis.

3.1 Poor Children in Zambia

The following subsections show the results of the multidimensional deprivation and monetary poverty analyses for all children (0-17 years old) in Zambia separately and the overlap between these two forms of child poverty.

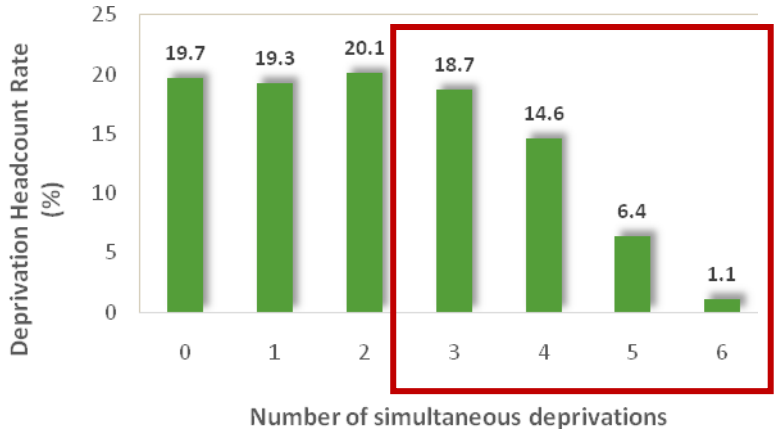
[7]Indices have been calculated using the Alkire and Foster (2011) methodology.

3.1.1 How Many Children are Deprived in Zambia and *What are They Deprived of?*

To understand the severity of the deprivations faced by children, it is useful to examine whether the deprivations are experienced simultaneously. This leads to a better understanding of children who suffer from several deprivations at the same time and, thus, are more vulnerable. Moreover, this section provides a baseline measure of child multidimensional and monetary poverty in Zambia, in line with the Sustainable Development Goals (SDG)'s poverty agenda, for monitoring progress in the reduction of child poverty.[8]

The distribution of the number of simultaneous deprivation experienced by each child in Zambia(Figure 3) indicates that **only 19.7% of Zambian children faces no deprivations while two out of five children under 18 years old (40.8%) suffer from at least three deprivations at a time.**

Figure 3. ***Distribution of the Number of Deprivations for All Children Aged 0-17 Years***



Source: Authors' calculation using Zambia LCMS (2015)

The deprivation distribution is complemented by the multidimensional deprivation indices. Table 1 goes further to explain the situation of children in Zambia by providing information of the depth and severity of deprivation considering all possible deprivation thresholds.[9] **The multidimensional deprivation indices show the overall incidence of poverty (i.e. the percentage of the children who are poor) and intensity of deprivation (i.e. the percentage of deprivations suffered by each child on average).** The deprivation headcount (*H*) provides the percentage of deprived children for each of the possible multidimensional deprivation cut-offs. As with the poverty gap in monetary poverty analyses, the average intensity among the deprived children (*A*) gives an indicator of the depth of deprivation.M_0 is simply a summarized index aggregating the deprivation headcount and intensity such that it captures increases in poverty index if a child becomes deprived in an additional dimension.

[8]Specifically, the measures presented in this section provide a measure for monitoring SDG 1.1 and SDG 1.2 referring to monetary poverty and multi-dimensional or deprivation poverty targets, respectively.

[9]The deprivation theshold, *k*, refers to the number of deprivations used as cut-off point for defining a child as being "multidimensionally deprived". E.g. if k=3, a child will be considered multidimensionally deprived if the child has at least 3 deprivations out of the total number of possible deprivations.

Table 1. ***Multidimensional Deprivation Indices for Children Aged 0-17 Years***

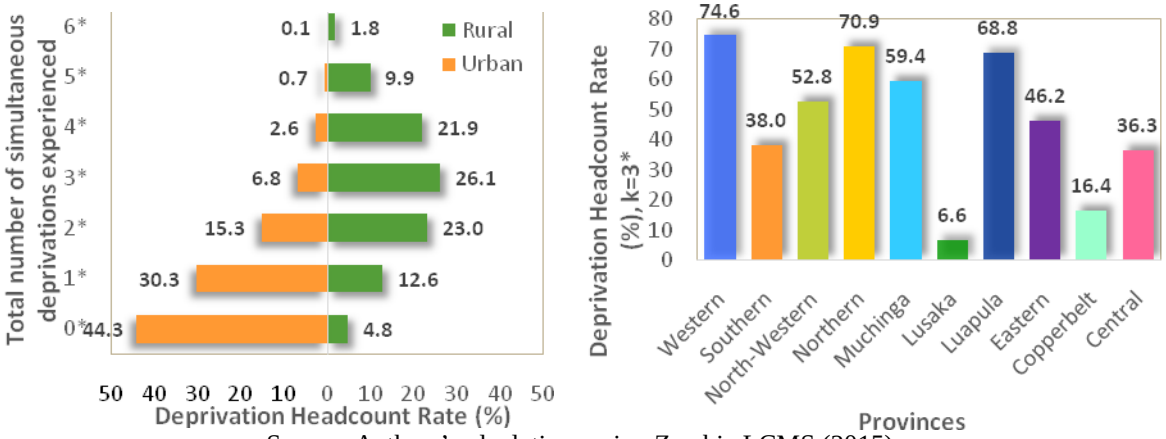
Number of DeprivationDimensions	Multidimensional DeprivationHeadcount (H) %	Average Number of Deprivations Intensity among the Deprived (A)	Average Intensity among the Deprived (A) %	Adjusted Deprivation Headcount Ratio (M0)
1-6 deprivations	80.3	2.7	44.2	0.36
2-6 deprivations	61.0	3.2	52.9	0.32
3-6 deprivations	**40.9**	**3.8**	**62.6**	**0.26**
4-6 deprivations	22.1	4.4	73.2	0.16
5-6 deprivations	7.6	5.2	85.8	0.07
6 deprivations	1.1	6.0	100.0	0.01

Source: Authors' calculations using Zambia LCMS (2015)

Considering a deprivation threshold of three dimensions (*k*=3), 40.9% of children in Zambia are deprived in at least three dimensions (*H*). Those children experience four deprivations on average, which represents 62.6% (*A%*) of the total number of possible deprivations used in this study (6 dimensions). This gives a deprivation headcount adjusted for intensity (M_0) of 0.26 which is simply the headcount ratio multiplied by the average intensity of deprivation (i.e. *H***A*).

Some characteristics of the children's households are highly correlated with the number of simultaneous deprivations that Zambian children face. Looking at the geographical distribution of the deprived children in Figure 4, it is observed that there are significant differences in the distribution of the percentage of children deprived and its intensity depending on the area where they live in. **While 60% of children living in rural areas are deprived in three or more dimensions simultaneously, this percentage represents only a 10% in urban areas.** It is also important to highlight that almost half of urban children (44.3%) suffers from no deprivations while in rural areas only a very small proportion of children (4.8%) is not deprived in any of the six dimensions. The differences between provinces are also very important. With a threshold of three deprivations, Lusaka and Copperbelt are the provinces with the lowest percentage of children deprived in at least three dimensions, with 6.6% and 16.4% respectively. **The highest deprivation rates are found in Western, Northern and Luapula provinces with more than 68% of children deprived in three dimensions or more.**

Figure 4. ***Deprivation Distribution by Geographical Location for Children Aged 0-17 Years***



Source: Authors' calculations using Zambia LCMS (2015)
Note: * p<0.05 in Chi-squared test of independence.

3.1.2 How Many Children are Monetary Poor in Zambia?

Multidimensional deprivation analysis for all children is complemented with the traditional analysis on poverty that focuses on monetary well-being. This approach often utilizes income or expenditure measures to assess the poverty status of members of a given household. Zambia's LCMS 2015 dataset provides a measurement of the adult-equivalent consumption per month in nominal terms. This variable is used to compute Foster-Greer-Thorbecke (*FGT*) class of indexes of monetary poverty measures that calculate and decompose poverty headcount rate, poverty gap, and poverty severity index for children in Zambia. Accordingly, **monetary poor children are identified as those age 0-17 years whose per adult equivalent consumption falls below the absolute poverty line**. For the analysis, we followed Zambia's official measures of monetary poverty using the national poverty line for 2015 of K214.26 per adult equivalent (monthly).

Table 2 shows the results of the monetary poverty analysis for Zambian children at the national level and by area of residence. The poverty headcount ratio measures simply the proportion of the children with a consumption per adult equivalent below the poverty line. Results indicate that **60% of children in Zambia are poor** or has a consumption below the nationally-defined poverty line. The poverty gap is an average normalized poverty gap that captures the proportional distance of each child to the poverty line, which indicates the poverty intensity. It represents the average income necessary to not being poor. Accordingly, **the average amount of money necessary to remove out of poverty each poor child in Zambia represents a 30.5% of the poverty line at the national level.** The poverty severity index or "squared poverty gap", besides the poverty gap, also considers the inequality among the poor children but has no immediate intuitive interpretation.

At the regional level, **80.5% of the rural child population is poor compared with a 25.2% of the urban child population**. As a result, an 84% of the poor live in rural areas. Child poverty is also deeper in rural areas than in urban areas, being the poverty gap three times larger (43.1% in rural areas compared to 9.7% in urban areas). Considering also the inequality among the poor children in Zambia, poverty severity is 27.4% in rural areas compared to a 5.3% in urban ones.

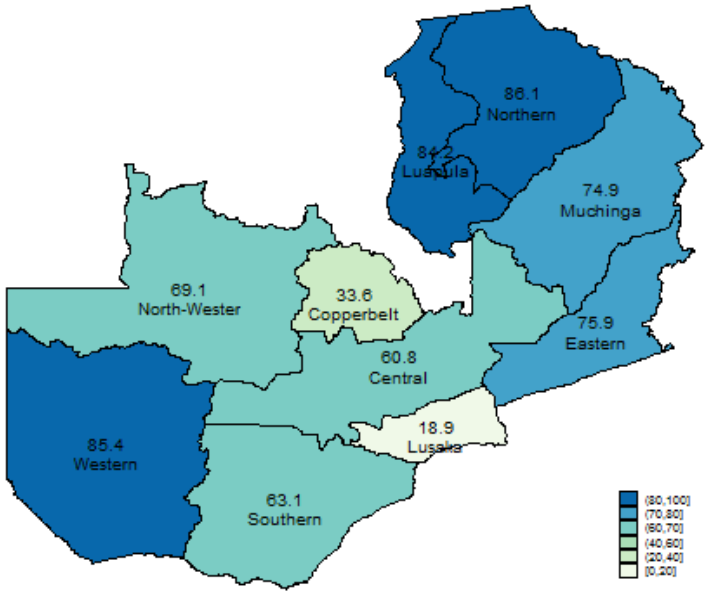
Table 2. ***FGT Indices of Monetary Poverty for Children Aged 0-17 Years***

	NationalPoverty Line	*PovertyHeadcount Ratio, FGT_0*	*Poverty Gap Index, FGT_1*	*PovertySeverityIndex, FGT_2*	*Poverty Share*
					AcrossAreas
National	**214.26**	59.6 %	30.5 %	19.0 %	100 %
Urban	**214.26**	25.2 %	9.7 %	5.3 %	16 %
Rural	**214.26**	80.5 %	43.1 %	27.4 %	84 %

Source: Authors' calculations using Zambia LCMS (2015)
Note: 2015 national poverty line was valued at K214.26 per Adult Equivalent (monthly)

Additionally, the child monetary poverty analysis is disaggregated by provinces (Figure 5) to identify the geographical distribution of the poor children considering Zambia's national poverty line.

Figure 5. ***Monetary Poverty Distribution by Province for Children Aged 0-17 Years***



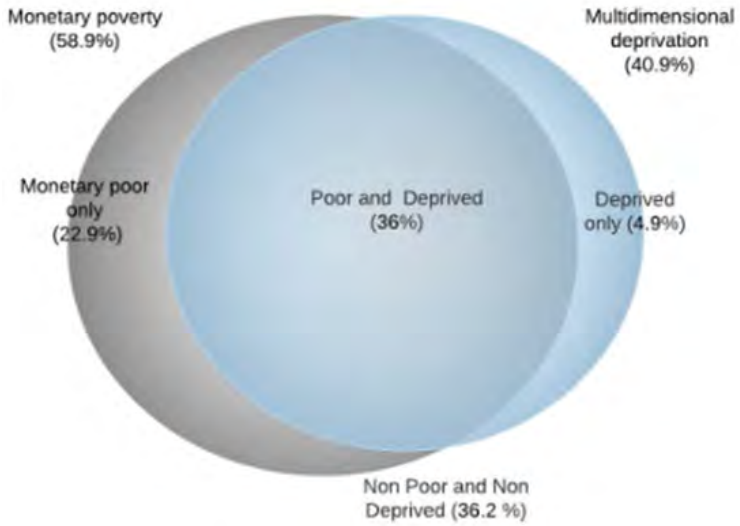
Source: Authors' calculations using Zambia LCMS (2015)
Note: 2015 national poverty line was valued at K214.26 per Adult Equivalent (monthly)

Lusaka is the province with the lowest proportion of poor children (18.9%) by far, followed by Copperbelt (33.6%). The provinces of **Western, Northern and Luapula register the highest shares of children living with an adult-equivalent consumption below the minimum necessary staying out of poverty**, with child poverty rates above 80%.

3.1.3 To What Extent Do Child Deprivation and Poverty Overlap in Zambia?

Multidimensional and monetary child poverty are significantly high in Zambia. To what extend do children face these two conditions simultaneously? To assess this question, this subsection examines the overlap between poverty and deprivation status of Zambian children (Figure 6) identifying four sub-groups: deprived and poor, deprived only, poor only, or non-poor and non-deprived children. The calculations were performed considering the multidimensional headcount ratio (H) with a deprivation threshold of k=3, and the poverty headcount ratio (FGT_0).

Figure 6. ***Overlap Between Monetary and Multidimensional Poverty for Children Aged 0-17 Years***



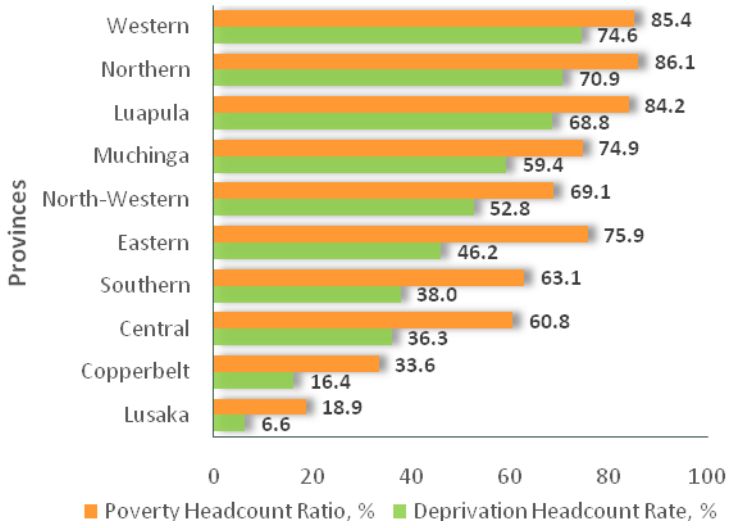
Source: Authors' calculations using Zambia LCMS (2015).
Note: Based on Multidimensional Headcount Ratio (*H*) (threshold k=3) and the Poverty Headcount Ratio (FGT_0), 2015 national poverty line: K214.26 per Adult Equivalent (monthly)

It is interesting to notice that **most of the deprived children are also monetary poor in Zambia** (only 5% are deprived but non-poor). Even if not deprived, there is a significant share of the children that are monetary poor (22.9%). **Overall, a significant share of Zambian children aged 0-17 years is either poor or deprived, that is a 64%.**

Figure 7 shows multidimensional deprivation and monetary poverty rates by province. The provinces are in decreasing order according to the deprivation headcount rate. The analysis reveals that the ranking by province varies depending on the poverty measure used. Differences can be observed not only in terms of ranking, but also in the level of monetary poverty and multidimensional poverty. In all the cases, monetary poverty represents higher proportions of children poor in Zambia. This underlines that the two poverty measures are conceptually different and can be used as complementary measures to identify the poor population to help identify appropriate policy responses. This comparison suggests that measuring child deprivation rate considering a deprivation threshold of k=3 captures a severe child poverty condition, especially among children in urban areas, as the total monetary poverty rates in urban areas are higher compared to the child deprivation ratio.[10]This may be the reason why **some of the more urban provinces such as Lusaka and Copperbelt have much higher monetary poverty rates compared to the deprivation rates among children**. **The poorest provinces both in terms of deprivation and monetary child poverty are Western, Northern and Luapula**. This suggests that these provinces have limited provision of basic public goods and services, pointing out at cases where interventions only based on income support to the households might not be enough to reduce child multidimensional poverty.

[10]Sensitivity analysis has been carried out, calculating the child deprivation rates with a threshold k=2. Results are in Appendix C.

