

Multiple Overlapping Deprivation Analysis (MODA)

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Office of Research at Innocenti, Florence

Research team: Kat Chzhen, Ashu Handa, Marlous de Milliano, Ilze Plavgo

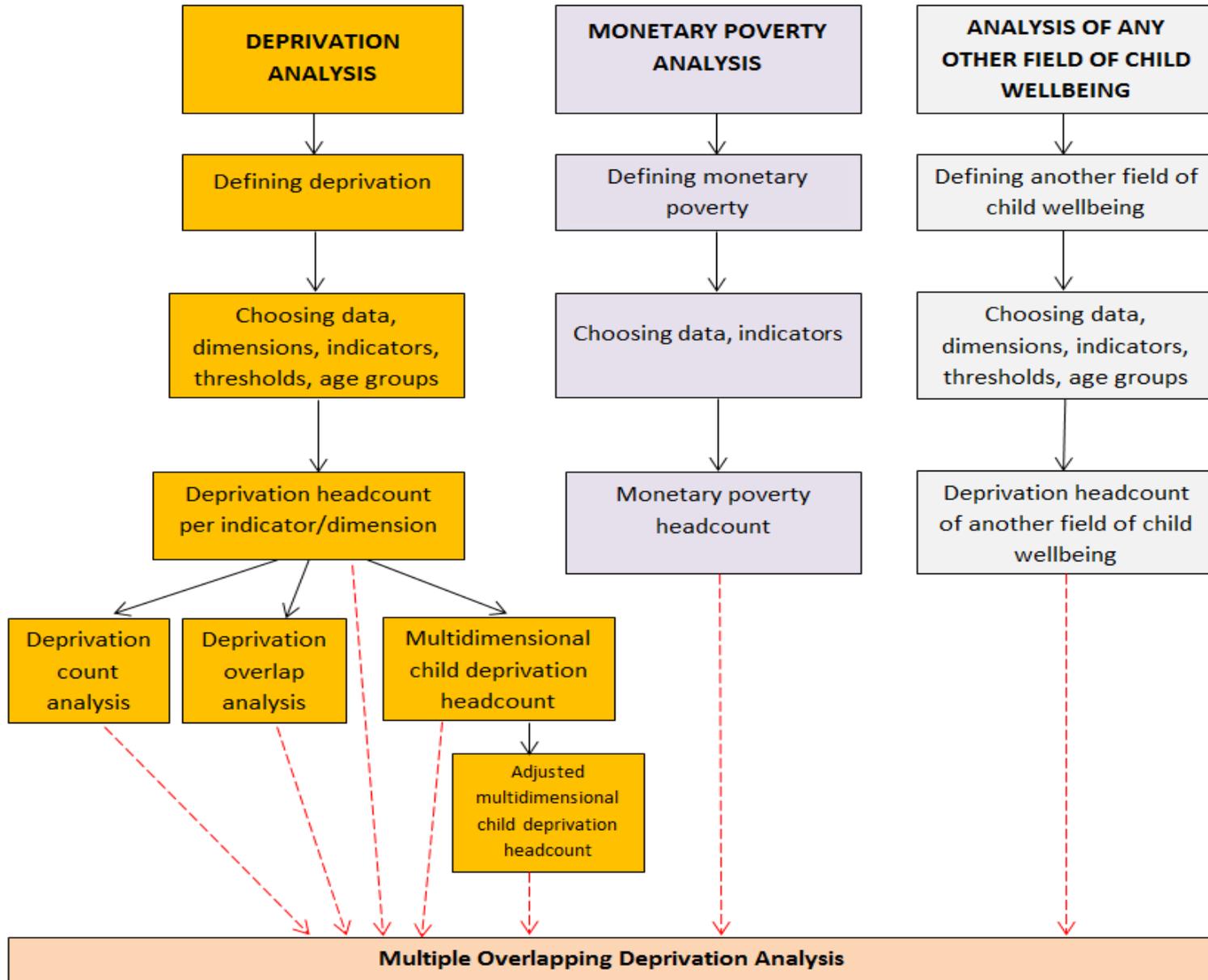
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Reasons for developing MODA

- To develop a methodology for a child-centered and multidimensional approach when measuring child poverty
- To recognize that children's needs are age-specific and multidimensional
- To put together the existing knowledge on measuring multidimensional poverty (Sector analyses; UNICEF's Global Study on Child Poverty and Disparities; OPHI's Multidimensional Poverty Index; overlap analyses; material deprivation & social exclusion studies)
- To define the different concepts of poverty and distinguish them well to ensure:
 - A clear separation of the different poverty measures conceptually and technically to have conceptual clarity of what is being measured
 - Possibility to look at how the different measures of poverty intersect
 - Possibility to look at individuals' characteristics depending on the form(s) of poverty they experience

Framework of the MODA methodology



Framework of the MODA methodology

Monetary poverty

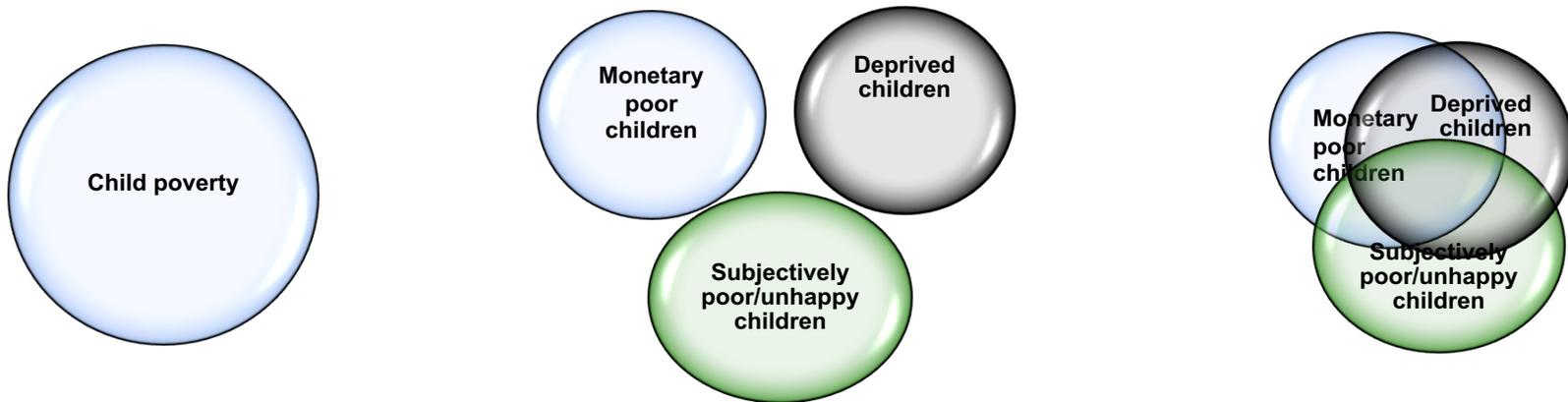
- Measured by household income/consumption
- Measures households' resources, means to access the goods and services necessary for household members' survival, development, and well-being

Deprivation

- Measures whether individuals have access to the basic goods and services necessary for their survival, development, and well-being
- Visualisation of the realities that the individuals are facing
- Measure of the individuals' living conditions
- MODA-specific: measure of the realisation/fulfilment of the rights of the child

Subjective poverty

- Measure of perceptions; measured by the individuals' perceptions and opinions



Measuring child poverty

WHY MONETARY POVERTY ANALYSIS IS NOT ENOUGH?

