

Cross-country Comparison of Multidimensional Child Deprivation Incidence and Intensity in sub-Saharan Africa

MODA In Brief 4

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The MODA methodology has been developed by UNICEF to define and measure child poverty both at a national and international level, taking into consideration the complex, multifaceted realities of poverty children experience at different stages of their lives. CC-MODA is a specific application of the general MODA methodology, designed as a child poverty measure to analyse multidimensional child deprivation in low- and middle-income countries. **This Brief compiles the data of CC-MODA analysis for sub-Saharan Africa (de Milliano and Plavgo, 2014), comparing countries based on the proportion of multidimensionally deprived children per country, as well as the deprivation intensity that children experience. It then analyses the contribution of each country to the overall multidimensional child deprivation across the sub-Saharan countries analysed.**

Measuring child poverty

MODA distinguishes two main concepts of poverty: monetary poverty and multidimensional deprivation, using both to analyse child poverty whenever the dataset used for the analysis has information on both.¹ The CC-MODA analysis includes only multidimensional child deprivation as the surveys used for this particular study do not include information on households' income or consumption.² It is, however, possible to compare the results with aggregate monetary poverty rates using other sources. This is further discussed in Brief 7, "Multidimensional Child Deprivation and Monetary Poverty in Sub-Saharan Africa".

Multidimensional child deprivation

Multidimensional child deprivation is defined as the non-fulfilment of children's rights in the main dimensions of survival, development, protection and participation. The child poverty measure focuses on the various age-specific needs of children (rather than those of the household as a whole). For CC-MODA, the dimensions, indicators and thresholds defining deprivation are standardized to be comparable across countries. The choice of the thresholds has been guided by international guidelines and in

consultation with sectoral specialists at UNICEF. Figure 1 lists indicators measuring child deprivation in CC-MODA.³

Dimensions differ per age group, as children's needs differ depending on the life-cycle they have reached. The analysis for sub-Saharan Africa is based on five dimensions per child: water, sanitation,

Figure 1 – Life-cycle stages, dimensions and indicators used for the CC-MODA analysis

Age 0-4	Age 5-17
1 Infant and young child feeding 2 Wasting Nutrition	1 Compulsory school attendance 2 Primary school attainment Education
1 DPT immunization 2 Skilled birth attendance Health	1 Availability of information devices Information
1 Access to improved water source 2 Distance to water source Water	1 Access to improved water source 2 Distance to water source Water
1 Access to improved sanitation Sanitation	1 Access to improved sanitation Sanitation
1 Overcrowding 2 Floor and roof material Housing	1 Overcrowding 2 Floor and roof material Housing
1 Domestic violence Protection from violence	1 Domestic violence Protection from violence

¹ See EU-MODA (Chzhen et al, 2014), Mali (de Milliano and Handa, 2014), Madagascar (Plavgo, forthcoming), where monetary poverty is included in MODA analysis.

² The CC-MODA analysis is carried out using the most recent DHS and MICS household survey data covering the period of 2008-2012.

³ Other choices are made when doing country-specific child poverty analyses. For national child poverty analyses (N-MODA), indicators and thresholds are chosen based on national standards, legislation, and in consultation with the national partners. See de Milliano and Handa (2014) and Plavgo (forthcoming) for examples.

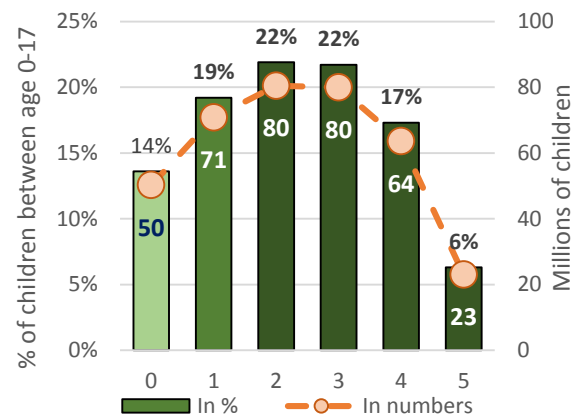
and housing for both age groups, nutrition and health for children below age five, and education and information for children between age 5 and 17.⁴

Deprivation intensity: counting the deprivations per child

Multidimensional analysis is done at an individual child level, counting the number of dimensions each child is deprived in. Figure 2 shows the deprivation distribution among children from 30 sub-Saharan African countries,⁵ showing the share and the absolute numbers of children experiencing none, one, two, three, four, and five dimensional deprivations simultaneously. As can be seen from Figure 2, among all the children below age 18 living in the 30 countries included in the analysis, **86% experience at least one out of a total of five deprivations analysed** (the sum of all the children within the bars shaded in dark), representing 318 million children. Knowing the number of deprivations each child suffers from allows to calculate the average deprivation intensity, which is the average number of deprivations that the deprived children suffer from.