Figure 7. ***Multidimensional Headcount Ratio and Child Poverty Rates in Zambia by Province.***



Source: Authors' calculations using Zambia LCMS (2015)
Note: Multidimensional Headcount Ratio (*H*) using a threshold k=3. Poverty Headcount Ratio considering 2015 national poverty line: K214.26 per Adult Equivalent (monthly)

Results of the monetary and multidimensional poverty analyses highlight the relevance of addressing both forms of child poverty to achieve the well-being of children in Zambia. Eliminating either monetary or multidimensional poverty alone is likely to leave behind a meaningful group of children who is poor according to both or either definition. This point is more clear by the high value in both the deprivation headcount rate of children with at least three deprivations at a time (41%) and the poverty headcount rate of children living below the poverty line (59%). This is even of higher concern when we notice that most of the provinces faces deprivation and monetary child poverty rates above the ones at the national level.

This means that even if monetary poverty is eradicated, a significant proportion of children will still may 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 Zambia. 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 having enough financial resources may be insufficient to enhance child's well-being.

3.1.4 Summary: Main Points from the Analysis for All Children

The main points that arise from monetary poverty and multidimensional deprivation analyses for all children in Zambia are:

1. More than 40% of Zambian children suffers from at least three deprivations at a time while a 60% are monetary poor considering the national poverty line;
2. Children experience four deprivations on average (out of 6);
3. The average amount of money necessary to remove each poor child out of poverty represents 30.5% of the poverty line at the national level;
4. The regional comparison of these measures shows that the gap in the deprivation rates and in the monetary poverty rates between areas is notably higher for children living in rural areas.

Significant differences are observed across provinces too, with similar patterns in both measures;

5. Most of the deprived children are also poor, but there is a significant share of Zambian children that is monetary poor only.

3.2 Single Deprivation Analysis: a Sector-by-Sector Type of Analysis

This section attempts to determine the sectors in which children in Zambia are deprived, identifying the different needs and profiling characteristics of children that are specific of each of the three age groups. As mentioned above, the single deprivation analysis presents the results for each of the separate dimensions and indicators that have been selected for the analysis. This gives an indication of which sectors should receive specific attention.

3.2.1 To What Extent Children in Zambia are Deprived? Analysis by Age Group

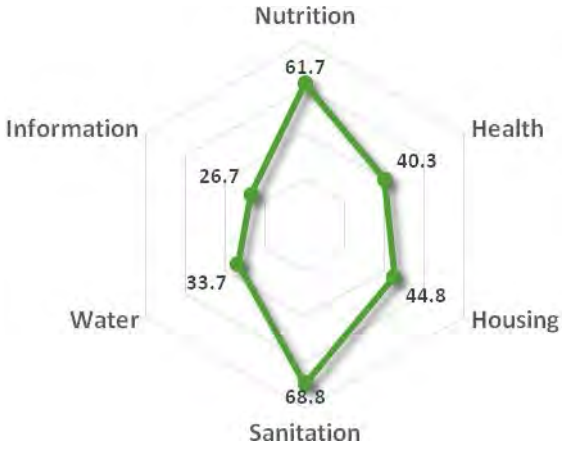
CHILDREN 0 TO 4 YEARS OLD

The analysis of deprivation by dimension for children age 0-4 years (6 dimensions in total) shows the highest incidence of deprivations in *Sanitation* and *Nutrition*. As shown in Figure 8, around two children out of three are indeed deprived in each of these dimensions.

***Health* and *Housing* incidences of deprivations are also high, with 40% and 45% of children age 0-4 years deprived in these dimensions.** In the particular case of *Health*, the deprivation in this dimension is measured by considering the deprivation in full immunization indicator.[11]Even BCG vaccination and Measles coverage is high (96% and 92%, respectively), 33% of the children above 12 months has not received 3 DPTs doses and 40% of children has received less than 3 Polio doses by the age of 12 months. This may be associated to the fact that BCG is applied in the hospital before leaving the health facility immediately after birth while the others do not, which might indicate the lack of infrastructure relatively close to the place of living of the households. Note that the lack of full vaccination associated to this kind of issues also signals potential child deprivations in other health conditions related to the access of the households to the sanitary facilities, since the costs to the families of commuting to assist or prevent their children against different diseases increases with the distance.

[11]Even the interest of considering additionally other indicators of health for this age group such as access to health services, among others, the data constrains in terms of variables availability and/or coverage impede the use of other indicators to complement full immunization indicator in defining the deprivation in health dimension.

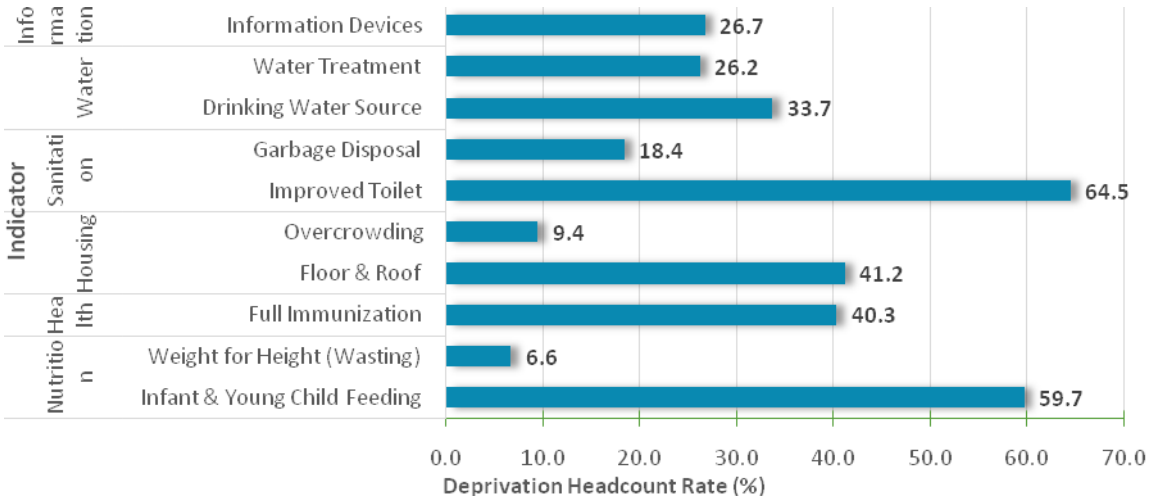
Figure 8. ***Number of Children Deprived in a Given Dimension as a Percentage of Children Aged 0-4 Years***



Source: Authors' calculations using Zambia LCMS (2015)

The high deprivation level in *Nutrition* is mainly driven by infant and young child feeding practices, consisting of exclusive breastfeeding for children under 6 months and minimum meal frequency for infants age 6 months to 4 years old (deprivation level of 60% - Figure 9). Inappropriate breastfeeding and infant feeding patterns appear to be a key determinant of the observed nutritional problems observed in Zambia. Figure 9 also shows that *Sanitation* deprivation is mainly associated to lack of improved toilet facility, which represents an incidence of 65% of the children age 0-4 years deprived in this indicator. *Water*-related indicators, on the contrary, show lower level of deprivation; thanks to correct water treatment (74% of children live in households where the water is appropriately treated) and that the main source of drinking water in the household for 66% of the children is improved.

Figure 9.*Number of Children Deprived in a Given Indicator as a Percentage of Children Aged 0-4 Years*

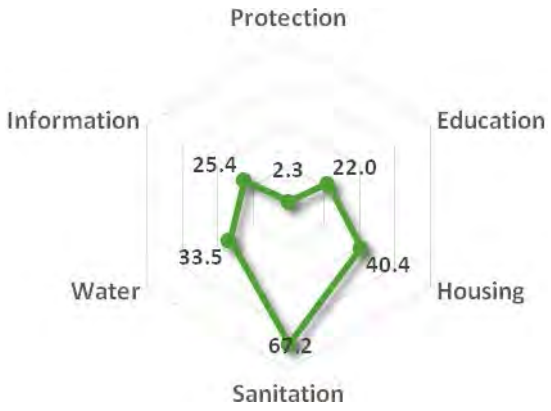


Source: Authors' calculations using Zambia LCMS (2015)

CHILDREN 5 TO 13 YEARS OLD

For children age 5-13 years, the levels of deprivation for *Sanitation* are similar to those of children 0-4 years, with approximately two third of children deprived in this dimension (Figure 10). The same evidence if observed for *Water* and *Housing* dimensions, with more than one third of children age 5-13 years deprived. Furthermore, one child out of four is deprived in *Information* dimension, measured through the indicator on availability of information devices in the household, and one child age 7-13 out of five is deprived of education (they are not attending school and/or attending but two years behind the corresponding age for the grade).

Figure 10. ***Number of Children Deprived in a Given Dimension as a Percentage of Children Aged 5-13 Years***

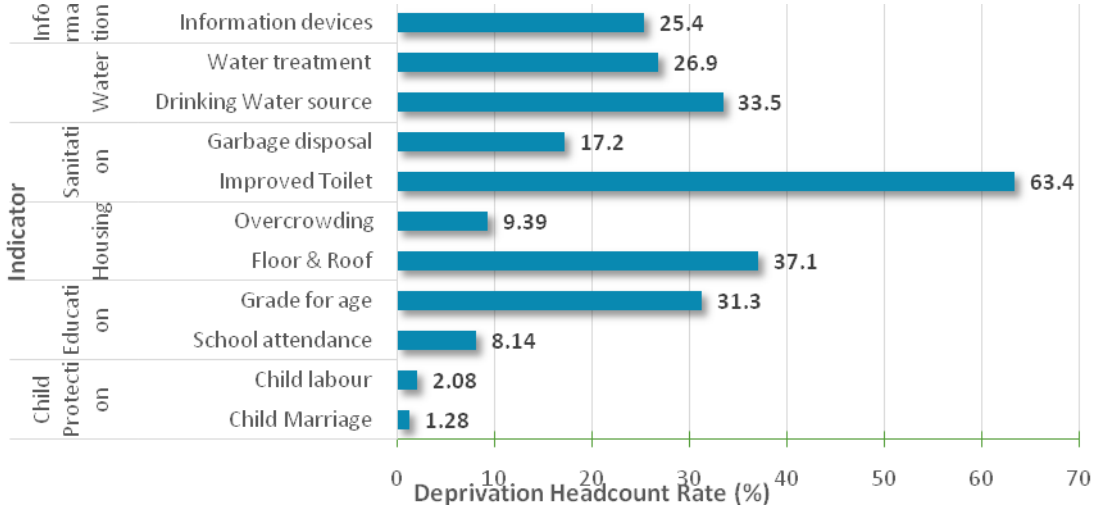


Source: Authors' calculations using Zambia LCMS (2015)

Deprivation on *Child protection* means that the child is in an environment that does not prevent him from violence, exploitation or abuse against him. This does not appear as a major issue for children age 5-13 years with only 2.3% of children not child protected. Depending on the reference child population, deprivation in this dimension is captured by child marriage and labor indicators. Most of these deprived children are engaged in an income generating activity or farming, and/or 1.3% of children age 12 or 13 years ever married or cohabited (Figure 11).

Figure 11 shows that **the high deprivation level in *Education* in the reference population of children age 7-13 years is mainly driven by grade for age indicator** (deprivation level of 31%) since 92% of children of primary school age is attending school.

Figure 11. *Number of Children Deprived in a Given Indicator as a Percentage of Children Aged 5-13 Years*



Source: Authors' calculations using Zambia LCMS (2015)

CHILDREN 14 TO 17 YEARS OLD

The analysis for children age 14-17 years in Figure 12 shows lower levels of deprivation in sanitation, housing, water and information compared to younger children in Zambia. In contrast, the deprivation levels for education and child protection are higher than for the reference group of children in age group 5-13 years (52.3% and 11.2%, respectively).

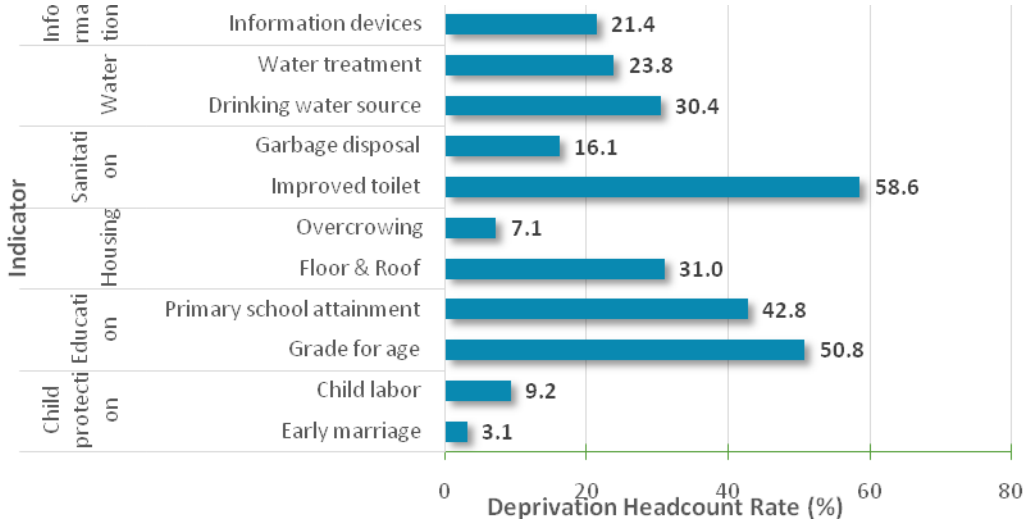
Figure 12. *Number of Children Deprived in a Given Dimension as a Percentage of Children Aged 14-17 Years*

Source: Authors' calculations using Zambia LCMS (2015)

The deprivation levels for grade for age indicator are higher for children age 14-17 years, with more than half of children below two years the grade corresponding to the age (Figure 13) compared to less than one child out of three in previous age group. **Even children in primary school age attendance to school is high, primary school attainment for children age 14-17 years is low, with 43% of children deprived in this indicator**. Low primary school attainment, used as a proxy of basic human capital formation, is indicating the low quality and efficiency of the school system in Zambia, calling for the implementation of reforms in Zambian school system in order to increase the quality of education of their children. Even child labor deprivation rate is three times the one of early

marriage/cohabitation indicator (9% compared to 3%), these levels are significantly higher than in children aged 5-13 years.

Figure 13. ***Number of Children Deprived in a Given Indicator as a Percentage of Children Aged 14-17 Years***



Source: Authors' calculations using Zambia LCMS (2015)

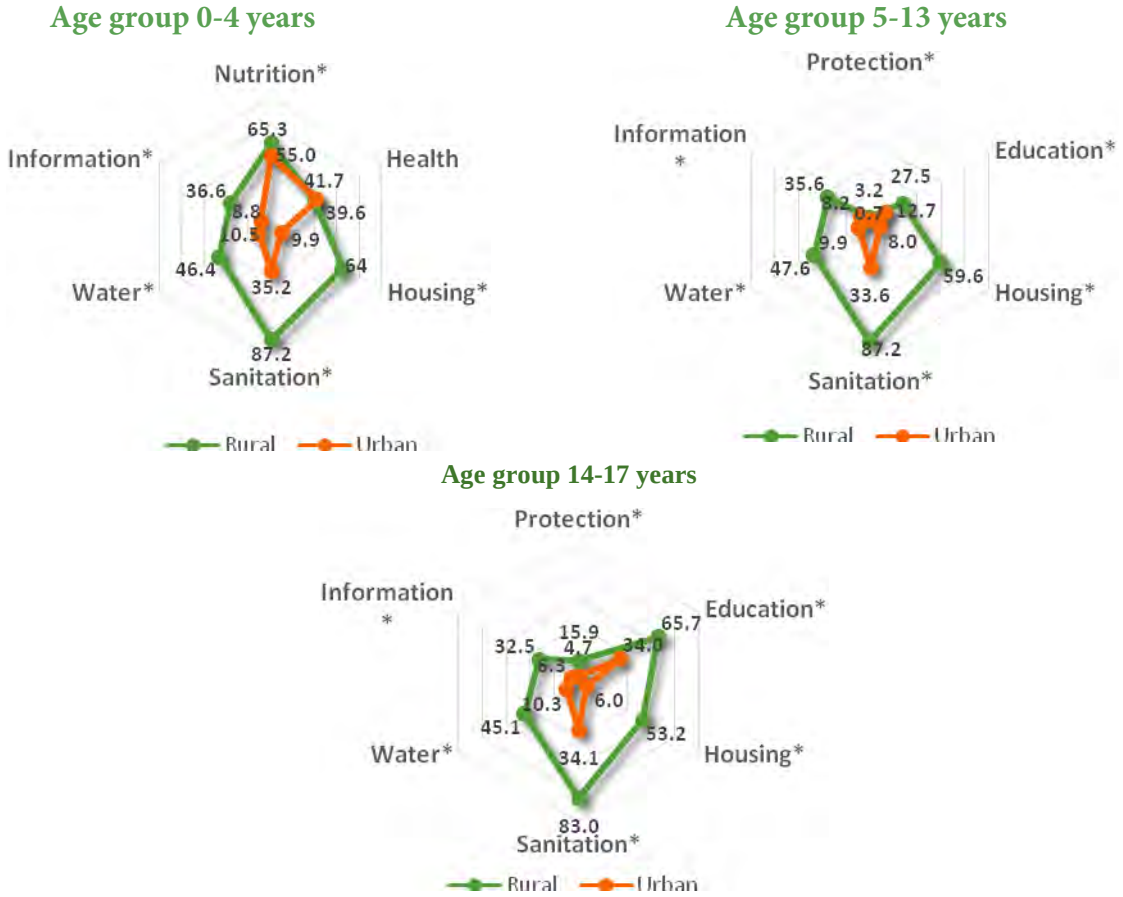
WHO ARE THE DEPRIVED CHILDREN IN ZAMBIA?