- Monetary poverty shows the household's means to access the necessary goods/services. Children are not in charge of these means
- Monetary poverty measure assumes equal intra household distribution
- Having just enough means may not lead to accessing the necessary goods and services; access may not depend only on household income (also discrimination, geographic location, disease, lack of services, lack of information, etc.)

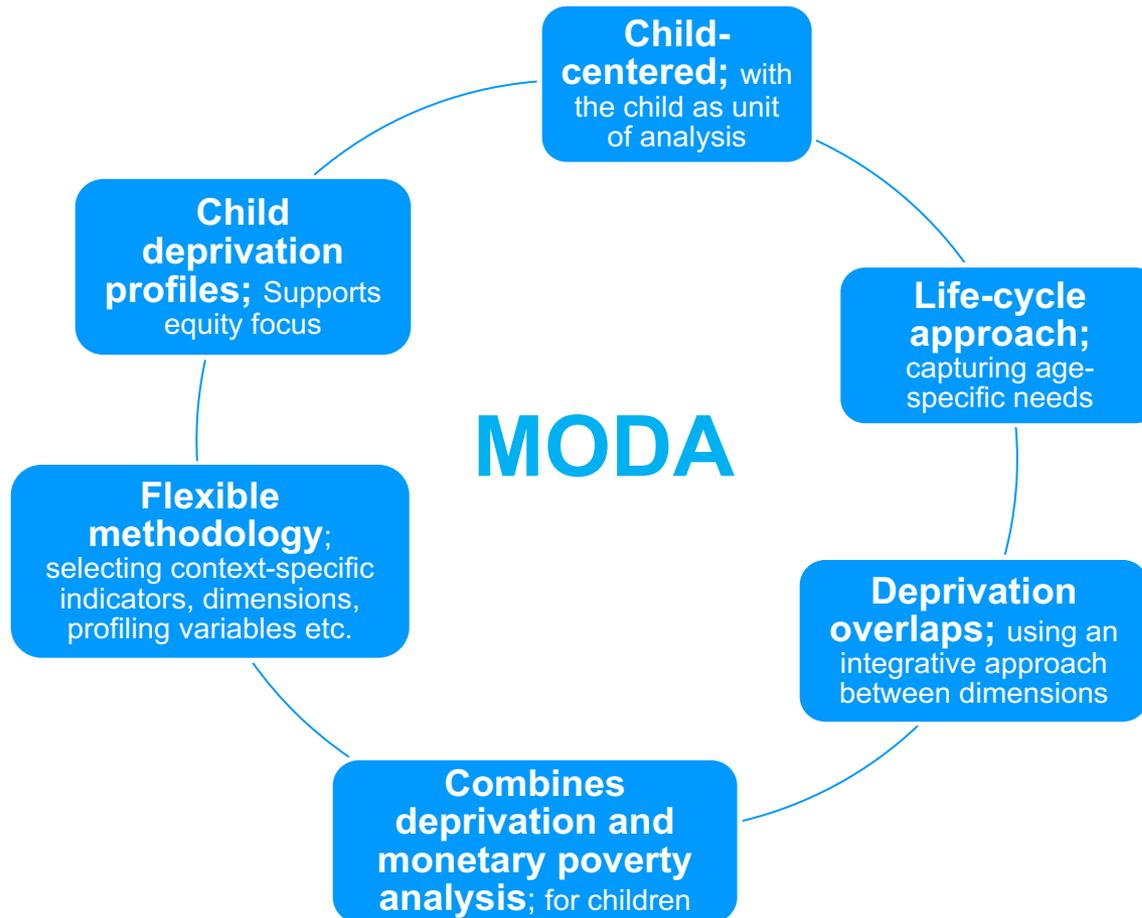
WHY DEPRIVATION ANALYSIS?

- To visualize children's realities, to measure their living conditions and whether they have access to basic goods and services
- To align child poverty measurement to the UN GA definition of poverty:
“Absolute poverty is a condition characterized by severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education and information.”
[UN 1995, The Copenhagen Declaration and Programme of Action: World Summit for Social Development, Chapter II: 19]
- To align child poverty measurement with the rights of the child to show whether and to what extent children's rights are realised; Monitoring certain children's rights according to the CRC (1989), *Convention on the Rights of the Child*, UN GA resolution 44/25

WHY MULTIDIMENSIONAL?

- To address inequalities:
“Deficits in nutrition, health, education and social inclusion are mutually reinforcing, and risks of enduring and damaging outcomes rise sharply as children's claims to multiple rights are not realised leading to more frequent and damaging adverse events.”
[UNICEF & UN Women, 2013, *The Global Thematic Consultation on the Post-2015 Development Agenda: Addressing Inequalities*]
- The extent of inequalities can be masked if indicators in each sector are analysed separately
- To measure the intensity of simultaneous deprivation that negatively affects children's lives