In sub-Saharan Africa, children identified as deprived in one or more dimensions simultaneously are on average deprived in 2.6 dimensions.⁶ There is, however, a large variety across the countries, ranging from 1.7 dimensional deprivations in Gabon and Swaziland to 3.4 in Chad and Ethiopia (see Figure 3, represented with dots).

Figure 2: Number of deprivations children suffer from: all children below age 18



Multidimensional deprivation: identifying the multidimensionally deprived children

In this study, children are identified as multidimensionally deprived if they are deprived in two or more dimensions. **Among all the children below age 18 across the 30 countries analysed, 67% are multidimensionally deprived**, experiencing two to five deprivations simultaneously (the sum of the darker four bars in Figure 2). Expressed in absolute numbers, **247 million out of 318 million children** have been identified experiencing multidimensional deprivation. The bars in Figure 3 show large differences in multidimensional deprivation incidence across countries. **The difference between countries with the lowest and the highest deprivation rates is 60 percentage points** (30% in Gabon and 90% in Ethiopia).

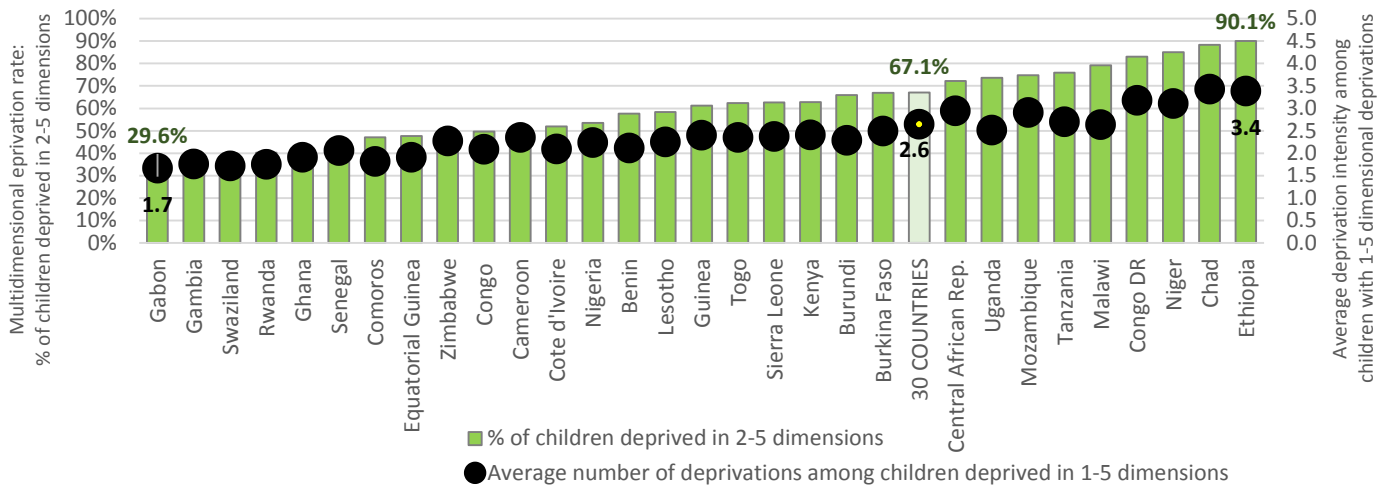
The deprivation intensity and the proportion of multidimensionally deprived children show a slightly different ranking of countries. For example, while the average number of deprivations that children experience is lower in Malawi compared to Mozambique (2.6 vs. 2.9 deprivations respectively), Malawi has a higher percentage of children deprived in two to five dimensions than Mozambique (79% vs. 75%). The combination of these findings means that the depth of the deprivation is greater in Mozambique, while proportionally Malawi has a slightly higher share of children deprived in a multitude of dimensions. Both measures are useful for analysing child poverty: the multidimensional deprivation rate to identify and count the multidimensionally deprived children, and the average deprivation intensity to understand how many deprivations these children experience simultaneously. In this way, the most vulnerable children with higher numbers of deprivations can be identified, and differences between moderately deprived and severely deprived children can be studied.

⁴ The 'protection from violence' dimension is excluded from this particular study as the indicators measuring violence are only available for 17 out of 30 countries analyzed. See the web portal <http://www.unicef-irc.org/MODA/> for analyses by country where "protection from violence" is included in the measure when available.