Using profiling variables contributes to identify who are the children with a higher probability of being deprived in a specific dimension in Zambia. This constitutes an equity analysis in which it is possible to identify whether deprivations are concentrated in specific geographic areas, among children of a specific group, with certain socio-economic characteristics, and so forth, and describes the characteristics of the most vulnerable children in each subgroup.[12]

For all children age 0-17 years old, **Figure 14 shows that living in rural areas have significantly higher deprivation headcount rates across most of the dimensions compared to those living in urban areas.** The only exception is found in *Health* dimension for age group 0-4 years, in which the percentage of children deprived in health is not significantly different depending on the area of residence.

[12] See Appendix D for the full list of deprivation headcount rates by all profiling variables included in the analysis.

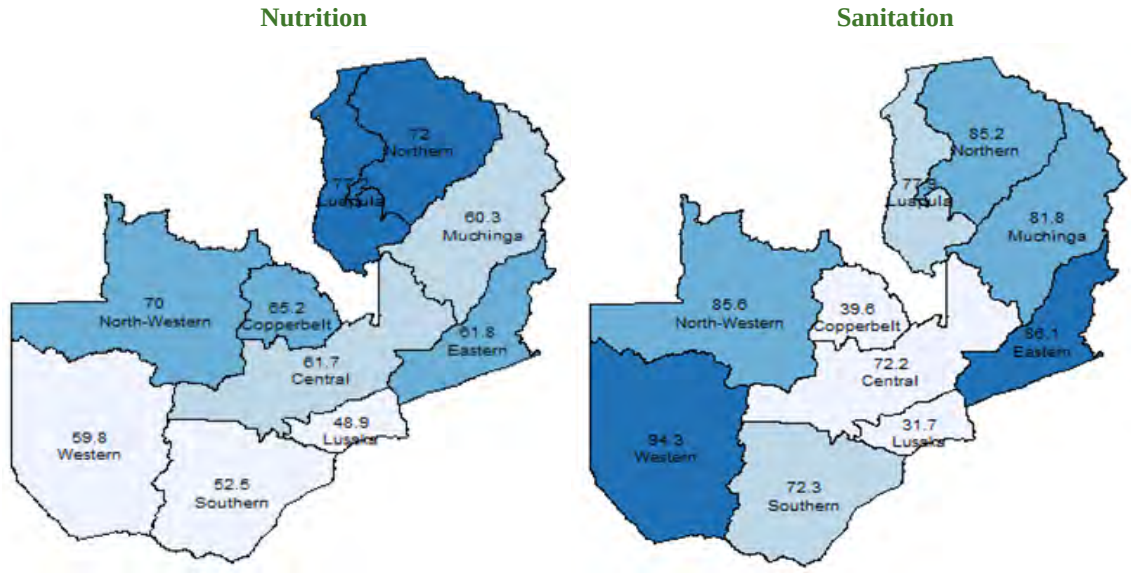
Figure 14. ***Number of Children Deprived in a Given Dimension as a Percentage of Children by Age Group***



Source: Authors' calculations using Zambia LCMS (2015).
Note: * p<0.05 in Chi-squared test of independence.

An analysis of the deprivation headcounts by province reveals that the provinces with the highest and lowest share of deprived children are not always the same, independently on the dimension of study. For instance, Figure 15 shows that, for age group 0-4 years, the lowest deprivation rates in *Nutrition* dimension (even very high) are found in the provinces located in the south of Zambia (Western, Southern, and Lusaka) with rates of 59.8%, 52.5% and 48.9%, respectively. On the other hand, the highest deprivation rates are in the north (Luapula and Northern) with rates of 77% and 72%, respectively. In *Sanitation*, the proportion of children in Western province that are deprived is the highest in Zambia (94.3%). We also observe that Lusaka and Copperbelt are the less deprived provinces in *Sanitation* dimension, with levels of deprivation highly far from the other provinces figures: 31.7% and 39.6%, respectively.

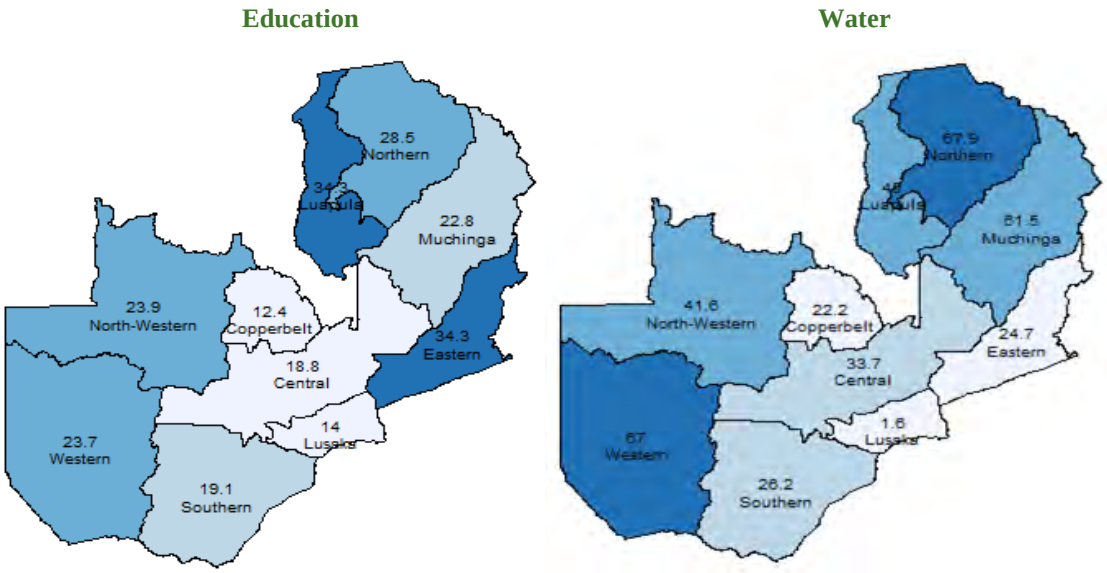
Figure 15. ***Distribution of Deprivation Headcount Rates by Province in Nutrition and Sanitation as a Percentage of Children Aged 0-4 Years***



Source: Authors' calculations using Zambia LCMS (2015).

In the case of children age 5-13 years old, the differences in the distribution of the deprivation headcount rates across provinces depending on the dimension are also observed. Despite of these variations, Lusaka and Copperbelt are the provinces with the lowest share of children age 5-13 years deprived in all dimensions. For example, Figure 16 shows the deprivation headcount rates in *Education* and *Water* dimensions by provinces for children in this age group which have the described distribution pattern. This figure also displays that, **while Luapula and Eastern are the most deprived provinces in *Education* with same headcount deprivation rates of 34.3%, in *Water* dimension, the most deprived provinces are Western (67%) and Northern (67.9%).**

Figure 16. ***Distribution of Deprivation Headcount Rates by Province in Education and Water as a Percentage of Children Aged 5-13 Years***

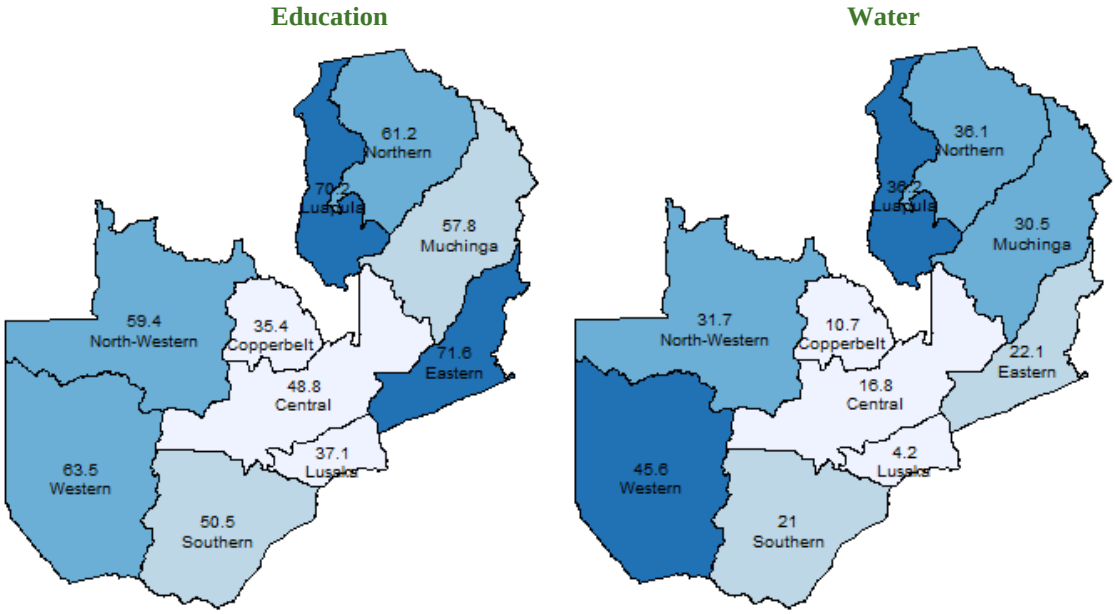


Source: Authors' calculations using Zambia LCMS (2015).

Analyzing the results by province for age group 14-17 years, we observe similar patterns in the distribution of the share of children deprived by dimension than age group 5-13 years, but with higher deprivation rates that this age group in most of the cases. Considering the distribution by province of

the deprivation headcounts in *Education* and *Water* dimensions (Figure17), for example, **Luapula and Eastern are the only provinces with more than 70% of children deprived from education while in the case of *Water* dimension, Western is the most deprived** with more than 45% of children age 14-17 years are living in households without access to improved drinking water and/or not treating unimproved water. At difference, Copperbelt, Central and Lusaka are in both dimensions the less deprived provinces.

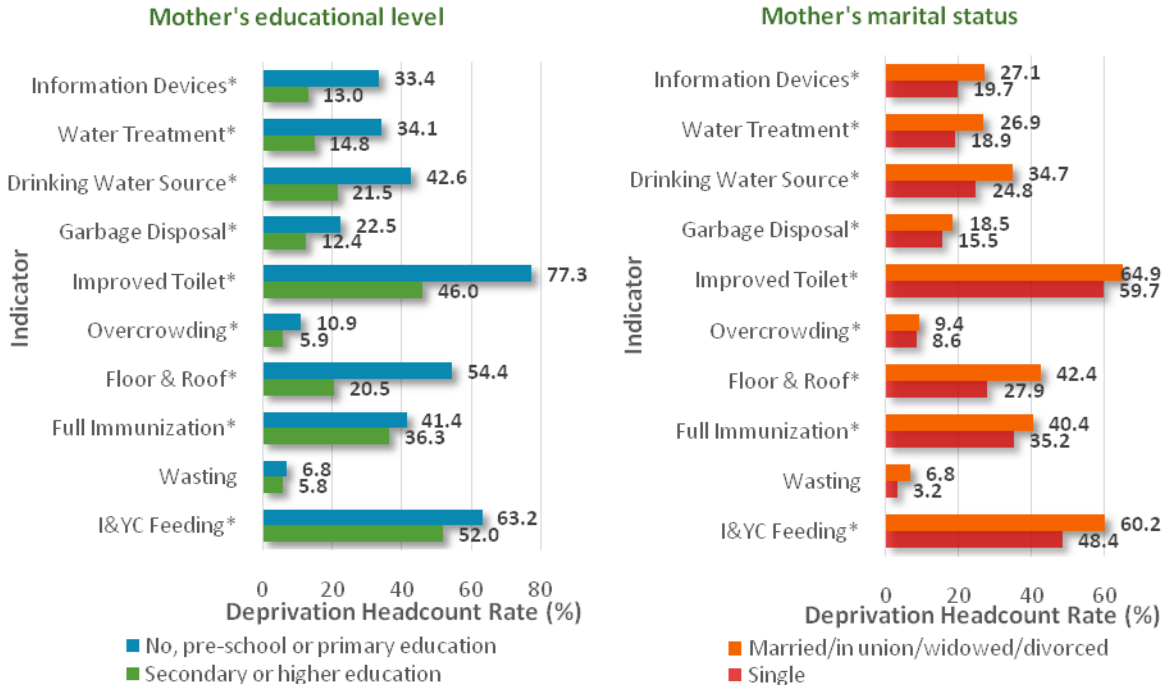
Figure 17. ***Distribution of Deprivation Headcount Rates by Province in Education and Water as a Percentage of Children Aged 14-17 Years***



Source: Authors' calculations using Zambia LCMS (2015).

Mother's characteristics are an important factor that relates with the deprivation status of children age 0-4 years old in Zambia. Figure 18 shows the headcount deprivation ratio for children in age group 0-4 by some characteristics of child's mother. Child deprivation status in most of the indicators significantly depends on the mother's educational level and marital status (the only exception is on *Wasting* indicator that differs significantly only when considering differences in deprivation rates by child's disability status). A child whose mother has not achieve a secondary school degree has higher probability of being deprived in these indicators than if the mother has completed the secondary school or a higher educational level. This reinforce the relevance of investing in the improvement of educational system in Zambia since, as shown before, not only children are deprived in education, but also it is an important factor that directly relates with future generation children and its deprivations in many indicators. Similarly, the probability of a child being deprived in the different indicators is significantly higher for a child whose mother is single than otherwise.

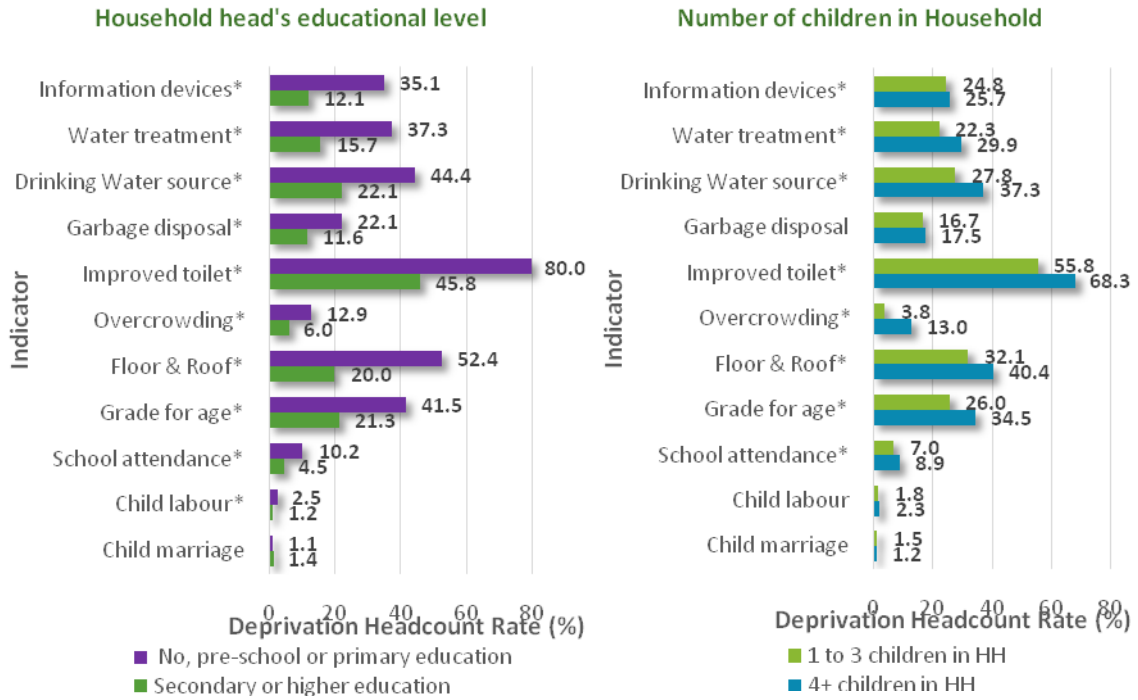
Figure 18. *Percentage of Children Deprived in a Given Indicator of Age 0-4 by Child's Mother's Characteristics*



Source: Authors' calculations using Zambia LCMS (2015)
Note: * p<0.05 in Chi-squared test of independence.