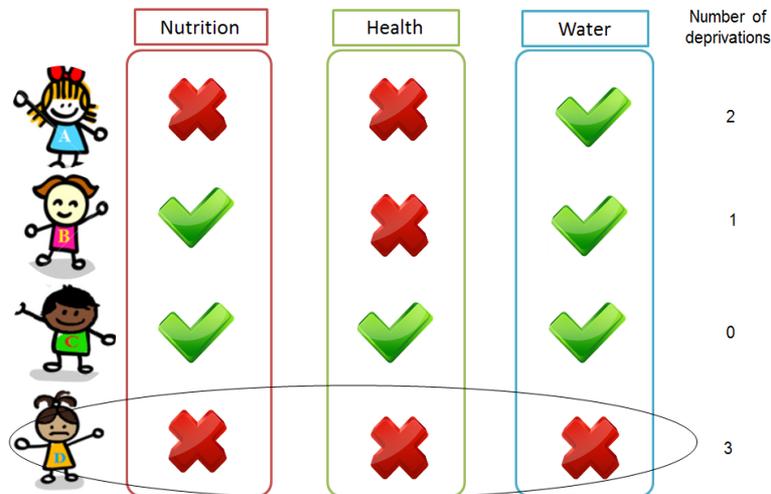
Six main contributions



Six main contributions

1. MODA uses a **child-centered, holistic approach**

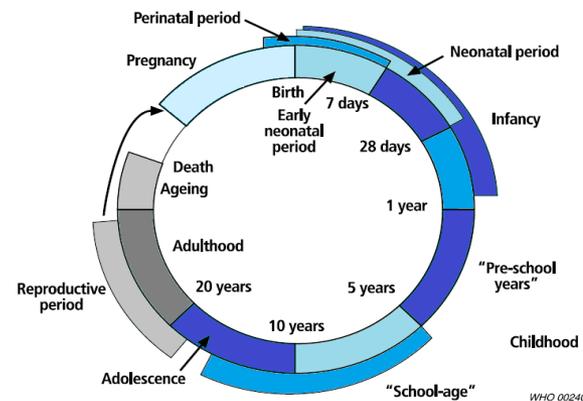
- Child is the unit of analysis (instead of the household)
- Dimension/indicator choice is driven by their relevance to child well-being (basic needs; rights of the child), preferably adapting to country-specific circumstances
- Focus is on the deprivations that a child experiences and on their intersection, rather than on single sectors in isolation. The multiple aspects of a child's life are the basis of the analysis, recognizing that children's needs are multidimensional



Six main contributions

2. MODA adopts a 'life-cycle approach'

- Children's needs are not homogenous across childhood
- Life-cycle approach allows to select age-specific indicators and analyse the different groups of children separately depending on their age to reflect children's different needs in the periods of infancy, childhood, and adolescence



Life-cycle stages and dimensions used for the CC-MODA analysis

Nutrition	Education
Health	Information
Water	Water
Sanitation	Sanitation
Housing	Housing
Protection from violence	Protection from violence
Age 0-4	Age 5-17

Life-cycle stages and dimensions used for the EU-MODA analysis

Below minimum compulsory school age (excluding those under one)	School age, under 16	Age 17-18
<ul style="list-style-type: none"> • Nutrition • Clothing • Early childhood education and care (ECEC) • Child development • Information • Housing 	<ul style="list-style-type: none"> • Nutrition • Clothing • Educational resources • Leisure • Social • Housing 	<ul style="list-style-type: none"> • Clothing • Activity • Leisure and social • Information • Healthcare access • Housing

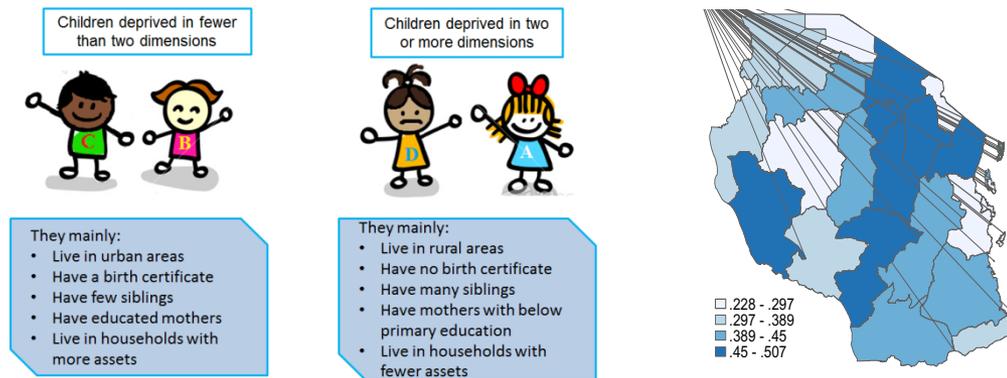
Six main contributions

3. MODA builds on **existing tools of poverty measurement**, bringing them together to **complement** each other

- Monetary poverty analysis
- Deprivation analysis sector-by-sector (single deprivation analysis)
- Deprivation counting methods: Bristol and UNICEF's Global poverty study
- Overlapping deprivation analysis
- Multidimensional deprivation indices: Oxford's MPI, UNDP's HDI

4. MODA supports **equity focus**

- Assists in the identification of particularly vulnerable groups
- Allows to concentrate on highly deprived groups in the society and to create profiles which assist in determining their geographical and social position

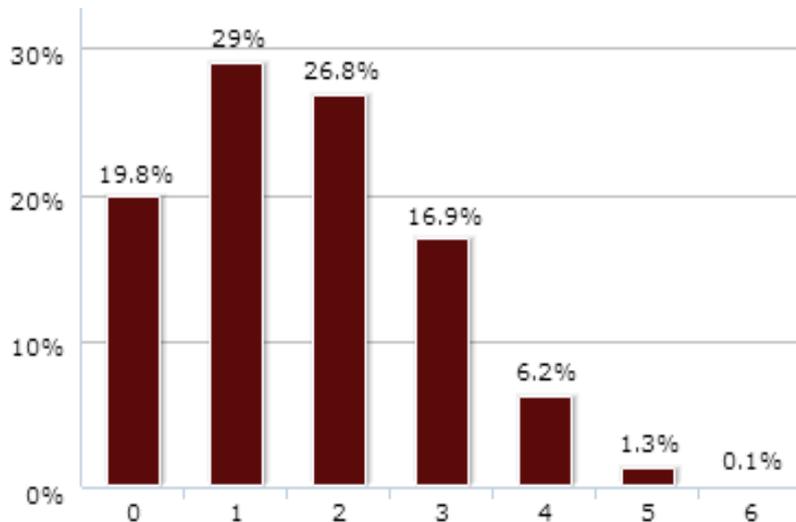


Six main contributions

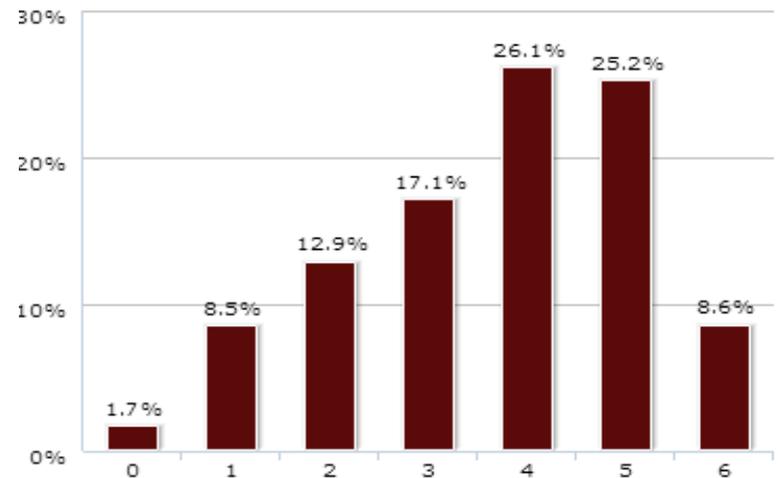
5. MODA supports **integrative approach** to policy-making

- Shows whether and where **inter-sectoral cooperation** is needed
- Stimulates the dialogue and cooperation between the different sections of UNICEF/different ministries of the government

How many children suffer from multiple deprivations?
How many deprivations do they experience simultaneously?