⁵ Benin (BEN), Burkina Faso (BFA), Burundi (BDI), Cameroon (CMR), Central African Republic (CAF), Chad (TCD), Comoros (COM), Congo (COG), Côte d'Ivoire (CIV), DR Congo (COD), Eq. Guinea (GNQ), Ethiopia (ETH), Gabon (GAB), Gambia (GMB), Ghana (GHA), Guinea (GIN), Kenya (KEN), Lesotho (LSO), Malawi (MWI), Mozambique (MOZ), Niger (NEG), Nigeria (NGA), Rwanda (RWA), Senegal (SEN), Sierra Leone (SLE), Swaziland (SWZ), Tanzania (TZA), Togo (TGO), Uganda (UGA), Zimbabwe (ZWE).

⁶ Average deprivation intensity is calculated summing all the (dimensional) deprivations that the deprived children experience, and dividing by the total number of deprivations that the deprived children could potentially experience if they were to have all five deprivations simultaneously. A cut-off of one dimension is used here to avoid censoring the deprivations that may be experienced in isolation from other deprivations. The average intensity, however, has also been calculated using higher cut-offs. Please see de Milliano and Plavgo (2014) for more results. See Brief 1 for the methodology.

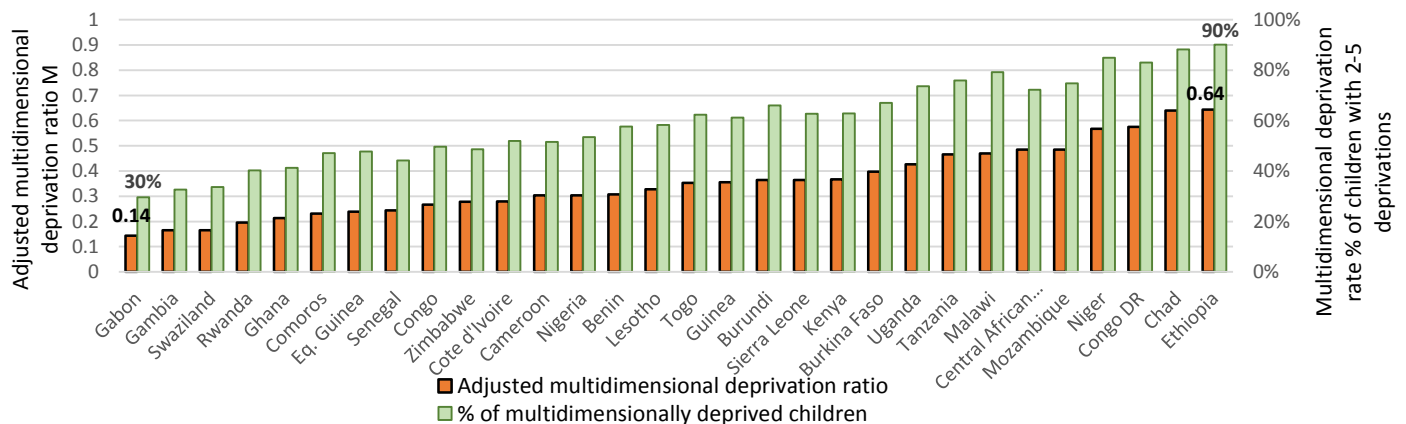
Figure 3: Multidimensional deprivation rate and average deprivation intensity by country for children below age 18



Adjusted multidimensional deprivation ratio

The adjusted multidimensional deprivation ratio (M)⁷ combines the two aforementioned poverty measures to get to an overall multidimensional deprivation measure that captures both the incidence of the deprived children and the depth of their deprivation. This ratio ranges between 0 and 1, zero showing no deprivation (according to the cut-off chosen) and one showing that everyone included in the analysis is deprived in all the dimensions analysed. In the thirty countries of sub-Saharan Africa, the adjusted multidimensional child deprivation ratio is 0.42 using a threshold of two (i.e., children are multidimensionally deprived if they suffer from two or more dimensional deprivations). This ranges from 0.14 in Gabon to 0.64 in Ethiopia. Figure 4 shows that ranking by adjusted multidimensional deprivation ratio (presented with darker bars) is similar to that based on the simple multidimensional deprivation ratio (presented in lighter bars in Figure 4, also corresponding to bars presented in Figure 3). The main differences are that Senegal, Zimbabwe, Cameroon, Central African Republic, and Mozambique have moved a few positions higher in the ranking, having a higher adjusted multidimensional child deprivation ratio relative to other countries when compared to ranking based on the simple multidimensional deprivation headcount ratio. This points out that, although with very similar deprivation headcount rates, children in these countries suffer from a higher number of deprivations on average (presented with dots in Figure 3). The adjusted child deprivation ratio incorporates this, ranking the countries with a higher depth of multidimensional deprivation as worse off than when a simple multidimensional deprivation rate is used.