The deprivation headcount rates in most of the indicators are not independent on household head's educational level nor on the number of children in the household for all children no matter the age group to which they belong. For example, Figure 19 displays the headcount deprivation rates by these profiling variables for children age 5-13 years by indicator.

Figure 19. *Percentage of Children Deprived in a Given Indicator of Age 5-13 by some Profiling Characteristics*



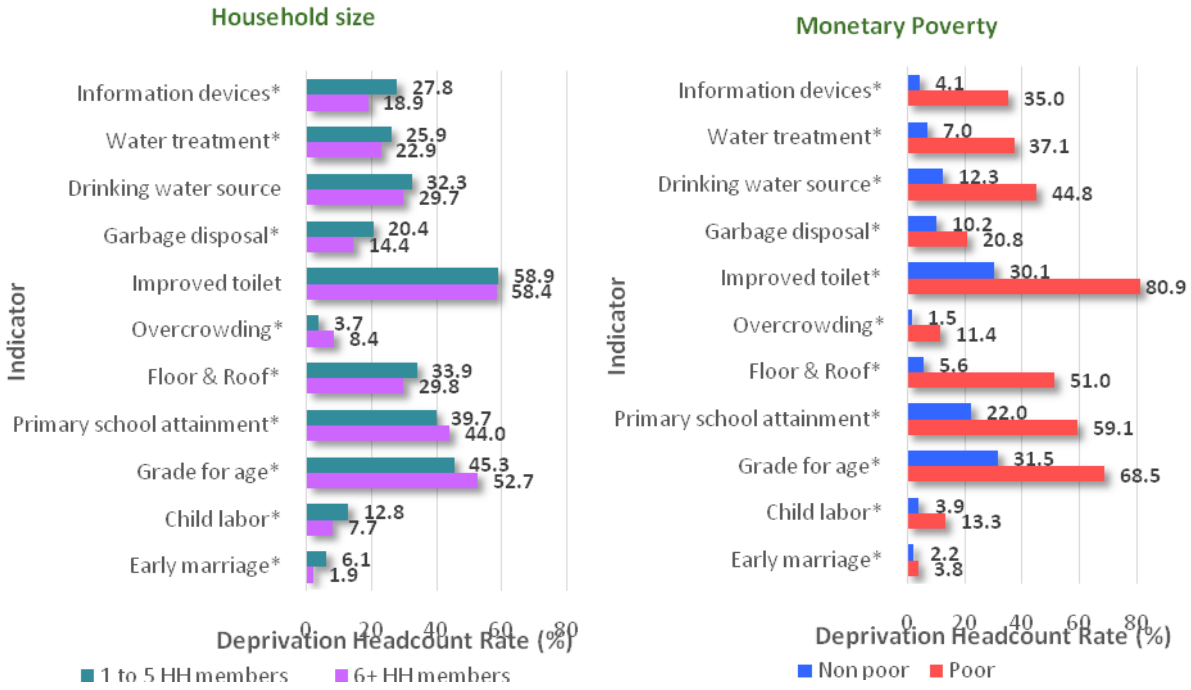
Source: Authors' calculations using Zambia LCMS (2015)
Note: * p<0.05 in Chi-squared test of independence.

As emerges from these figures, children have lower probability of being deprived in most of these indicators if the household's head has complete secondary or higher education than if not. Moreover, children living in households with a number of children above Zambia's median of three children are more likely deprived in the corresponding dimensions.

The analysis of the headcount deprivations rates for children aged 14-17 years reveals that household size matters for child deprivation in most of the indicators with exception of the use of improved drinking water and toiler facility (Figure 20). **Children age 14-17 years living in households with a size above Zambia's median of five members face higher probability of being deprived in these indicators.** For other age groups, household size is not always so relevant for the child deprivation in the analyzed indicators. For example, there are significant differences in deprivation rates for information, garbage disposal and overcrowding indicators in the remaining age groups, but never on floor and roof indicator, or child protection indicators (the last, for age group 5-13 years).

The deprivation in all the indicators depends also on household's monetary poverty status. As shown in figure below for children age 14-17 years, **children that live in poor households are always significantly more deprived than those not-poor, independently on the age group** (with exception of immunization indicator).

Figure 20. ***Percentage of Children Deprived in a Given Indicator of Age 14-17 by some Profiling Characteristics***

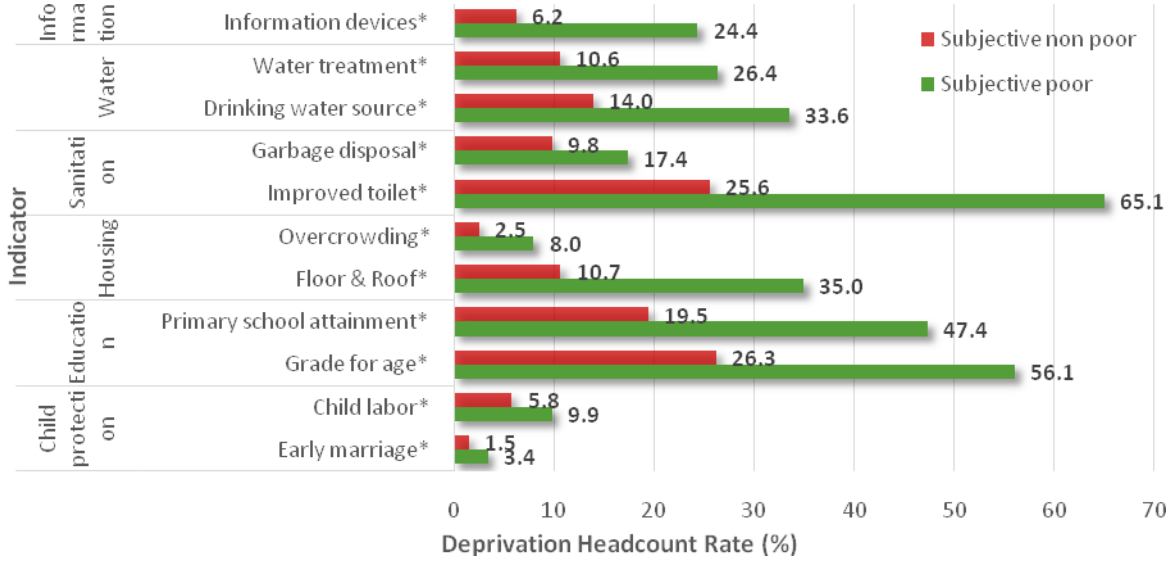


Source: Authors' calculations using Zambia LCMS (2015)
Note: * p<0.05 in Chi-squared test of independence.

Even if a child is deprived in many dimensions, household's members do not necessarily perceive themselves as poor. This point emerges from the analysis of the differences in the incidence of deprivation of children living in household self-perceived as poor and not. Looking at the results, for instance, for children in age group 14-17 years (Figure 21), **the proportion of children deprived is significantly higher in children from self-perceived poor households in all the indicators. Nevertheless, there is a significant proportion of children living in households that do not consider themselves to be poor but are deprived.** This might be associated with specific individual

household socio-economic characteristics (i.e. gender, age, employment status, education, the residence area, among others), available household resources and specific aspects of household/community social capital.

Figure 21. ***Percentage of Children Deprived in a Given Indicator of Age 14-17 by Self-Perceived Poverty***



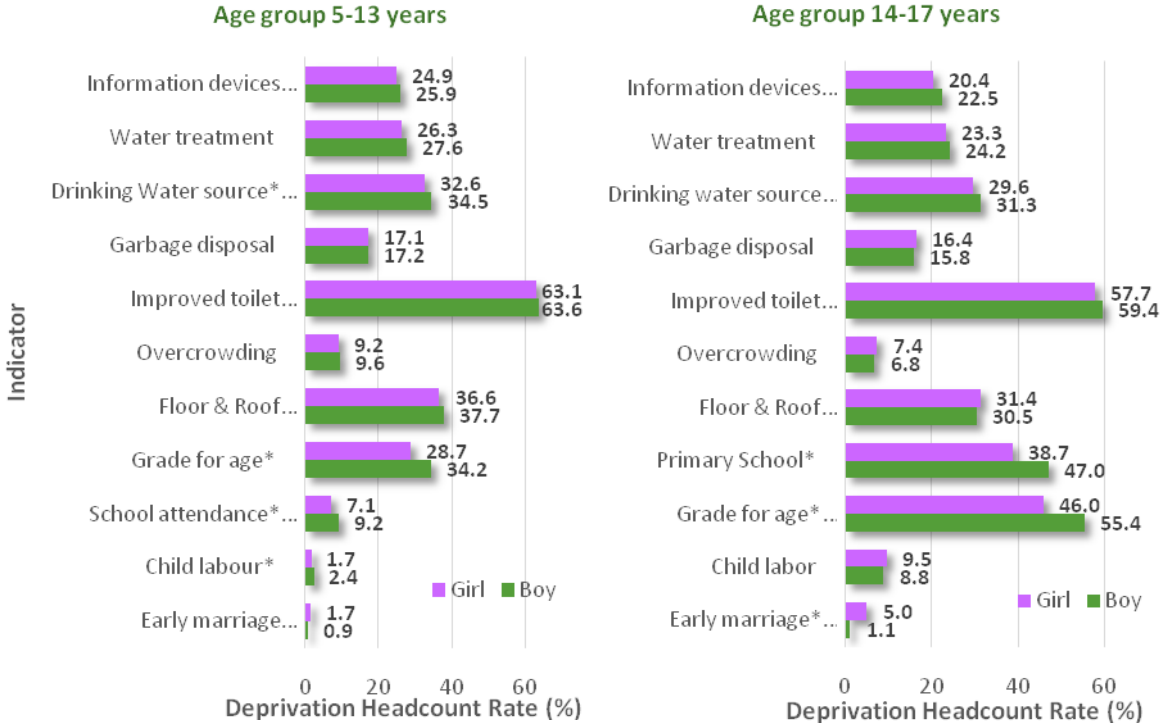
Source: Authors' calculations using Zambia LCMS (2015)
Note: * p<0.05 in Chi-squared test of independence.

3.2.2 Does Gender matter? Deprivations in Dimensions and Indicators by Child's Gender

The analysis by gender shows that girls and boys are equally deprived in all dimensions when they are 0-4 years old. For older children, there are differences in the deprivation rates only in some indicators. Figure 22 below display the differences by gender in each of the indicators corresponding to age groups 5-13 and 14-17.

Education's indicators present differences in the deprivation rates depending on the gender of the children older than 5 years in Zambia, in which cases girls are less deprived. For instance, for age group 14-17 years, primary school attainment is 39% for girls versus 47% for boys, while the incidence in grade for age indicator is 46% versus 55%. Figure 22 shows that within *Child Protection* dimension, child labor is slightly higher for boys age 5-13 years while for age group 14-17 the differences are not significant between gender but early marriage is affecting girls five time more than boys. Drinking water source is another indicator that registers gender differences, with levels slightly higher for boys i.e. 35% of boys live in households in which the main drinking water source is unimproved, but this is only for children aged 5-13 years.

Figure 22. ***Percentage of Children Deprived in a Given Indicator by Gender and Age Group***



Source: Authors' calculations using Zambia LCMS (2015)
Note: * p<0.05 in Chi-squared test of independence.

3.2.3 Summary: Main Points from the Analysis by Sector

Key messages for the single deprivation analysis are that:

1. Younger children tend to suffer from higher levels of deprivations than older children;
2. *Sanitation*, *Housing* and *Water* are among the sectors with highest incidence;
3. *Nutrition* and *Health* are key deprivations in age group 0-4 years, while *Education* is a key sector for the other two age groups;
4. A high percentage of the households does not self-perceive as poor even when their children are deprived in many dimensions;
5. The comparison of deprivation levels using different profiling variables shows that differences between girls and boys are limited and that the well-being of children is not mainly driven by wealth, but also by other individual and household background characteristics.

3.3 Multiple Deprivation Analysis

To understand the severity of the deprivation faced by children, it is useful to examine whether they are experienced simultaneously. An overlap in deprivations has higher adverse effects in more socio-economically disadvantaged groups of children, emphasizing the relevance of having a better understanding of who are these children. Moreover, it allows analyzing how deprivations are interrelated by different sub-groups and to identify policy responses to reduce the deprivations among children.

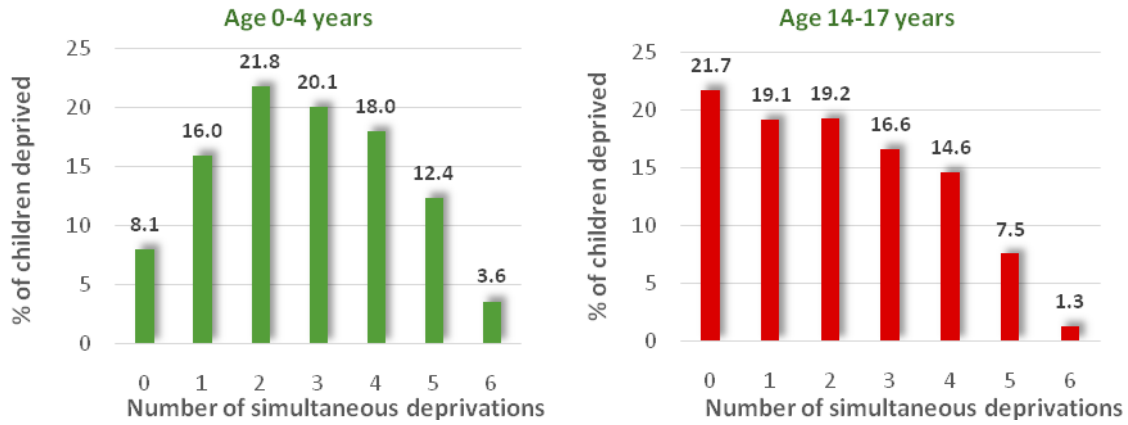
The Multiple Overlapping Deprivation Analysis (MODA) takes a multidimensional lens, examining how many and what combination of deprivations each child experiences simultaneously. It

shows: (i) the distribution of the number of deprivations, (ii) the deprivation overlaps between dimensions, (iii) multidimensional deprivation ratios, (iv) the profile of the multi dimensionally deprived children, and (v) the contribution of various characteristics and dimensions to the adjusted deprivation headcount ratio. Understanding how certain dimensions overlap and are experienced allows for identifying the most vulnerable children and detecting sectors that could benefit from an integrative approach to policy-making. Additionally, simultaneity in deprivations may point to adopting more generic and universal approaches such as universal child benefits or other social protection interventions thus curing several deprivations at the same time.

3.3.1 To What Extent Children Face Simultaneous Deprivations in Zambia? Analysis by Age Groups

Looking at the distribution of the number of deprivations of each child for the different age groups (Figure 23), we observe that **younger children tend to be deprived in more dimensions simultaneously that older children**. While 54% of the children age 0-4 years are deprived in three dimensions, 40% of children age 14-17 years face the same breadth of deprivation (similar results are observed when comparing the younger group with children age 5-13 years).

Figure 23. ***Distribution of the Number of Deprivations for all Children by Age Group***

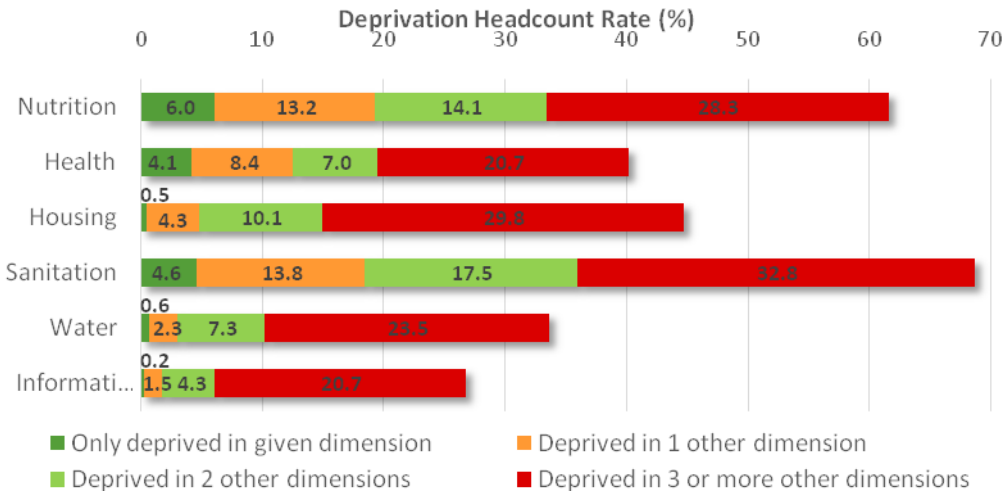


Source: Authors' calculations using Zambia LCMS (2015)

The deprivation overlap analysis for each dimension shows the proportion of children deprived in one, two, or three or more additional dimensions. **In Zambia, the proportions of children in each age group that is deprived in only a given dimension is relatively low**.[13]For instance, looking at the deprivation overlap by dimension for age-group 0-4 years (Figure 24), we observe that around two third of the children age 0-4 years in Zambia are deprived in the *Nutrition* dimension. Nevertheless, only 6% are only deprived in *Nutrition* while the rest are deprived in *Nutrition* and one to six other dimensions: 13.2% deprived in one other dimension, 14.1% in two others and 28.3% in three or more additional dimensions. In the case of *Housing*, *Water* and *Information* dimensions, almost none of the children age 0-4 years are only deprived in these dimensions. In addition, the analysis indicates that more than half of children deprived in *Health*, *Housing*, *Water* or *Information* were deprived in three to five other dimensions, and for the children deprived in *Nutrition* or *Sanitation* it is around 40% and 47%, respectively.