Côte d'Ivoire 2012: children aged 5-17 years



Congo DR 2010: children aged 5-17 years

Six main contributions

5. MODA supports **integrative approach** to policy-making

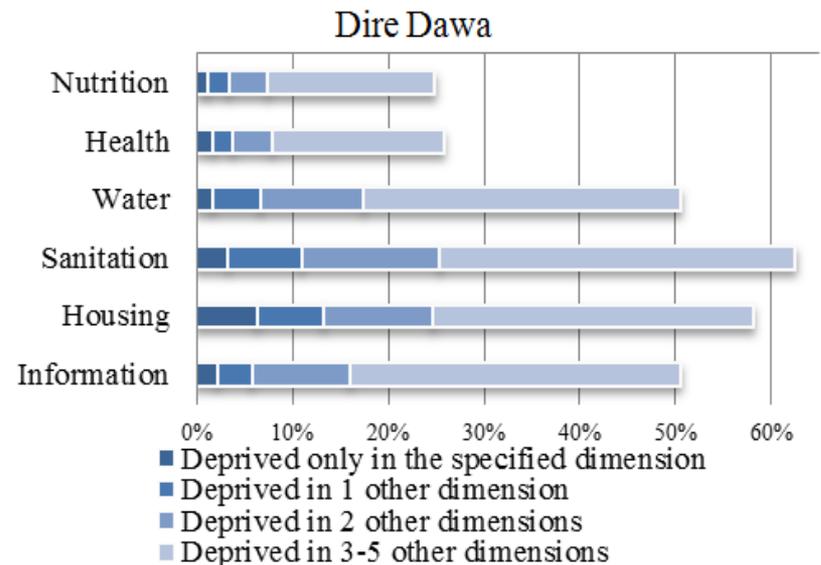
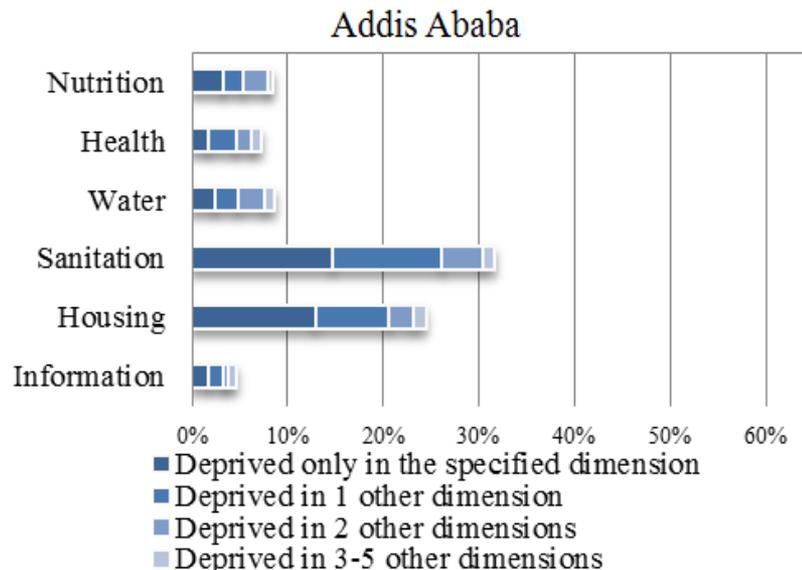
- Shows whether and where **inter-sectoral cooperation** is needed
- Stimulates the dialogue and cooperation between the different sections of UNICEF/different ministries of the government

Which deprivations do the children suffer from simultaneously?

How many and who are these children?

Which sectors need a multi-sectoral, integrative approach? Are there regional differences?

Deprivation overlap for each dimension in Ethiopia (2011) among children aged below five, by region



Six main contributions

5. MODA supports **integrative approach** to policy-making

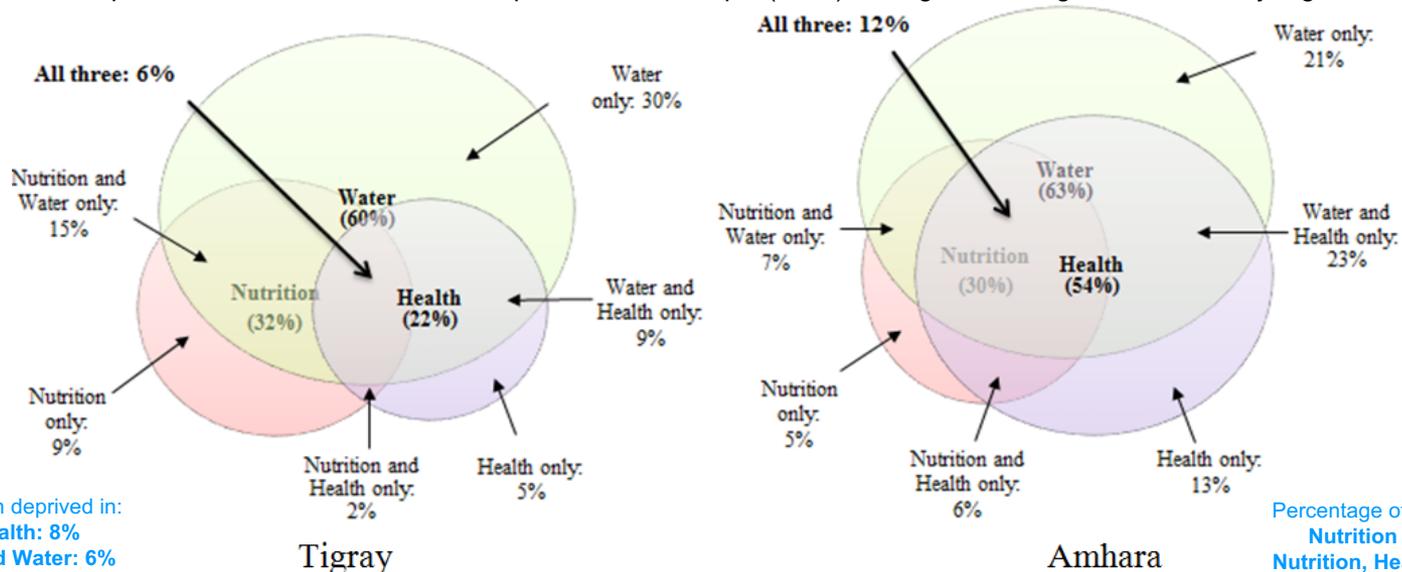
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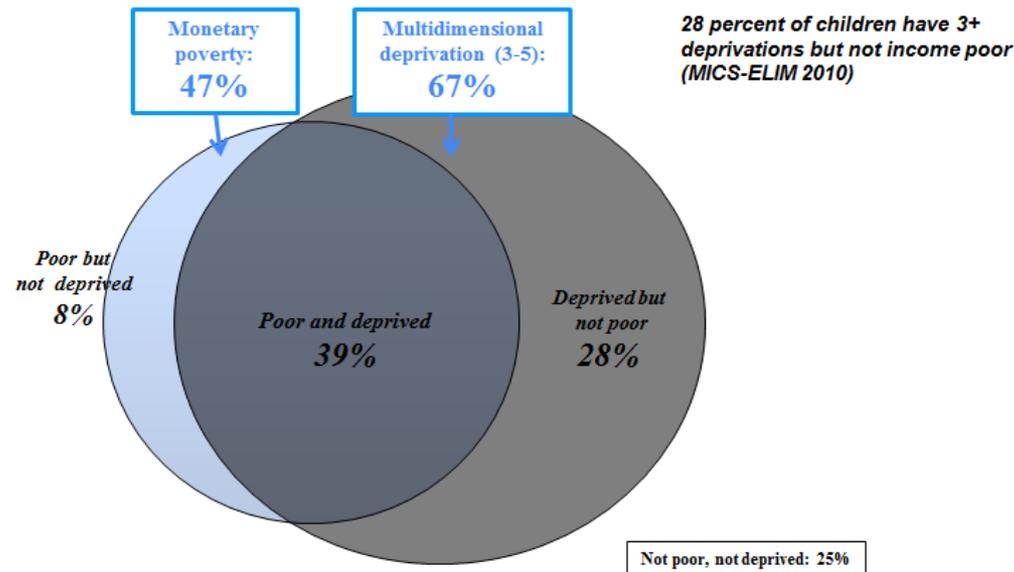
Overlap of nutrition, health, and water deprivations in Ethiopia (2011) among children aged below five, by region