Figure 4: Simple and adjusted multidimensional deprivation ratios by country for children below age 18



⁷ The Alkire and Foster (2011) methodology has been applied to calculate the ratio and to decompose it by country and by dimension. See Brief 1 for methodology.

Figure 5 presents the findings in a map, indicating a few clear groupings of countries with different deprivation levels. The highest multidimensional deprivation levels are found in Ethiopia (0.64) and at the centre of the continent (Chad, DR Congo, Niger, and Central African Republic, ranging between 0.49 and 0.64), followed by a stretch of countries with high levels of deprivation in the East (Mozambique, Malawi, Tanzania, Uganda and Kenya, ranging from 0.37 to 0.49), and Burkina Faso, Sierra Leone, Guinea and Togo in West Africa (between 0.35 and 0.40).

Figure 6 shows the contribution of each country to the total adjusted multidimensional child deprivation ratio of the selected sub-Saharan African countries.⁸ The largest contributions come from Ethiopia (20%), Nigeria (17%) and the Democratic Republic of the Congo (13%). The extent to which each country contributes to the total adjusted deprivation ratio depends not only on the percentage of multidimensionally deprived children per country and their deprivation intensity, but also on the size of the child population per country. For this reason, countries such as Chad with a high deprivation incidence and intensity contribute relatively little since their child population is small compared to the other countries analysed. The composition of the pie chart helps to understand where the largest shares of the total number of all children experiencing multiple deprivations are found across the thirty countries.

Figure 5: Adjusted multidimensional deprivation ratio: Children below age 18 deprived in 2-5 dimensions

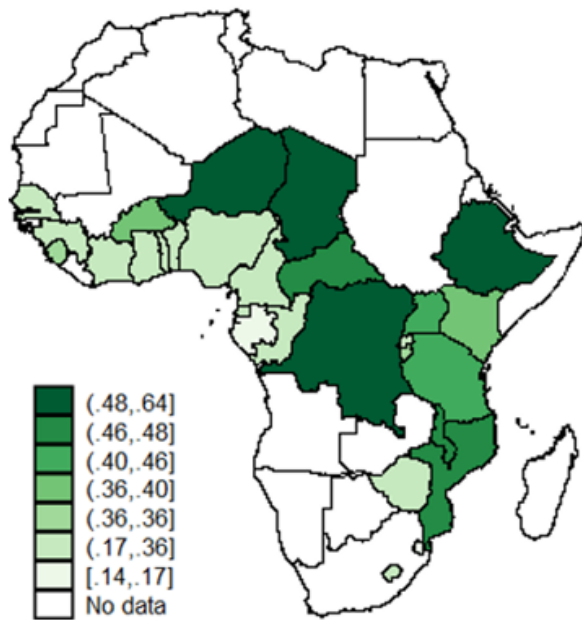
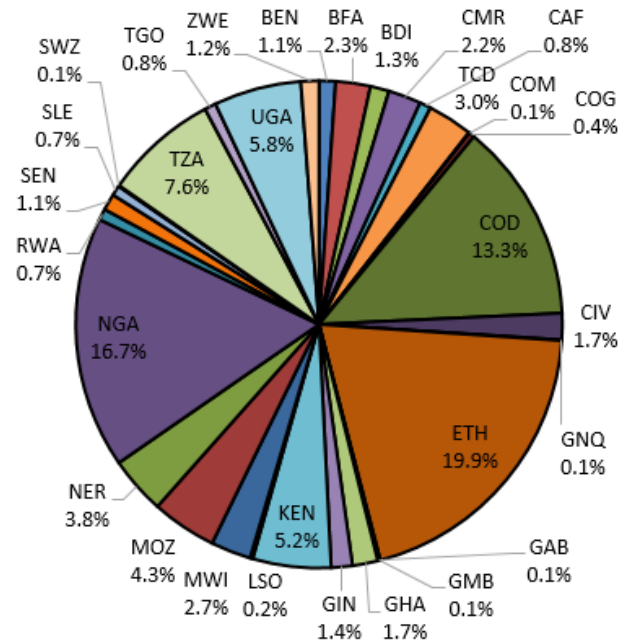


Figure 6: Contribution of each country to the total adjusted multidimensional deprivation ratio (children deprived in 2-5 dimensions)



*See footnote 5 for full country name of each respective abbreviation

See de Milliano and Plavgo (2014) for the child population size per country and for results using other cut-offs for measuring multidimensional child deprivation. Other Briefs provide more details on the CC-MODA methodology and results (see below).