[13]The only exception is found for *Sanitation* dimension in the oldest age groups where more than 14% and 8% of children are deprived only in this dimension for age group 5-13 and 14-17 years, respectively.

Figure 24. ***Deprivation Overlap by Dimension for Children Aged 0-4 Years***



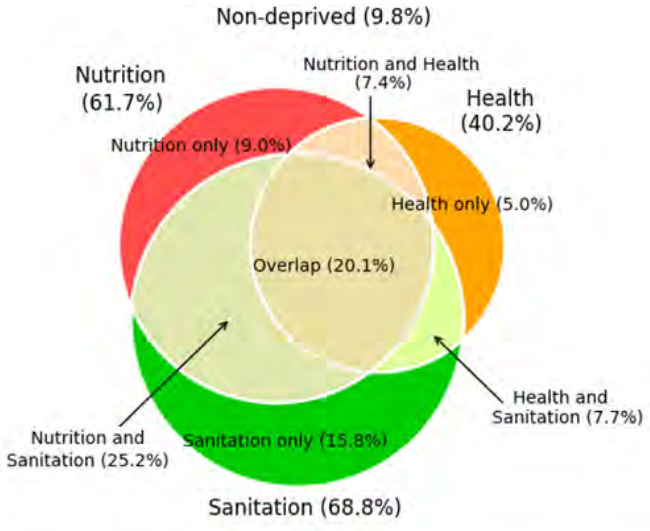
Source: Authors' calculations using Zambia LCMS (2015)

3.3.2 To What Extent Do Deprivations Overlap in Zambia? Multidimensional Deprivation Overlap Analysis

The deprivation overlap of two or three dimensions shows the different combinations of deprivations that the children are suffering from simultaneously. Given the multiple combination possibilities for each age-group, we report in this section only some of the most relevant findings.

Figure 25displays the overlap for deprivations in *Nutrition*, *Health* and *Sanitation* dimensions for children aged 0-4 years. The results show that there is a high level of overlap between the three deprivations for children under 5 years, among whom 20% are deprived in all three dimensions simultaneously. *Sanitation* and *Nutrition* overlap with the other dimensions to the largest extent (around 33%). While 62% of children age 0-4 years are deprived in *Nutrition*, only 9% are deprived in *Nutrition* but not deprived in *Sanitation* and/or *Health*.

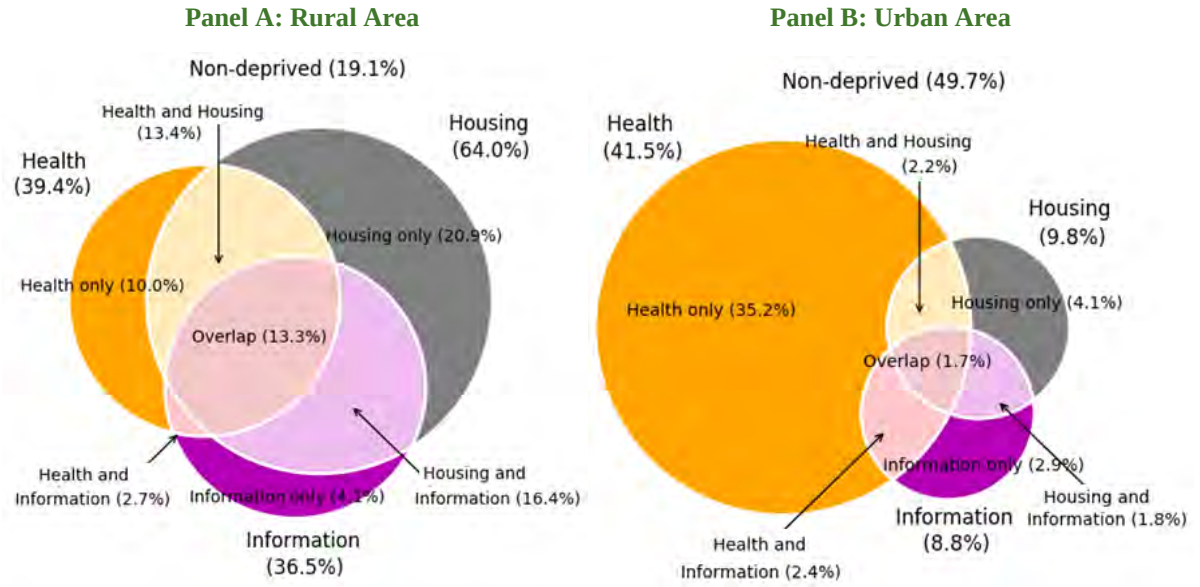
Figure 25. ***Deprivation Overlap for Children Aged 0-4 Years in Nutrition, Health and Sanitation***



Source: Authors' calculations using Zambia LCMS (2015)

In Figures 26.A and 26.B, the children under 5 years are split into those who live in rural areas and those living in urban areas. The results show that, **even the percentage of children deprived in *Health* is similar in these two areas, children in rural areas are more likely to be deprived simultaneously in other dimensions than in urban areas**: in urban areas 35% of children 0-4 years are not deprived simultaneously in *Housing* and/or *Information*, while in rural areas the percentage is only 10%. Also, children living in rural areas experience these three deprivations simultaneously to a much larger extent (13%) compared to only 2% overlap in children living in urban areas.

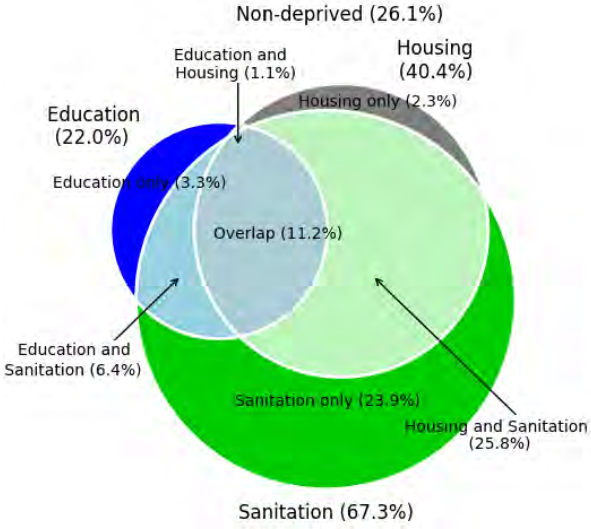
Figure 26.*Deprivation Overlap for Children Aged 0-4 Years in Health, Housing and Information by Area of Residence*



Source: Authors' calculations using Zambia LCMS (2015)

In the case of children age 5-13 years, Figure 27 shows that there is a large proportion of children that is deprived in *Education*, *Housing* and *Sanitation* simultaneously (11%). **One out of four children are deprived in *Housing* and *Sanitation* but not in *Education*.** Although 22% of children age 5-13 years are deprived in *Education*, only 3% of the children are not deprived at the same time in *Housing* and/or *Sanitation* dimensions. In other words, most of the children deprived in *Education*, are also deprived of these two other basic needs. Nevertheless, the exposition to deprivation in *Education* and only *Sanitation* or *Housing* is low, indicating that those children deprived in *Education* are more severely deprived.

Figure 27. ***Deprivation Overlap for Children Aged 5-13 Years in Education, Housing and Sanitation***

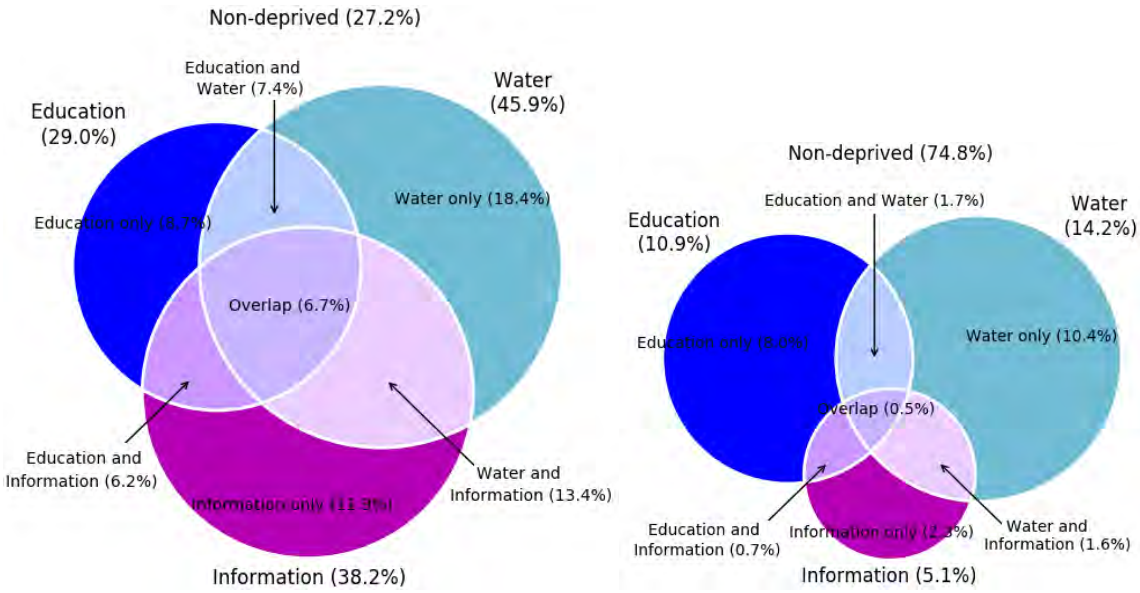


Source: Authors' calculations using Zambia LCMS (2015)

Splitting the children age 5-13 years according to the monetary poverty status of their households, Figure 28.A and 28.B shows the deprivation overlap between *Education*, *Water* and *Information* dimensions.

Figure 28.*Deprivation Overlap for Children Aged 5-13 Years in Education, Water and Information by Monetary Poverty Status of the Household*

Panel A: Monetary Poor **Panel B: Monetary non- Poor**



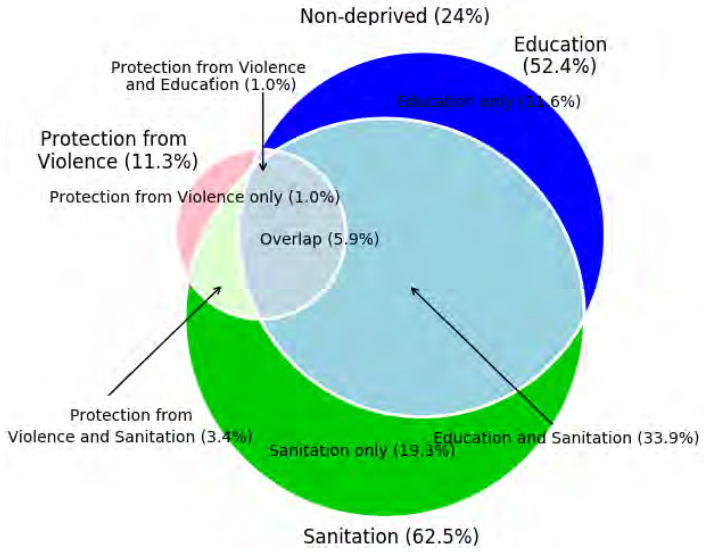
Source: Authors' calculations using Zambia LCMS (2015)

The results show that children that live in poor families are three times more deprived in *Education*, *Information* and/or *Water* (73%) than those living in non-poor families (25%). Moreover, **children in poor families have a higher likelihood to be deprived of these three child rights simultaneously (7%) while almost none of the children in not-poor households**. Deprivation rates for each of these dimensions separately are much higher for poor children age 5-13 years as well as the percentage of children that is simultaneously deprived in two of these dimensions. For poor children, 7% are found deprived in *Education* and *Water*, 13% in *Water* and *Information*, and 6% in

Education and *Information* while in the case of non-poor children these percentages are only 2%, 2% and 1%, respectively. From this follows that although *Education* and *Water* are major issues also among children from non-poor households, these children are less likely to be deprived in all three dimensions (or even two of them) simultaneously compared to children from poor families.

In the case of children population in Zambia belonging to age group 14-17 years, Figure 29 displays the deprivation overlap between *Child Protection*, *Education*, and *Sanitation* dimensions. **Although 11% of children are deprived from protection from violence (either work or are/were married/cohabiting), only 1% is not deprived form either *Education* and/or *Sanitation* dimensions at the same time**, and a 6% of the children deprived in this dimension is expose to the other two dimensions simultaneously. Regarding the likelihood of being deprived in *Education* for children in this age group (52%), the 78% of children deprived in this dimension are not protected from violence and/or deprived in *Sanitation*. Similarly, 19% out of 63% of children deprived in *Sanitation* dimension are deprived in this dimension but not in *Education* or *Child Protection*.

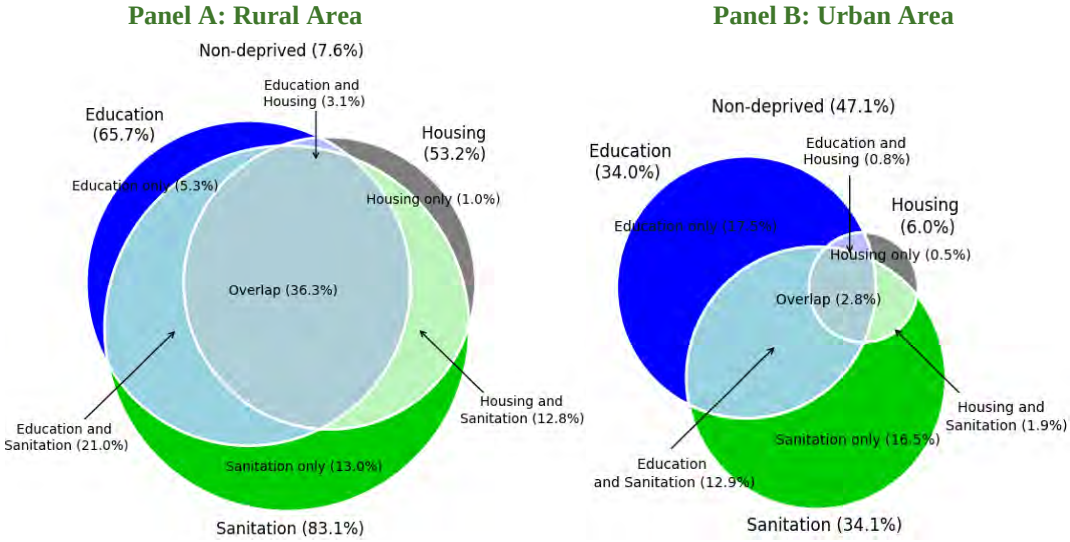
Figure 29. ***Deprivation Overlap for Children Aged 14-17 Years in Child Protection, Education and Sanitation***



Source: Authors' calculations using Zambia LCMS (2015)

An overlap analysis of deprivations in *Education*, *Housing* and *Sanitation* dimensions by area of residence for age group 14-17 years (Figure 30. A and 30.B) shows figures for each area that are quite different. While we have already shown that the differences in single deprivation rates for these dimensions are very important with percentages of children deprived in rural areas that are more than double of the urban ones, the overlap of *Education*, *Housing* and *Sanitation* is relatively much higher as well. **The severity of deprivation in the three dimensions at the same time is very high for children living in rural areas with more than 36% of the children deprived**. On the contrary, this is not a big problem in urban areas, where the simultaneous deprivation in the three dimensions is of 2.8%. In both rural and urban area, only a small percentage of children is deprived in *Housing* and not in either of the other two deprivations. In *Education*, in contrast, most of the children aged 14-17 years in rural area deprived in this dimension are also deprived in *Housing* and/or *Sanitation* (60% out of 66%), but in urban areas less than half are also deprived in at least one other of the two dimensions.

Figure 30. ***Deprivation Overlap for Children Aged 14-17 Years in Education, Housing and Sanitation by Area of Residence***



Source: Authors' calculations using Zambia LCMS (2015)

3.3.3 How Do Deprivation Levels Change Depending on Deprivation Intensity? Multidimensional Poverty Indices

The analysis of this section focuses on assessing child deprivation considering the deprivation intensity that children experience in Zambia by age group. To this purpose, multidimensional deprivation indices had been calculated to identify the overall incidence and intensity of deprivation among children deprived.