Six main contributions

6. MODA is **complementary** to **monetary poverty** analysis

- MODA defines deprivation and monetary poverty as two different concepts of poverty that are conceptually different, and complement each other when measuring child poverty
- MODA analysis includes monetary poverty analysis whenever information on income or consumption is available
- Overlap analysis allows measuring to what extent these two measures coincide, and allows investigating the characteristics of the different groups of children (i.e., only deprived and non-poor, only poor and non-deprived, both deprived and poor). It shows to what extent monetary poverty measure captures children who lack access to basic needs and services (fulfilment of rights)



'Poverty': Children below the national poverty line (165,431 LCU per year, Mali, 2010);

'Deprivation': Children deprived in three or more of the following five dimensions: nutrition, health, water, sanitation, housing

Components of the MODA project

Components of the MODA project

1. MODA methodology
2. CC-MODA
3. N-MODA
4. Financial Poverty and Deprivation overlap
5. MODA web-portal
6. MODA workshops and trainings
7. EU-MODA

Components of the MODA project

1. MODA methodology

- Flexible methodology comprising various aspects of existing methods of multidimensional deprivation measurement (i.e. counting, overlap, and multidimensional deprivation ratio analyses)
- Methodology can be adapted to apply to a particular context:
 - Country (N-MODA)
 - Region (e.g. EU-MODA)
 - Situation (e.g. CC-MODA, or MODA on sub-national level)
- Used during workshops/trainings for UNICEF staff and partners
- Designed by UNICEF OoR together with UNICEF DPS
- MODA materials:
 - **'Step-by-Step Guidelines to the Multiple Overlapping Deprivation Analysis (MODA)'** (2012), by C. De Neubourg, J. Chai, M. de Milliano, I. Plavgo, Z. Wei, Working Paper 2012-10, UNICEF Office of Research, Florence.
 - **'Guidance note on Child poverty profiling using N-MODA'** (forthcoming)

Components of the MODA project

2. Cross-country MODA (CC-MODA):

- A special application of the MODA methodology for lower- and middle-income countries
- Standardized methodology based on DHS & MICS datasets to ensure comparability across countries (does not include monetary poverty)
- Uses the Convention on the Rights of the Child (CRC) as guiding principles
- Uses standardized definitions for age-groups, dimensions, indicators, thresholds, profiling variables
- Results available in an interactive web-portal (www.unicef-irc.org/MODA/). Currently 31 cases uploaded. Results can all be exported as a pdf or Excel.
- MODA material:
'Cross-country MODA Study: Multiple Overlapping Deprivation Analysis (MODA) - Technical note', (2012), by C. de Neubourg, J. Chai, M. de Milliano, I. Plavgo, Z. Wei (2012b), Working Paper 2012-05, UNICEF OoR, Florence.

Components of the MODA project

2. Cross-country MODA (CC-MODA):

CC-MODA country coverage		
	Currently on the web-portal	To be added upon data availability, quality and prioritization
1	Bangladesh (DHS 2011)	Barbados (MICS 2011) Lebanon (Palestinians) (MICS 2011)
2	Burkina Faso (DHS 2010-11)	Belize (MICS 2011) Lesotho (DHS 2009)
3	Burundi (DHS 2010-11)	Bhutan (MICS 2010) Liberia (DHS 2012-13)
4	Cambodia (DHS 2010-11)	Benin (DHS 2011-12) Mali (MICS 2009-10)*
5	Central African Republic (MICS 2010)	Cuba (MICS 2011-11) Mauritania (MICS 2011)
6	Cote d'Ivoire (DHS 2011-12)	Cameroon (DHS 2011) Mozambique (HDS 2011)
7	DR Congo (MICS 2010)	Chad (MICS 2010) Niger (DHS 2012)
8	Equatorial Guinea (DHS 2011)	Congo Brazzaville (DHS 2011-12) Pakistan (MICS 2011 (Punjab) ; DHS 2012)
9	Gambia (MICS 2010-11)	Djibouti (MICS 2011) Sierra Leone (MICS 2010)
10	Iraq (MICS 2012)	Gabon (DHS 2012) South Sudan (MICS 2010)
11	Lao PDR (LSIS 2011-12)*	Ghana (MICS 2010) Sudan (MICS 2010)
12	Malawi (DHS 2010)	Guinea (DHS 2012) Swaziland (MICS 2010)
13	Mongolia (MICS 2010)	Guinea Bissau (MICS 2010) Surinam (MICS 2010)
14	Nepal (DHS 2011)	Haiti (DHS 2012) Timor-Leste (DHS 2009-10)
15	Nigeria (MICS 2011)	Honduras (DHS 2011-12) Trinidad and Tobago (MICS 2011)
16	Occupied Palestinian Territory (MICS 2010)*	Jordan (DHS 2012) Uganda (DHS 2011)
17	Rwanda (DHS 2008)	Kenya (DHS 2008-09) Sao Tome and Principe (DHS 2008-09)
18	Senegal (DHS 2010-11)	Kenya (Nyanza Province) (MICS 2011)
19	Sierra Leone (MICS 2010)	
20	Togo (MICS 2010)	
21	Tunisia (MICS 2011-12)	
22	United Republic of Tanzania (DHS 2010)	
	Viet Nam (MICS 2010-11)	
23	Zimbabwe (DHS 2010-11)	* Password-protected. Not publicly available as data not officially released