⁸ The contribution of each country has also been calculated using the simple multidimensional child deprivation ratio (see de Milliano and Plavgo, 2014). The patterns are very similar, with the exception of a few cases. For Ethiopia and DR Congo, the contribution to the total deprivation level is smaller when using the simple deprivation ratio H (17% and 12%) than when using the adjusted deprivation ratio M (20% and 13%, respectively). This is because the adjusted deprivation ratio takes into account that the average number of deprivations children in these countries experience is relatively higher compared to other countries with a similar headcount ratio.

SOURCES

MODA web portal:

<http://www.unicef-irc.org/MODA/>

CC-MODA Technical Note:

De Neubourg, C., J. Chai, M. de Milliano, I. Plavgo, Z. Wei (2012), 'Cross-country MODA Study: Multiple Overlapping Deprivation Analysis (MODA) - Technical note', *Innocenti Working Paper* 2012-05, UNICEF Office of Research, Florence. [\[EN pdf\]](#) [\[FR pdf\]](#)

CC-MODA results for sub-Saharan Africa:

de Milliano, M. and I. Plavgo (2014). Analysing Child poverty and deprivation in sub-Saharan Africa: CC-MODA – Cross Country Multiple Overlapping Deprivation Analysis, *Innocenti Working Paper* No.2014-19, UNICEF Office of Research, Florence. [\[EN pdf\]](#)

MODA guidelines:

De Neubourg, C., J. Chai, M. de Milliano, I. Plavgo, Z. Wei (2012), 'Step-by-Step Guidelines to the Multiple Overlapping Deprivation Analysis (MODA)', *Innocenti Working Paper* 2012-10, UNICEF Office of Research, Florence. [\[EN pdf\]](#) [\[FR pdf\]](#)

Background on MODA and multidimensional poverty analysis:

De Neubourg, C., M. de Milliano, I. Plavgo (2014). Lost (in) Dimensions: Consolidating progress in multidimensional poverty research, *Innocenti Working Paper* No. 2014-04, UNICEF Office of Research, Florence. [\[EN pdf\]](#)

REFERENCES

Alkire, S., Foster, J. (2011). 'Counting and Multidimensional Poverty Measurements', *Journal of Public Economics*, no. 95, pp. 476-487.

Chzhen, Y., C. de Neubourg, I. Plavgo and M. de Milliano (2014). Understanding Child Deprivation in the European Union: The Multiple Overlapping Deprivation Analysis (EU-MODA) Approach, *Innocenti Working Paper* No.2014-18, UNICEF Office of Research, Florence.

De Milliano, M., Handa, S., (2014). 'Child Poverty and Deprivation in Mali – the first national estimates', *Innocenti Working Paper* 2014-20, UNICEF Office of Research, Florence.

Plavgo, I., (forthcoming). 'Child Monetary and Multidimensional Poverty Analysis in Madagascar', Working Paper, UNICEF Office of Research, Florence.

BRIEFS RELATED TO CC-MODA:

- [BRIEF 1: THE BASICS OF THE CROSS-COUNTRY MULTIPLE OVERLAPPING DEPRIVATION ANALYSIS \(MODA\)](#)
- [BRIEF 2: DISTRIBUTION OF DEPRIVATIONS AMONG CHILDREN IN SUB-SAHARAN AFRICA](#)
- [BRIEF 3: OVERLAP ANALYSIS OF DEPRIVATIONS IN SUB-SAHARAN AFRICA](#)
- [BRIEF 4: CROSS-COUNTRY COMPARISON OF MULTIDIMENSIONAL CHILD DEPRIVATION INCIDENCE AND INTENSITY IN SUB-SAHARAN AFRICA](#)
- [BRIEF 5: COMPOSITION OF MULTIDIMENSIONAL CHILD DEPRIVATION IN SUB-SAHARAN AFRICA BY DIMENSION](#)
- [BRIEF 6: MULTIDIMENSIONAL CHILD DEPRIVATION IN SUB-SAHARAN AFRICA](#)
- [BRIEF 7: MULTIDIMENSIONAL CHILD DEPRIVATION AND MONETARY POVERTY IN SUB-SAHARAN AFRICA](#)