Table 3 displays the multidimensional deprivation indices for children in Zambia by age-group, focusing on a deprivation threshold of *k=3* dimensions, meaning that only those children who face 3 or more deprivations are classified as deprived (see Appendix E for the results of the analysis considering all possible deprivation cut-offs, *k*).

Table 3. ***Multidimensional Deprivation Indices by Age Group Considering a Deprivation Threshold of k=3***

Age Group	Multidimensional DeprivationHeadcount (H), %	Average Intensity among the deprived (A), %	Average Number of Deprivations among the deprived (A)	Adjusted Multidimensional Deprivation Headcount (M0)
0-4 years	54.2	66.5	4.0	0.36
5-13 years	36.4	59.9	3.6	0.22
14-17 years	40.1	64.0	3.8	0.26

Source: Authors' calculations using Zambia LCMS (2015)

Comparing the three age groups, **children age 0-4 are the population group in Zambia with the highest proportion of multidimensional deprived children (54.2%).**In case of children older than five years, the deprivation rates are more than 14 percentage points lower, with 40% of children age 14-17 years multidimensionally poor and 36% for age group 5-13 years. Even the differences in the incidence, the intensities of deprivation experienced for these age groups, which measures the breadth of child deprivation among the multi dimensionally deprived children, are only slightly different varying in a range from 67% of all possible deprivations on average for children age 0-4 years to 60% for children age 5-13 years. In all the cases, this means4 out of 6 deprivations on average per child. **This indicates that even the likelihood of being multidimensionally deprived in**

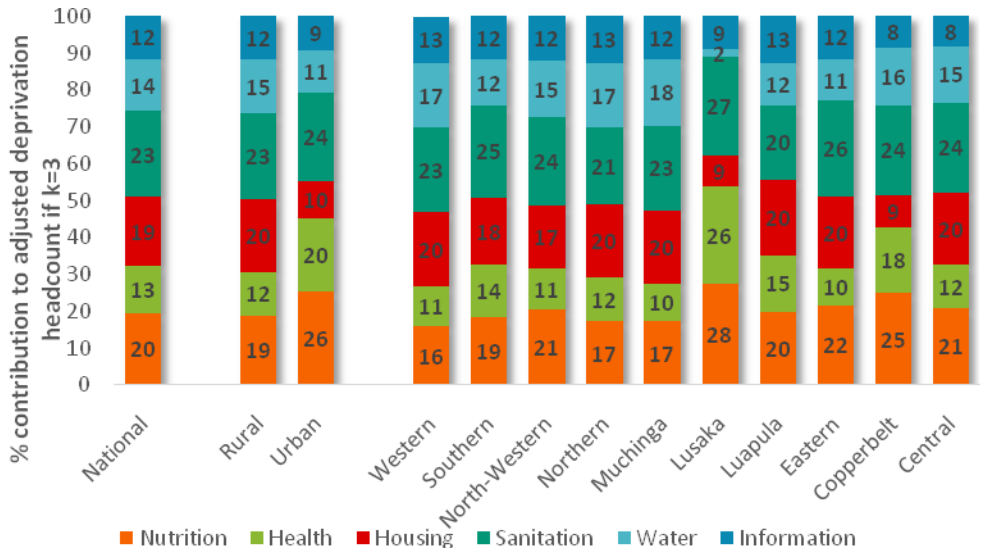
Zambia is higher for children younger than 5 years old, the intensity of deprivation is quite similar among the children deprived independently of the age.

While the adjusted multidimensional deprivation headcount does not have a direct interpretation, it allows a comparison between the three age groups adjusting jointly for both intensity and severity of deprivations. The results confirm that age group 0-4 years is the one with higher levels of children multidimensionally deprived.

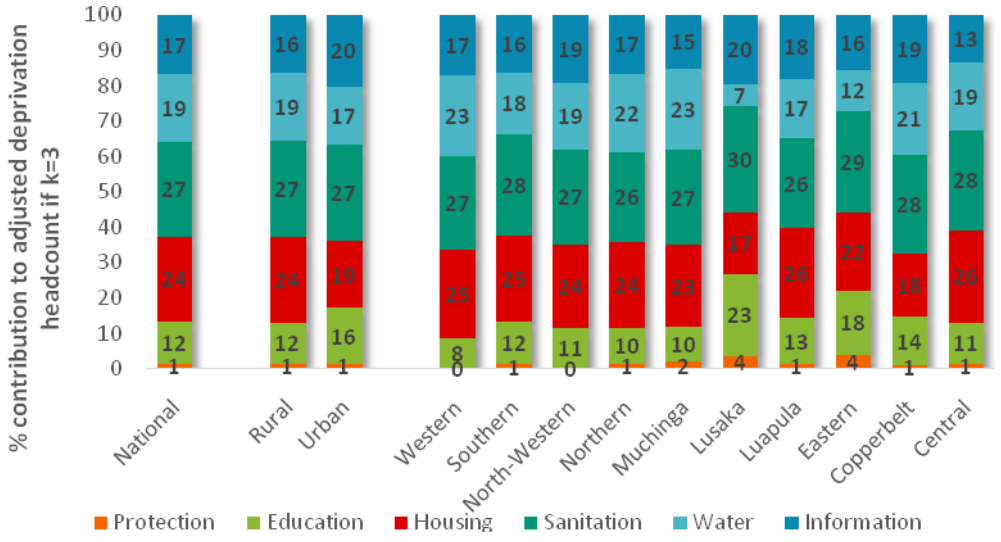
To understand the contribution of each dimension to the overall adjusted deprivation headcount ratio (M_0) by age group in Zambia, we decomposed this index at the national level and by area of residence and province. Figure 31 shows the percentage contribution to adjusted multidimensional deprivation headcount for age group 0-4 (Panel A), 5-13 (Panel B) and 14-17 years (Panel C), considering a deprivation threshold of k=3.

Figure 31. ***Decomposition by Dimension of the Adjusted Multidimensional Deprivation Ratio (M0) at National Level and by Area and Province for all Age Groups***

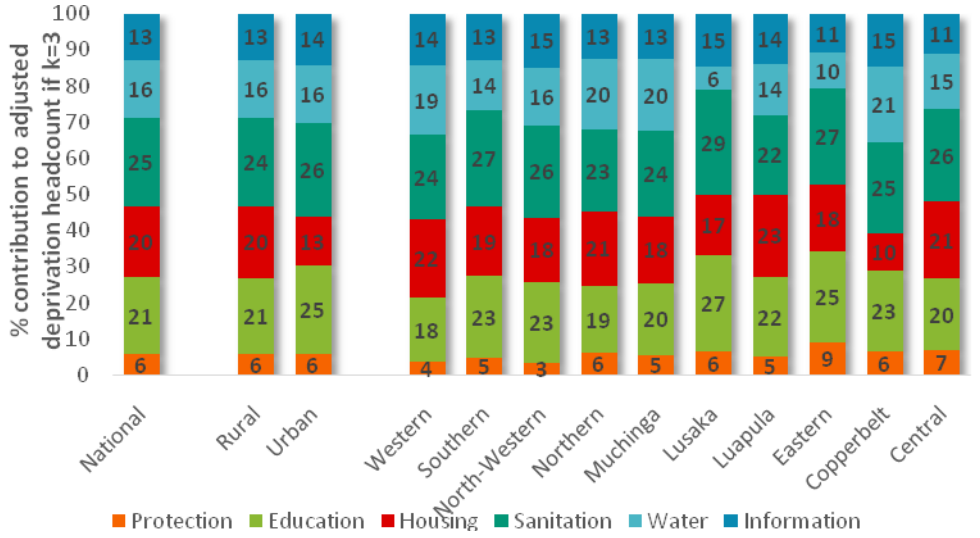
Panel A: Age Group 0-4 years



Panel B: Age Group 5-13 years



Panel C: Age Group 14-17 years



Source: Authors' calculations using Zambia LCMS (2015)

For children under five years, figure in Panel A shows that *Sanitation* has the highest contribution to the total number of deprivations at country level (23%), followed by *Nutrition*(20%) and *Housing* (19%).The contribution varies in some dimensions considerably depending on the area of residence. While in the rural area the highest contribution to the adjusted deprivation headcount comes from *Sanitation* (23%) consistently with national levels, in the urban area it is from *Nutrition* dimension (26%). Moreover, we observe that *Housing* dimension contribution is also relatively high (20%), but in urban area the contribution to the area's deprivation rate is among the lower ones. An analysis by province allows to identify the differences in the contributions by dimension. For example, *Sanitation* percentage contribution to the adjusted deprivation headcount ranges from 20% to 27% depending on the province, accounting for the highest contribution in all the cases. However, the contribution of *Housing* dimension is in general very important (around 20%) but, on the contrary, not very relevant in Lusaka and Copperbelt. *Water* contribution to the overall deprivation count in Lusaka is very low compared to the other provinces.

For children age 5-13 years, the results in Panel B display the contribution of each dimension to the overall sum of deprivations in this age group, showing that *Sanitation* and

***Housing* have the highest contributions at the national level** (27% and 24%, respectively), followed by *Water* (19%), *Information* (17%) and *Education* (12%). The main differences in the contribution to the total number of deprivations by area are given by *Information* and *Housing*'s contributions. While in *Housing* represents the second most important contribution to deprivations for children living in rural areas (24%), in urban areas the second highest contribution is provided by the child deprivation in *Information*. Differences in contributions to M_0 by provinces are significant. For example, *Water*'s contribution to total deprivation is high in all the provinces but Lusaka. However, Lusaka registers a contribution of *Education* dimension to the total deprivation in this province relatively much higher than in most of the provinces (23% versus 18%, in Eastern, to 8% in Western province).

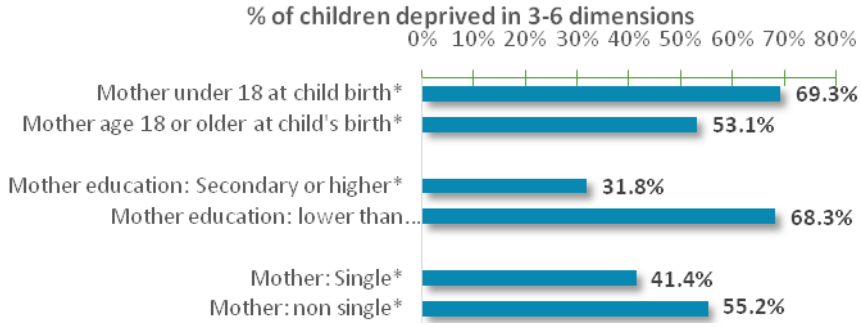
While in age group 5-13 years the contribution of *Child Protection* to the overall sum of deprivation was almost null, for older children it represents a 6%. Moreover, **for age group 14-17 years, *Education*'s contribution becomes one of the highest levels (21%) preceded by *Sanitation* (25%) and followed by *Housing* (20%).** At the area of residence level, the main differences in contributions are found, as in previous age groups, in *Housing* dimension, that is among the highest percentage contribution to multidimensional child deprivation in rural area (20% versus 13% in urban area). An analysis of the results of the decomposition by province highlights the differences in the contribution of each dimension in some cases. For instance, *Education*'s contribution to the adjusted deprivation headcount ranges from 18% (Western) to 27% (Lusaka), which is consistent with the results found for age group 5-13 years, and suggests an increase in the severity of the deprivation with the age. The contribution of *Water* also varies significantly depending on the province in where the child lives but, in general, is more than 14% (except for Lusaka and Eastern provinces).

Profiling the children with more severe deprivation levels highlights differences in characteristics of those multidimensionally deprived, facilitating the identification of particularly vulnerable children for the different groups of age. We focus on the most important profiles that provide an insight into the identification of the characteristics of the children by age group by looking at the multidimensional deprivation headcount, considering a threshold of k=3 (results for the remaining profiling variables considered in the analysis can be found in Appendix F).

Looking at the differences in the multidimensional deprivation headcount for children age 0-4 years in Figure 32, child poverty rates are significantly higher among children with mother's that were under 18 years when giving birth the child (69%), with lower than complete secondary education (68%), and when their mother is alive and her marital status is other than single (including married/in union/widowed/divorced) (55%), providing evidence of the importance of mother's characteristics for children being deprived in three or more dimensions at the same time.[14]

[14]Note that given that the dataset allows to identify mother's characteristics only for children under de age of 5, we can only analyze the relationship between these profiling variables for children in age group 0-4 years.

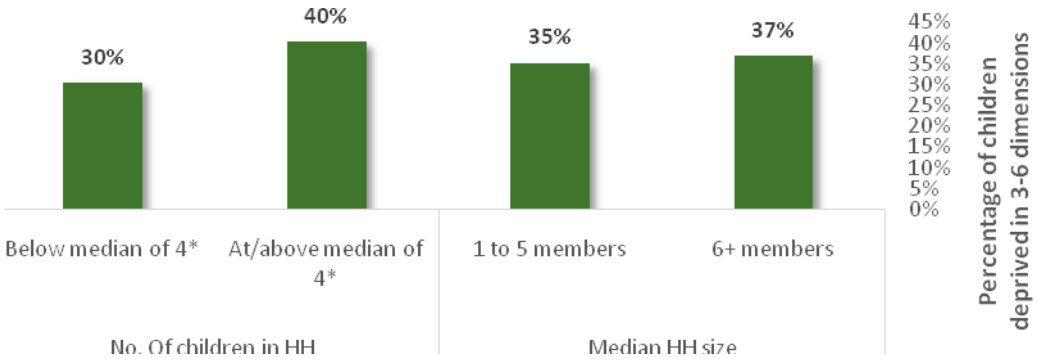
Figure 32.*Multidimensional Deprivation Headcount (%) for Age Group 0-4 Years by Mother's Characteristics*



Source: Authors' calculations using Zambia LCMS (2015)
Note: Multidimensional Headcount Ratio (*H*) using a threshold k=3. * p<0.05 in Chi-squared test of independence.

The number of children under 18 years in the household is also significantly related with the multidimensional deprivation headcount for all children, but it is independent of the household size. For example, looking at children age 5-13 years (Figure 33), 40% of children living in households with 3 or more other children are multidimensionally deprived, while this percentage is significantly lower for children living only with other two children (30%). This evidence is in line with the point that children have specific needs different from adults and it is more difficult to satisfy them when the number of children in the household is relatively high.

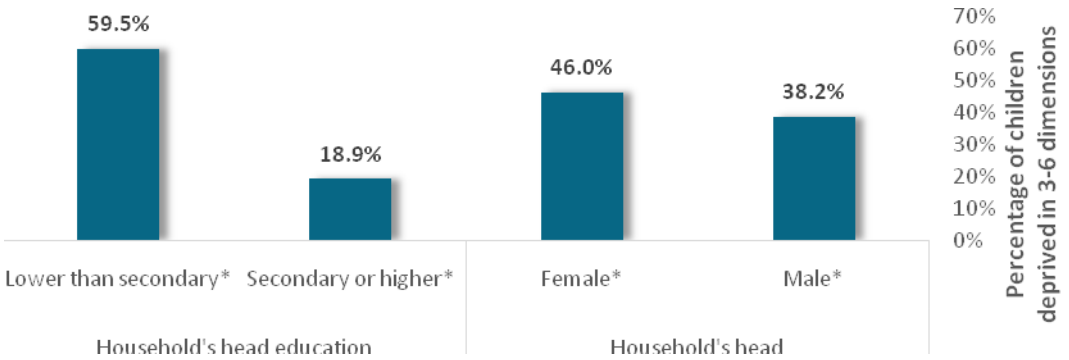
Figure 33.*Multidimensional Deprivation Headcount (%) for Age Group 5-13 Years by Number of Household's Members*



Source: Authors' calculations using Zambia LCMS (2015)
Note: Multidimensional Headcount Ratio (*H*) using a threshold k=3, * p<0.05 in Chi-squared test of independence.

Household's head characteristics such as his/her educational level and gender are also seen as important factors affecting multidimensional child deprivation independently of the age group. Looking, for instance for age group 14-17 years, at the differences in multidimensional deprivation headcount depending on these characteristics (Figure 34), children living in households with a female head are more likely to suffer three or more deprivations simultaneously than when the head is male (46% versus 38%, respectively). The differences are even more severe when looking at household's head level of education, with 19% of children multidimensionally deprived when head's level of education reached is complete secondary or higher and 60% of children age 14-17 years deprived when the educational level is lower.

Figure 34.*Multidimensional Deprivation Headcount (%) for Age Group 14-17 Years by Head of Household's Characteristics*



Source: Authors' calculations using Zambia LCMS (2015)
Note: Multidimensional Headcount Ratio (*H*) using a threshold k=3, * p<0.05 in Chi-squared test of independence.