Components of the MODA project

3. National MODA (N-MODA):

- A special application of the MODA methodology with an aim to develop a country-specific and policy-relevant child poverty analysis
- Uses datasets that fit the purpose of the study best, including national datasets
- Uses country specific definitions for age-groups, dimensions, indicators, thresholds, profiling variables
- N-MODA development is in collaboration with UNICEF COs and their national counterparts (government officials, partners from national statistics offices, national research centres) to ensure that the analysis is country-specific and responds to the needs and objectives of the national partners
- The objectives for carrying out a National MODA differ by country
(e.g., to conduct a child poverty study; for SitAn; for helping COs institutionalize the child poverty measurement into government policies and monitoring systems; informing specific policy-making and programming)
- Each N-MODA process differs case by case
Some N-MODAs are to be carried out by a national research centre or a consultant recruited by CO (OoR provides with technical support and advice only); others are to be conducted by OoR, in cooperation with the CO's and their counterparts
- N-MODA process has started in Ethiopia, Tunisia, Algeria, Lao PDR, Côte d'Ivoire, Senegal, and Mali
The MODA team (based at UNICEF OoR), upon request of UNICEF COs, has initiated these analyses by giving training and in some cases providing with technical support

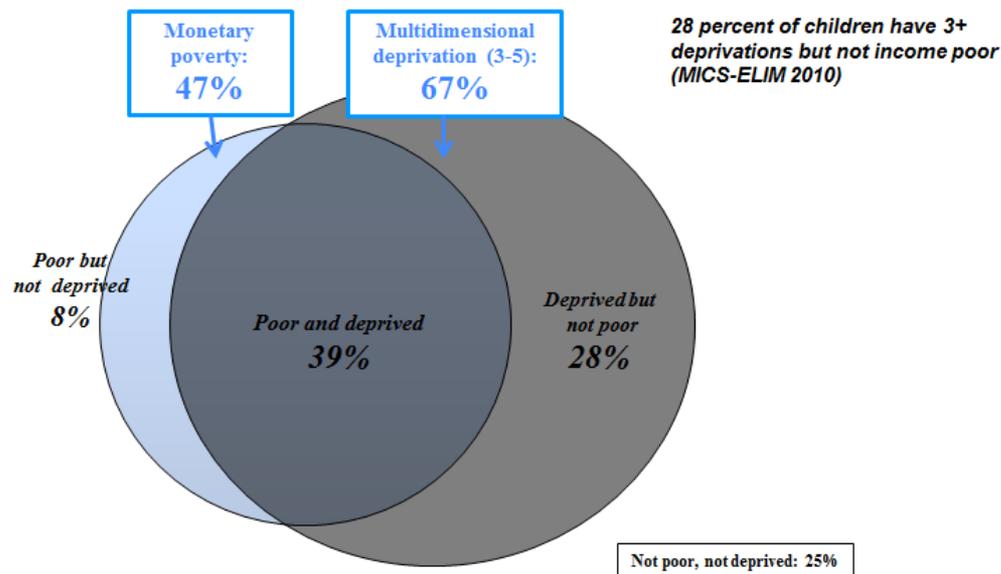
Components of the MODA project

4. Financial Poverty and Deprivation overlap

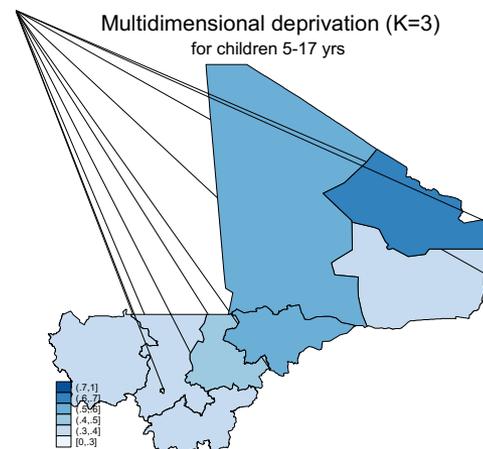
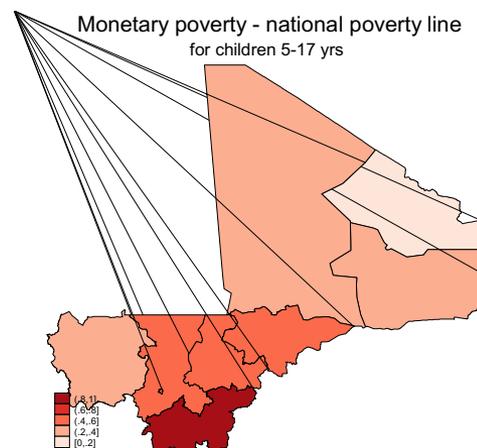
Example: Mali

Monetary poverty alone does not capture deprivation among children in Mali (MICS-ELIM 2010)

Overlap between monetary poverty and deprivation among children below age 5 in Mali (MICS-ELIM, 2010)



Poverty and deprivation headcount rates by region among children aged 5-17 Mali (MICS-ELIM, 2010)



'Poverty': Children below the national poverty line (165,431 LCU per year, Mali, 2010);

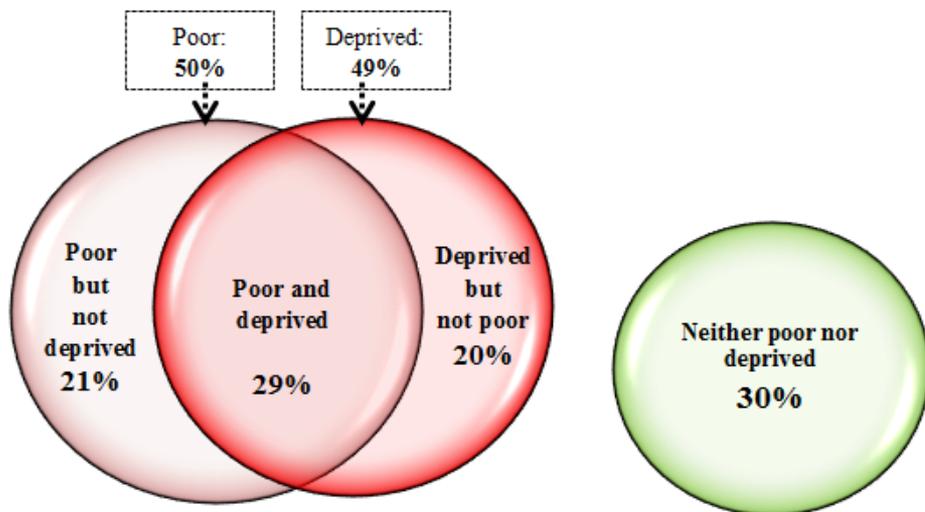
'Deprivation': Children deprived in three or more of the following five dimensions: nutrition, health, water, sanitation, housing

Components of the MODA project

4. Financial Poverty and Deprivation overlap

Example: Dominican Republic

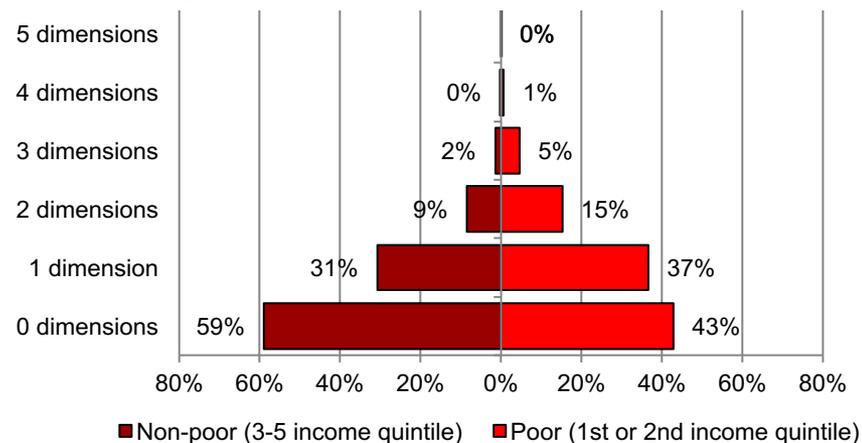
Overlap between monetary poverty and deprivation among children between 5-17 years in Dominican Republic (DHS, 2007)



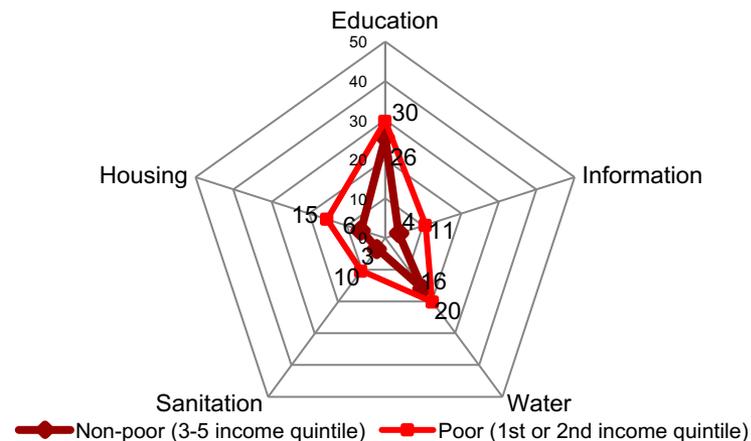
'Poor' – Children in the 1st and 2nd income quintile

'Deprived' – Children deprived in one or more dimensions out of five

Distribution of number of deprivations among children aged between 5-17 years depending on the income of their households in Dominican Republic (DHS, 2007)



Deprivation headcount (%) by dimension among children aged between 5-17 years depending on the income of their households in Dominican Republic (DHS, 2007)



Components of the MODA project

5. MODA web-portal

- <http://www.unicef-irc.org/MODA/>
- An assembly point for all studies and works related to MODA: CC-MODA, N-MODA, background materials, guidelines and publications
- Structure designed by OoR together with colleagues from UNICEF DPS; technical development of the portal done by DevInfo
- The main part of the webportal → CC-MODA analysis; results by country and across countries
Results can be seen by country, age group, dimension, profiling variable and/or deprivation threshold according to the user's preference. A short description and example is provided for each part of the multidimensional deprivation analysis to assist with the interpretation of the results. All of the graphs and figures can be downloaded to enable the use of MODA results to COs
- MODA team is expanding the MODA webportal contents on an on-going basis (e.g. adding on the CC-MODA database; adding case-studies; N-MODA results when available)

Components of the MODA project

6. MODA workshops and trainings

- Organized upon request and in cooperation with ROs and/or COs
- Purpose: to introduce the MODA methodology; to present and interpret the results; to train the participants in the application of MODA to a particular country or dataset
- Participants: mainly UNICEF staff; or local partners from national governments, bureaus of statistics, local research institutes and civil society organisations
- Regional workshops held:
MENA RO: UNICEF COs + partners from national institutions, March 2013, Cairo;
WCARO: (1) English-speaking UNICEF COs, April 2013, Dakar; (2) French-speaking UNICEF COs, Sept 2013.
- *Regional workshops planned:*
ESARO (UNICEF COs, April 2014 in Botswana)
- *National workshops held:* Tunisia, Algeria, Ethiopia, Côte d'Ivoire, Lao PDR.
- *National workshops planned:* Mali (April 2014), Senegal (April 2014)

Components of the MODA project

7. EU-MODA

- A special application of MODA for 29 European countries: 27 EU member states + Norway & Iceland
- Dimensions, indicators and thresholds selected based on their relevance for children in this region
- The results are comparable between the countries included in the study
- Data used: EU-SILC
- Includes deprivation and monetary poverty
- EU-MODA materials
 - **'Multiple Overlapping Deprivation Analysis for the European Union (EU-MODA): Technical Note'** (forthcoming), by Y. Chzhen, C. de Neubourg, UNICEF Office of Research Working Paper
 - Results are to be uploaded on a separate interactive EU-MODA web-portal by mid-2014

Step-by-step Guidelines to MODA

Summary of the Step-by-Step Guidelines to MODA

Note: the choices made for CC-MODA are an illustration of what choices have been made in the particular case of CC-MODA. When carrying out a National MODA, different choices can and will be made to ensure country- and policy-relevance.