3.3.4 Summary: Main Points from the Multidimensional Analysis

Multiple deprivation analysis leaves the following key messages:

1. The proportion of children in each age group deprived only in a given dimension is quite low;
2. Younger children tend to be deprived in more dimensions simultaneously than older ones;
3. Deprivation in *Nutrition* is highly overlapped with other dimensions for children 0-4 years old; similarly, older children deprived in *Education* are severely deprived. Simultaneous deprivations in three dimensions are always significantly higher for children living in rural areas or in poor families.
4. Younger children population has the highest proportion of multidimensional deprived children but with similar intensities of deprivation than other age groups.
5. Sanitation has the highest contribution to the adjusted multidimensional deprivation headcount. Differences in percentage contributions are observed by area and provinces.
6. Mother's and household's head characteristics are significantly related with the multidimensional deprivation headcount. Even the number of children under 18 years in the household is also associated to differences in this index, household size is not.

4 CONCLUDING REMARKS

Child poverty and deprivation significantly affect well-being during childhood but they may also influence child's sustainable development and future socio-economic conditions. Understanding which are the needs of children is essential to interpret their situation and to be able to inform child-oriented policies that allow children to fully develop in a society. This study has measured and analyzed in-depth child poverty in Zambia from monetary and deprivation perspective using the MODA methodology, building a profile of most vulnerable children.

A high percentage of children in Zambia are both monetary poor and multidimensionally deprived. Most of poor and/or deprived children live in rural areas, while disparities in deprivation and poverty rates across provinces are remarkable. This fact underlines the necessity to target

interventions according to province-specific situation and, thus, to contribute not only with the provision of basic public goods and services but also by providing income support to the households. Both forms of poverty should be simultaneously addressed if we want to improve child's well-being in Zambia. Incorporating child poverty and deprivation indicators into the national development plans and/or strategies may contribute to policies and programs to reduce both forms of poverty.

A comprehensive national poverty reduction strategy should aim to involve multiple sectors of child's well-being. The sectoral analysis in this child poverty study highlights that children are highly affected by sanitation provision. This is an important feature to be considered in anti-poverty national plans, since adequate sanitation provisions is important for children's well-being since it helps to reduce vulnerability to a range of health risks considerably. In addition, high deprivations rates in nutrition point out the importance of improving infant and young child feeding practices in combination with sanitation and water conditions in Zambia, which sequentially contribute to reduce nutritional problems and associated diseases and potential deaths.

Education is other sector that needs a special focus. Even though attendance to school among children in primary school age is high in Zambia, primary school attainment for children above this age is low. Low primary school attainment, as a proxy of human capital formation, is indicating the low quality and efficiency of the school system in Zambia. This points out the need of a reform in Zambian school system in order to increase the quality of education of their children and future generation, contributing towards the economic growth and overall productivity level of the country.

The analysis of the simultaneous deprivations faced by children in Zambia and the disaggregation of multidimensional child poverty rates by different profiles have allowed the identification of the most vulnerable children in each age group and their simultaneous needs. Multiple factors, that range from household, mother and child characteristics as well as geographical location, have proven influence child access to facilities or basic goods that ensure their well-being and suitable development throughout the country. Therefore, a holistic approach should be adopted in tacking child poverty in Zambia to enhance equality and equity, with explicit objectives and targeted groups that influence national policies, plans and budget allocations. Multi-sector collaboration may be necessary in many cases towards the achievement of better outputs, in an overall integrated approach. The analysis pursued in this study contains relevant evidence that are useful for guiding the targets for programming such interventions and evaluating them, and the baseline for measuring progress.

The need for a holistic approach to child poverty and deprivation is illustrated by the fact that more than sixty percent of the children suffer from two or more deprivations, while more than forty percent of the children in Zambia suffer from deprivations in three or more dimensions at the same time. The results invariably demonstrate that very many children in Zambia are victim of overlapping deprivations in education, health and sanitation especially in rural areas. Improving the poverty and deprivation levels of all children in Zambia and developing young people to become healthy adults who could contribute to future economic growth is a challenge that can only be addresses by considering policy interventions in several domains simultaneously.

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Appendix

Appendix A. Sample Description LCMS 2015

	All children	0-4 years	5-13 years	14-17 years
National	**31,472**	**6,384**	**18,223**	**6,865**
In Households	*10,198*	*4,853*	*8,286*	*5,041*
Urban	13,130	2,515	7,403	3,212
Rural	18,342	3,869	10,820	3,653
Province				
Central	3,159	632	1,828	699
Copperbelt	3,308	665	1,903	740
Eastern	3,470	846	1,906	718
Luapula	3,261	717	1,822	722
Lusaka	3,082	495	1,881	706
Muchinga	2,731	474	1,697	560
Northern	3,135	628	1,823	684
North-Western	2,928	515	1,751	662
Southern	3,542	802	1,966	774
Western	2,856	610	1,646	600

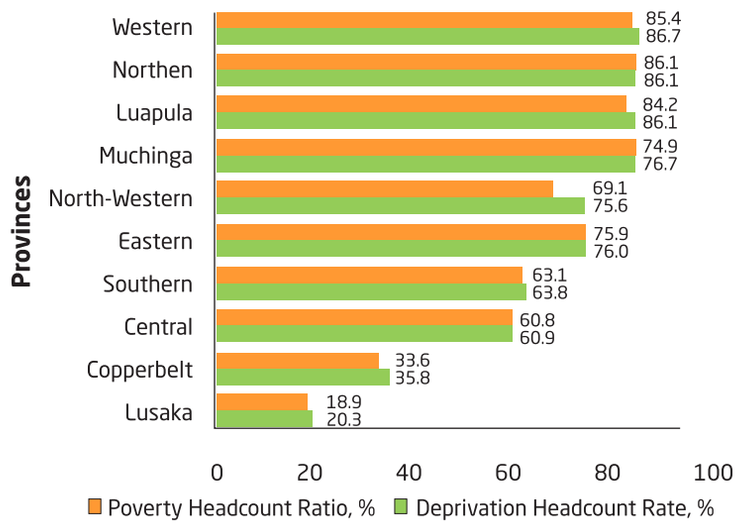
Source: Authors' calculations using Zambia LCMS (2015)

Appendix B. Dimension, Indicators and Dimension Thresholds

Dimension	Indicator	Deprivation Threshold
NUTRITION	*Infant and Young Child Feeding: Exclusive breastfeeding*	0-5 months: Child not exclusively breastfed.
	Infant and Young Child Feeding: Meal Frequency	6-59 months: Currently breastfeeding children: Child 6-8 months has not received a minimum of 2 complementary feedings a day; 9-23 months has not received at least 3 complementary feedings. Currently non-breastfeeding children: Child between 6-23 months has not received at least 4 feedings a day. 24-59 months: Child not having a minimum of four meals a day.
	Weight for Height (Wasting)	0-59 months: Child's weight-for-height/length Z-score is below minus two standard deviations (-2 SD) from the median of the WHO reference population, considered thin (wasted) and acutely malnourished.
HEALTH	*Full Immunization (BCG, 3 Polio, 3 DPT, Measles)*	0-59 months: Child has not received all basic vaccinations by the recommended date (Tuberculosis (BCG) by age of 12 months; child 12-59: has not received a vaccination against TB (BCG), and three doses of each of the following: Diphtheria; Pertussis; Tetanus / Hepatitis B/HaemophilusInfluenzae type b (DPT-HepB-Hib). Additionally, they must be vaccinated against Polio (3) and a Measles, within the first twelve months from birth.

CHILD PROTECTION	*Child Marriage/Cohabitation*	12-17 years: Child got married or is cohabiting with the partner, or ever married.
	Child Labor	5-15 years: Child younger than 15 years of age is engaged in any income generating activity or farming.
INFORMATION	*Availability of Information Devices*	0-17 years: Household does not report having at least one of the following information devices: TV, Radio, PC, phone, mobile phone.
EDUCATION	*Compulsory School Attendance*	7-13 years: Child of compulsory school age is not currently attending school.
	Grade-for-Age	7-17 years: Child is not attending at school age or attending school but 2 or more years behind the corresponding grade for the age.
	Primary School Attainment	14-17 years: Child beyond primary school age with no or incomplete primary education.
HOUSING	*Overcrowding*	0-17 years: Household has on average more than four people per occupied room (excluding bathrooms and toilets)
	Housing Material (Floor and roof)	0-17 years: Both roof and floor are made of natural materials, which are not considered permanent. Floor: mud, soil, sand, no floor; Roof: no roof, thatch/palm leaf/grass, mud, plastics.
SANITATION	*Access to Improved Sanitation*	0-17 years: Household usually uses unimproved toilet facility: pit latrine without slab or open pit (Own, communal or from neighbor's/another household's), no facility, bush or field, bucket toilet/toilet/another container, other. Improved toilet facility: Flush toilet inside/outside the household (if flushed to piped sewer system, to pip latrine, to septic tank, or don't know), Pip latrine with slab (Own, Communal or from neighbor/another household), composting toilet, Aqua privy.
	Garbage Disposal	0-17 years: Household's garbage disposal is not refuse collected, or pit, or dumped in designated places.
WATER	*Drinking Water Source*	0-17 years: Household main source of drinking water is unimproved. Unimproved water sources: unprotected well, unprotected spring, surface water (river, dam lake ponds, stream, stream, canal, irrigation channel), tanker truck, cart with small tank, other. Also, deprived if main source is bottled water and the source of main non-drinking water is unimproved.
	Water Treatment	0-17 years: Unimproved water source is not treated or is not appropriately treated. Appropriate treatment method: boiling, adding bleach or chlorine, using a water filter, using solar disinfection.

Appendix C. Multidimensional Headcount Ratio and Child Poverty Rates in Zambia by Province for all Children Age 0-17 Years, Deprivation Threshold k=2



Source: Authors' calculations using Zambia LCMS (2015)
Note: Multidimensional Headcount Ratio (*H*) using a threshold k=2. Poverty Headcount Ratio considering 2015 national poverty line: K214.26 per Adult Equivalent (monthly)

Appendix D. Deprivation Headcount Rate (%) by Dimension for all Age Groups Considering all Profiling Variables in the Analysis, Deprivation Threshold k=3

Deprivation Headcount Rate (%) for Age Group 0-4 years

Profiling Variable	Sample	Nutrition	Health	Housing	Sanitation	Water	Information
National	**National**	**61.7**	**40.3**	**44.8**	**68.8**	**33.7**	**26.7**
Province	Western	59.8	39.6	73.5	94.3	63.2	44.4
	Southern	52.5	36.5	42.2	72.3	27.1	25.2
	North-Western	70.0	35.7	51.1	85.6	47.7	35.2
	Northern	72.0	48.2	78.6	85.2	69.0	49.0
	Muchinga	60.3	35.6	64.9	81.8	61.7	37.2
	Lusaka	48.9	52.9	7.9	31.7	1.9	7.3
	Luapula	77.2	57.9	78.1	77.9	42.0	46.0
	Eastern	61.8	27.1	49.5	86.1	25.8	27.7
	Copperbelt	65.2	41.1	10.6	39.6	19.4	9.7
	Central	61.7	29.5	44.8	72.2	34.9	17.5
Area	Rural	65.3	39.6	64.0	87.2	46.4	36.6
	Urban	55.0	41.7	9.9	35.2	10.5	8.8
Monetary Poverty	Poor	68.9	41.6	66.6	87.3	46.1	40.7
	Non poor	52.1	38.5	16.1	44.4	17.1	8.3

Stratum	High cost	41.8	37.9	4.0	9.7	2.8	2.6
	Medium cost	41.7	38.9	3.9	15.0	1.3	3.2
	Lowcost	57.8	42.3	11.1	39.9	12.3	10.0
	Non-agric.	63.2	40.7	43.2	65.0	29.3	36.7
	Largescale	36.6	39.2	13.3	47.2	64.6	2.4
	Medium scale	61.1	38.7	36.7	81.9	38.8	13.7
	Small scale	65.7	39.5	66.4	88.9	47.7	37.5
Subjective poverty	Subjective poor	62.9	40.9	48.1	73.3	35.6	29.4
	Subjective non poor	53.4	36.2	21.7	37.3	20.3	8.4
Stunting	Stunted	68.8	44.4	47.3	72.9	34.5	29.0
	Not Stunted	64.9	36.6	42.7	66.7	32.4	24.8
Mother under 18 years at Child's birth	Mother child pregnant at child's birth	69.4	41.8	51.7	81.9	43.9	31.8
	Mother not child pregnant at child's birth	60.7	39.9	44.5	67.9	33.3	26.2
Median HH members	6+ HH members	62.9	40.9	45.2	69.4	34.5	24.4
	1 to 5 HH members	60.3	39.6	44.3	68.0	32.7	29.4
Child's gender	Male	62.9	41.4	45.3	68.6	33.8	26.7
	Female	60.5	39.3	44.3	68.9	33.6	26.7
HH's Head Gender	HH head male	61.6	40.7	44.3	68.2	33.9	24.4
	HH head female	62.0	38.3	47.3	72.0	32.4	39.7
Median no. Of children in HH	4+ children in HH	63.7	41.2	48.9	73.2	37.1	26.5
	1 to 3 children in HH	59.7	39.4	40.9	64.6	30.4	26.9
Child's Disability	Has some disability	69.8	42.8	44.7	67.7	59.0	9.4
	No disability	61.7	40.3	44.8	68.8	33.6	26.8
Mother's education	Secondary or higher	53.6	36.3	23.4	50.1	21.5	13.0
	Lower than secondary	65.6	41.4	58.3	81.9	42.6	33.4
Mother's marital status	Single	49.8	35.2	31.5	64.2	24.8	19.7
	Married/in union/widowed/ divorced	62.2	40.4	46.0	69.2	34.7	27.1
HH Head's education	secondary or higher	57.1	38.8	30.0	55.4	25.8	16.4
	Lower than secondary	66.2	40.7	60.1	83.2	43.0	35.2

Orphanhood	Single/double orphan	68.0	41.1	46.5	73.0	34.4	34.3
	Both parentsalive	61.5	40.3	44.7	68.6	33.6	26.5

Source: Authors' calculations using Zambia LCMS (2015)

Deprivation Headcount Rate (%) for Age Group 5-13 years

Profiling variable	Sample	Child Protection	Education	Housing	Sanitation	Water	Information
National	National	2.3	22.0	40.4	67.2	33.5	25.4
Province	Western	0.6	23.7	74.4	94.7	67.0	48.1
	Southern	2.0	19.1	42.5	74.0	26.2	22.2
	North-Western	0.7	23.9	48.6	83.7	41.6	38.5
	Northern	3.5	28.5	68.6	84.7	67.9	43.7
	Muchinga	4.4	22.8	53.8	79.7	61.5	33.1
	Lusaka	0.9	14.0	6.4	31.5	1.6	6.3
	Luapula	3.3	34.3	73.3	79.8	45.0	46.0
	Eastern	5.8	34.3	42.7	84.9	24.7	26.5
	Copperbelt	0.9	12.4	11.6	41.0	22.2	11.1
	Central	1.9	18.8	40.9	70.0	33.7	16.8
Area	Rural	3.2	27.5	59.6	87.2	47.6	35.6
	Urban	0.7	12.7	8.0	33.6	9.9	8.2
Monetary Poor	Poor	3.2	29.1	60.2	86.0	45.9	38.4
	Non poor	0.9	10.9	9.4	37.8	14.1	5.1
Stratum	High cost	0.4	7.4	2.7	6.4	1.3	3.0
	Medium cost	0.6	6.7	2.0	15.2	1.9	3.1
	Lowcost	0.8	14.1	9.4	39.1	12.0	9.5
	Non-agric.	1.9	21.5	37.3	68.0	24.4	30.4
	Large scale	1.7	22.2	8.4	57.0	29.9	5.2
	Medium scale	2.8	22.1	36.9	79.3	40.6	12.6
	Small scale	3.3	28.1	62.0	88.7	49.1	37.1
Subjective Poverty	Subjective poor	2.4	23.5	44.0	72.2	36.0	28.1
	Subjective non poor	1.4	12.3	16.9	34.7	17.5	7.5
Median HH Size	6+ HH members	2.4	23.8	41.1	68.2	35.0	24.0
	1 to 5 HH members	2.2	18.0	38.8	65.2	30.4	28.4
Child's gender	Male	2.6	24.0	41.1	67.5	34.5	25.9
	Female	2.0	20.1	39.7	67.0	32.6	24.9
HH's Head Gender	HH head male	2.4	21.4	39.4	66.5	33.9	21.6
	HH head female	2.1	24.3	44.4	70.2	31.9	41.2

Median no. Of Children in HH	4+ children in HH	2.5	24.8	44.9	71.8	37.3	25.7
	1 to 3 children in HH	2.0	17.7	33.5	60.3	27.8	24.8
Child's Disability	Has some disability	1.4	53.7	56.6	80.1	47.9	35.0
	No disability	2.3	21.8	40.3	67.2	33.5	25.3
HH Head's education	secondary or higher	1.4	14.3	22.7	49.7	22.1	12.1
	Lower than secondary	2.7	27.9	56.3	84.1	44.4	35.1
Orphanhood	Single/double orphan	3.5	26.9	40.3	67.3	31.8	30.6
	Both parent salive	2.2	21.4	40.4	67.2	33.8	24.7

Source: Authors' calculations using Zambia LCMS (2015)

Deprivation Headcount Rate (%) for Age Group 14-17 years

Profiling Variable	Sample	Child Protection	Education	Housing	Sanitation	Water	Information
National	National	11.2	52.3	33.3	62.5	30.4	21.4
Province	Western	11.8	63.5	71.7	92.1	63.4	45.6
	Southern	9.84	50.5	34.6	68.2	24.8	21
	North-Western	8	59.4	38.8	81.4	38.6	31.7
	Northern	18.3	61.2	60.8	78.8	65.9	36.1
	Muchinga	14.6	57.8	44.7	72.4	54	30.5
	Lusaka	4.78	37.1	4.48	34	1.92	4.21
	Luapula	13.7	70.2	61.4	70	42.9	36.2
	Eastern	21.8	71.6	39.5	82.6	23.9	22.1
	Copperbelt	5.5	35.4	7.97	39.6	21.9	10.7
	Central	11.8	48.8	33.1	60.4	26.7	16.8
	Rural	15.9	65.7	53.2	83	45.1	32.5
	Urban	4.7	34	6	34.1	10.3	6.28
Monetary Poverty	Poor	15.6	68.2	54.3	83.5	44.8	35
	Non poor	5.66	32.2	6.71	35.7	12.3	4.11
Stratum	High cost	2.19	14.8	1.45	7.85	0.794	0.958
	Medium cost	4.68	20.7	0.932	13.4	1.72	2.49
	Lowcost	4.98	38.3	7.34	40.5	12.7	7.5
	Non-agric.	15.8	44.5	30.5	57.5	26.5	23.4
	Large scale	11.4	47.7	16.1	42.4	33.1	2.81
	Medium scale	13	57.8	32	72	36.7	14
	Small scale	16.1	67.3	55.7	85.1	46.5	34.1
Subjective	Subjective poor	12	57.1	37.6	68.5	33.6	24.4

	Subjective non poor	7.01	28.4	11.8	31.6	14	6.22
Median HH Size	6+ HH members	9.25	54.2	32.7	61.6	29.7	18.9
	1 to 5 HH members	16.2	47.6	34.9	64.7	32.3	27.8
Child's gender	Male	9.69	56.7	32.4	63.6	31.3	22.5
	Female	12.7	48.1	34.2	61.3	29.6	20.4
HH Head's gender	HH head male	11.3	52.8	31.7	61.2	30.5	18
	HH head female	11	50.9	38.8	66.7	30	32.8
Median no. of children in HH	4+ children in HH	9.94	56.7	37.9	65.8	32.7	21
	1 to 3 children in HH	12.9	46.4	27.2	57.9	27.3	22.1
Child's Disability	Has some disability	14.5	84	40.4	69.2	31.2	21.3
	No disability	11.2	52.1	33.2	62.4	30.4	21.4
HH Head's education	secondary or higher	6.78	36.7	16.2	44.7	18.9	8
	Lower than secondary	14.9	66.8	49.6	80.7	41.9	32.8
Orphanhood	Single/double orphan	13.7	47.2	32.2	60	27.4	24.1
	Both parent salive	10.5	53.7	33.6	63.1	31.2	20.7

Source: Authors' calculations using Zambia LCMS (2015)

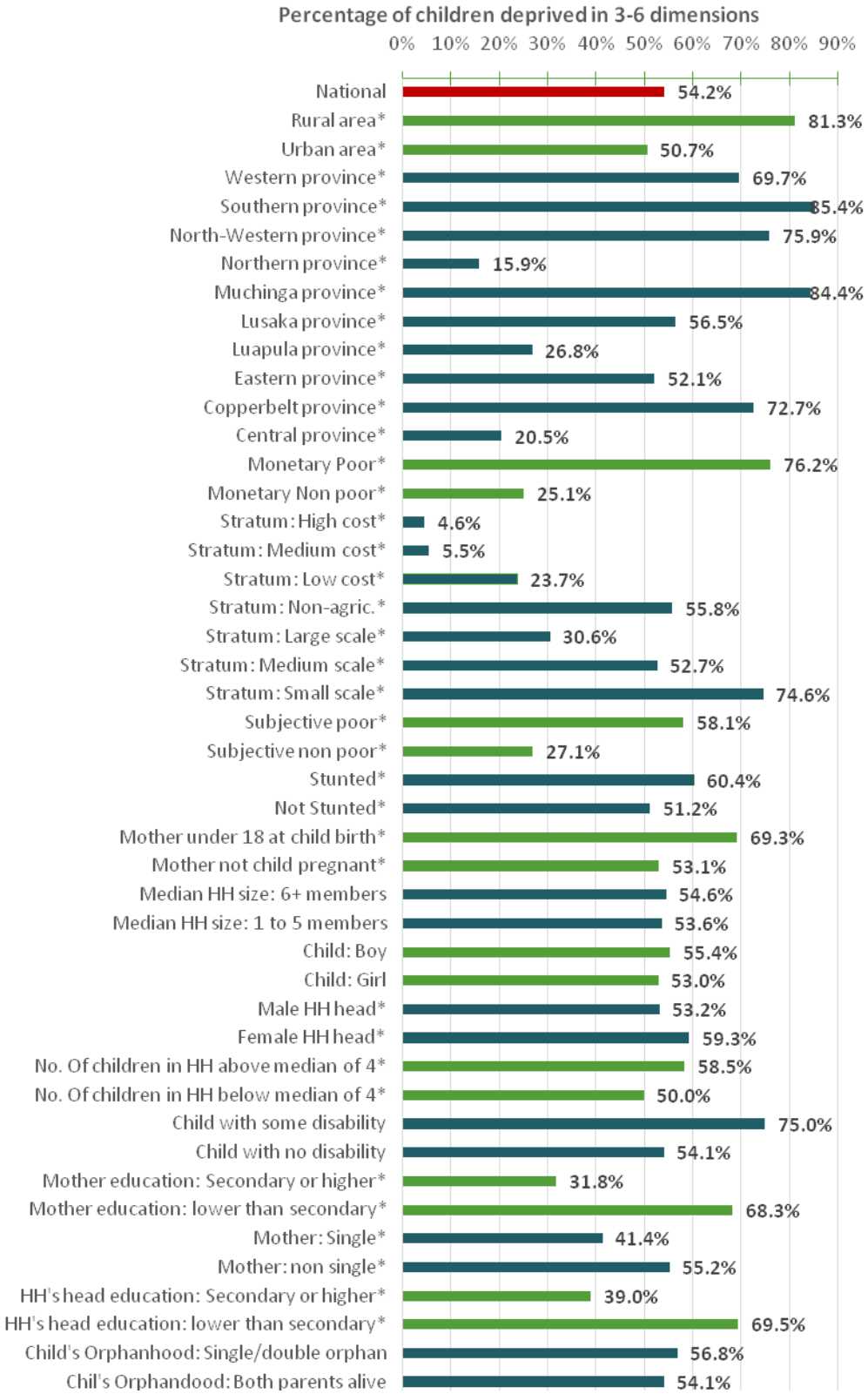
Appendix E. Multidimensional Deprivation Indices by Age Group for all Possible Deprivation Thresholds

Number of Deprivations by age group	Multidimensional DeprivationHead count (H), %	Average Intensity among the deprived (A), %	Average number of deprivations among the deprived (A)	Adjusted multidimensional deprivation headcount (M^I)
Agegroup 0-4 years:				
1-6 deprivations	92.0	50.0	3.0	0.46
2-6 deprivations	75.9	57.0	3.4	0.43
3-6 deprivations	54.2	66.5	4.0	0.36
4-6 deprivations	34.1	76.3	4.6	0.26
5-6 deprivations	16.0	87.1	5.2	0.14
6 deprivations	3.6	100.0	6.0	0.04
Agegroup 5-13 years:				
1-6 deprivations	76.7	41.4	2.5	0.32
2-6 deprivations	56.2	50.5	3.0	0.28
3-6 deprivations	36.4	59.9	3.6	0.22
4-6 deprivations	17.4	70.7	4.2	0.12
5-6 deprivations	4.0	84.0	5.0	0.03
6 deprivations	0.2	100.0	6.0	0.00
Agegroup 13-17 years:				
1-6 deprivations	78.3	44.9	2.7	0.35
2-6 deprivations	59.2	54.0	3.2	0.32
3-6 deprivations	40.1	64.0	3.8	0.26
4-6 deprivations	23.4	73.9	4.4	0.17
5-6 deprivations	8.8	85.8	5.2	0.08
6 deprivations	1.3	100.0	6.0	0.01

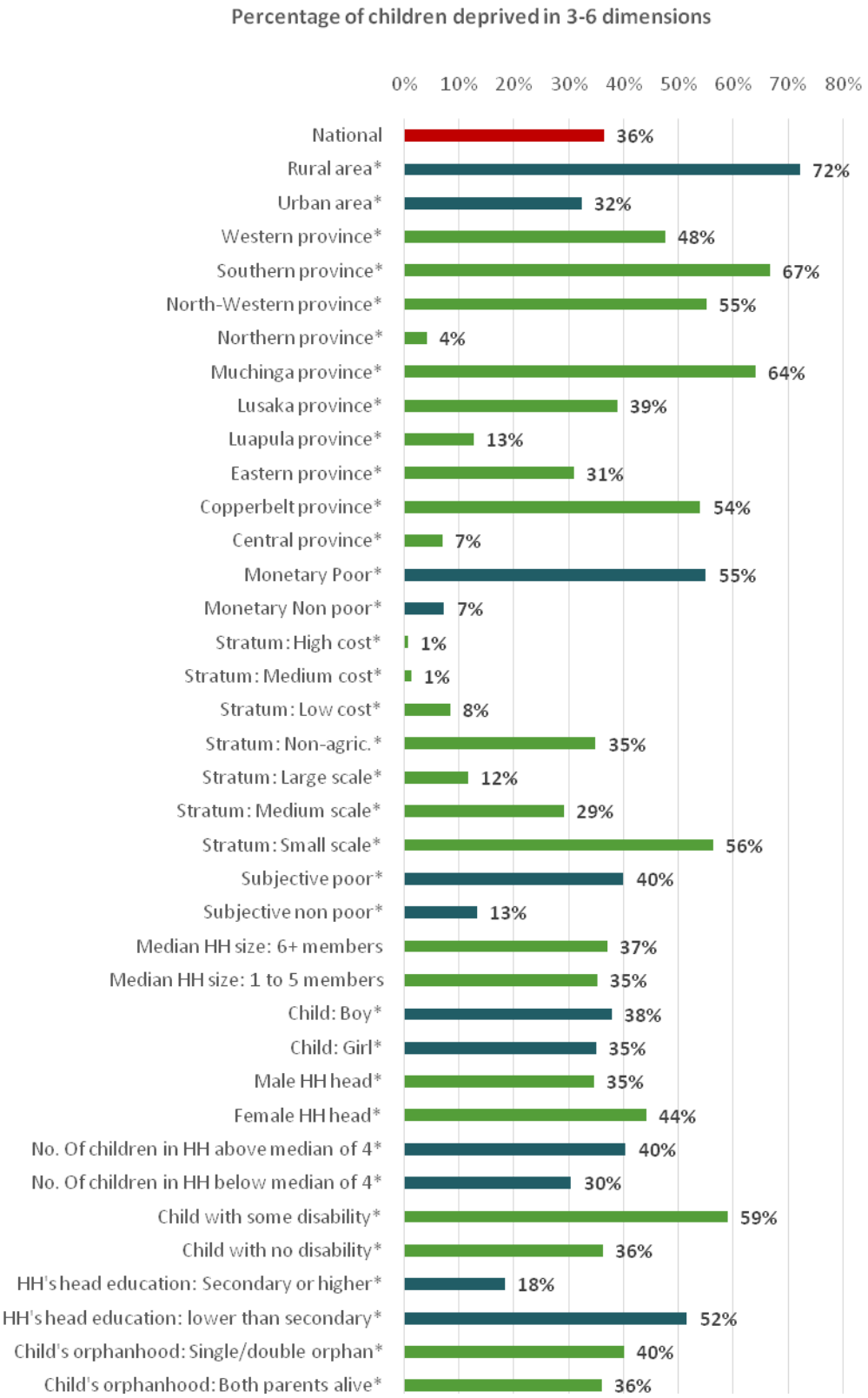
Source: Authors' calculations using Zambia LCMS (2015)

Appendix F. Multidimensional Deprivation Headcount by Age Group for all Possible Profiling Variables Using a Deprivation Threshold of k=3

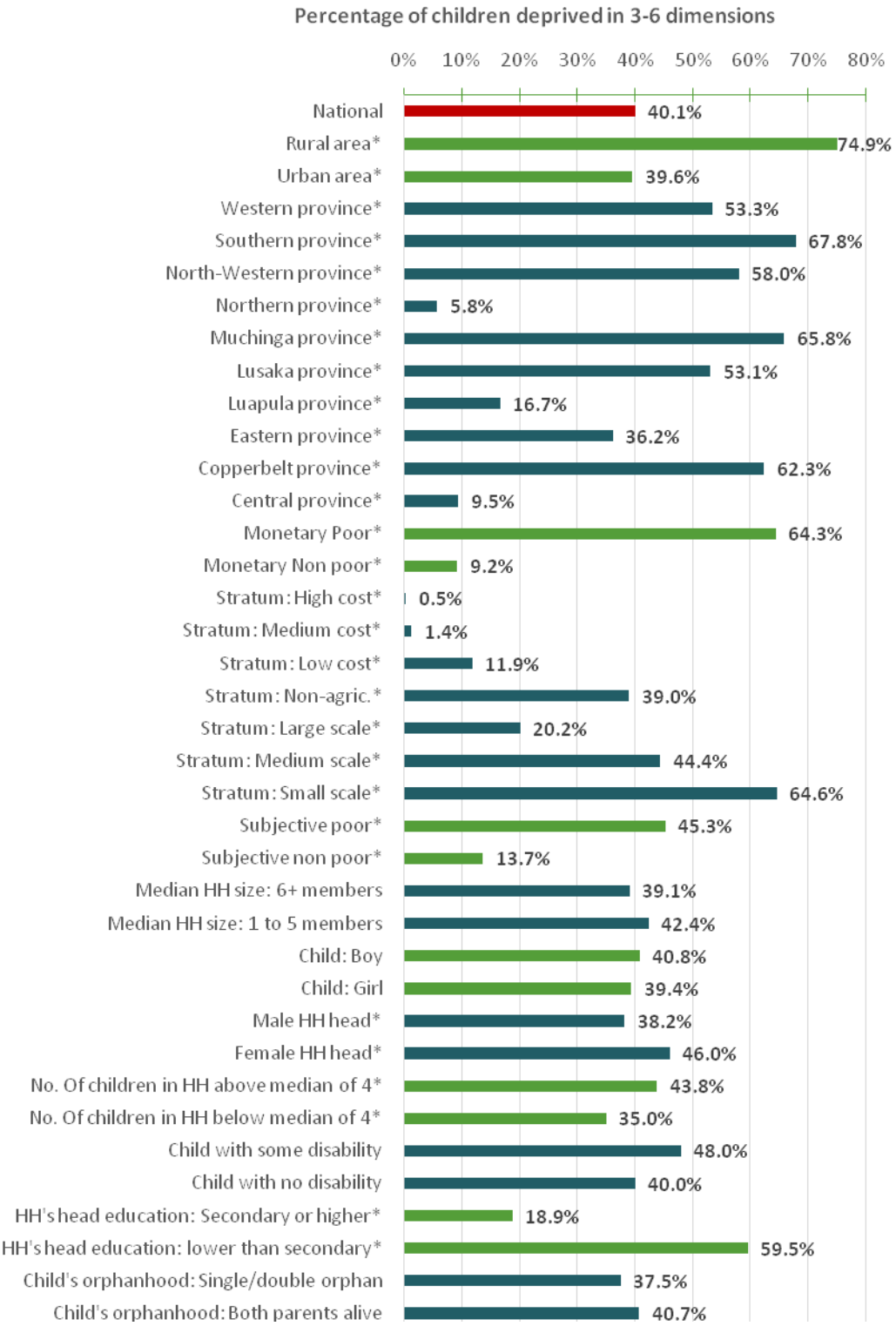
Multidimensional Deprivation Headcount (%) for Age Group 0-4 years



Multidimensional Deprivation Headcount (%) for Age Group 5-13 years



Multidimensional Deprivation Headcount (%) for Age Group 14-17 years



Source: Authors' calculations using Zambia LCMS (2015)
Note: Multidimensional Headcount Ratio (*H*) using a threshold k=3.

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