Reference:

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

Step-by-step Guidelines to MODA

Getting Started: Concepts, Definitions, Data Choice

Step 1 - Choose the field(s) of child well-being to be analyzed

Most commonly used measures of child well-being:

- Monetary poverty
- Deprivation of basic needs
- Subjective or self-assessed poverty/deprivation/well-being

Additional fields may be defined:

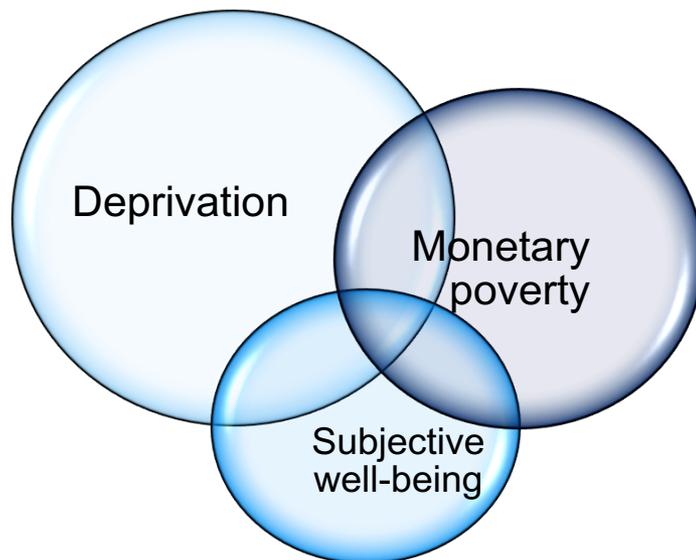
- Financial strains (self assessed perception of one's ability to afford certain goods or services)
- Social exclusion

Step-by-step Guidelines to MODA

Getting Started: Concepts, Definitions, Data Choice

Step 1 - Choose the field(s) of child well-being to be analyzed

'It is important to distinguish the different concepts well, since each refers to a specific aspect of well-being. Merging these concepts leads to a loss of dimensions rather than to a multidimensional analysis'



Step-by-step Guidelines to MODA

Step 2 - Define deprivation and specify its dimensions, based on the chosen definition

- Deprivation can be defined using one or more of the following sources:
 - National norms, standards, or legislation;
 - Internationally-agreed definitions, international conventions, e.g. United Nations Millennium Development Goals (MDGs), Convention on the Rights of the Child (CRC), UN resolutions and reports;
 - Regionally-agreed definitions (e.g. by the European Union);
 - Theories written by scholars, researchers, academia (e.g. Sen, 1999; Townsend, 1979; Gordon, 2003);
 - Explicit or implicit assumptions about what people value or should value;
 - Public “consensus”;
 - Empirical evidence regarding what children (or others) value most as elements of well-being (e.g. EU barometer).

Step-by-step Guidelines to MODA

Step 2 - CC-MODA STARTING POINT WHEN CHOOSING DIMENSIONS

Table 1: Child Well-being Dimensions according to the CRC

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

Source: Authors' selection (article numbers refer to the CRC)

Step-by-step Guidelines to MODA

Step 3 – Select the dataset(s) and choose the unit of analysis

- The choice of a MODA dataset should be guided by: (1) the data quality (e.g., missing values), (2) the sample size and sample quality, (3) representativeness, and (4) the possible unit of analysis.
- Unit of analysis to analyze child poverty:
 - The individual (child) level;
 - The household level with a child focus;
 - The household level

Note: child level data are the only data that allow for the identification of age- and gender-driven differences (i.e. intra-household differences).
- [CC-MODA application](#): DHS and MICS data
- [N-MODA application](#): any dataset that fits the criteria best

Step-by-step Guidelines to MODA

Preparation for the Deprivation Analysis:

Choice of Dimensions, Indicators, Thresholds, and Age Groups

Step 4 - For each dimension, select indicator(s) and define the reference population

Seven main criteria are used to select indicators:

1. **Relevance to child well-being and deprivation:** *outcome indicators are preferred, but are not always available or meaningful;*
2. **Attribution to dimensions:** *to enhance policy relevance, it is recommendable to use indicators that originate in a particular policy domain;*
3. **Variance:** *in particular with regards to the overlapping deprivation analysis and the construction of an index, variance it is important to be able to identify differences in the number of children who are deprived versus non-deprived according to that indicator;*
4. **Coverage:** *the methodology of multiple deprivation analysis requires that indicators should be available for all children in a given age group: children for whom no information is available would distort the results if the indicator is used;*

Step-by-step Guidelines to MODA

Step 4 - For each dimension, select indicator(s) and define the reference population

Seven main criteria are used to select indicators (cont'd):

5. **Free from measurement bias:** *especially important in cross-country studies as reporting practices may differ between countries due to administrative or cultural factors;*
6. **Scalability:** *the aggregation of indicators implicit in the construction of the deprivation ratios requires a certain degree of scalability of the indicators;*
7. **Parsimony and internal consistency:** *In CC-MODA it has been decided to use 2 indicators per dimension, wherever possible. This avoids weighting problems.*

Notes:

- *The indicators should reflect actual deprivation instead of the possible causes of deprivation;*
- *Missing values can distort the sample representativeness and with this the outcomes of the deprivation ratios;*
- *The reference population for each indicator should be defined by specifying age and gender.*

Step-by-step Guidelines to MODA

Step 4 – CC-MODA APPLICATION

Table 2 Availability of relevant dimensions in DHS and MICS

Dimensions	Indicators available in DHS	Indicators available in MICS
Food, nutrition	Only for children under 5	Only for children under 5
Water	Yes	Yes
Health care	Only for children under 5	Only for children under 5
Shelter	Yes	Yes
Environment, pollution	No	No
Education	Only for children aged 5 and older	Yes
Leisure	No	No
Cultural activities	No	Yes
Information	Yes	Yes
Exploitation, child labour	For some countries*	Yes
Other forms of exploitation	No	No
Cruelty, violence	Only violence towards one female household member, available for some countries*	Yes
Violence at school	No	No
Social security	No	No
Birth registration; Nationality	Yes	Yes
Freedom of expression, views, opinions; Being heard; Freedom of association	No	No

Step-by-step Guidelines to MODA

Step 4 – CC-MODA APPLICATION

Table 2 Availability of relevant indicators in DHS and MICS

Dimensions	Indicators	Reference population
Nutrition	Breastfeeding	0-5 months
	Infant and young child feeding	6-59 months, applying feeding practices of children aged 6-23 months
	Weight for height (wasting)	0-4 years
Health	DPT immunization	1-4 years
	Skilled assistance at birth	DHS: 0-4 years. MICS: 0-4 years, applying information on one child per household aged 0-1 years
Education	Compulsory school attendance	From starting to ending age of compulsory school
	Primary school attainment	From lower secondary school age up to 17 years
Information	Availability of information devices	5-17 years (information available for all children)
Water	Access to improved water source	all children
	Distance to water source	all children
Sanitation	Access to improved sanitation	all children
Housing	Overcrowding	all children
	Roof & floor material	all children
Protection from violence	Domestic violence	DHS: all children, applying violence experienced by one female adult per household
		MICS: all children, applying violence experienced by one child per household aged 2-14 years

Step-by-step Guidelines to MODA

Step 5 - Specify indicator threshold(s) and construct the indicator(s)

The thresholds are the demarcation line between deprivation and non-deprivation.

The choice of deprivation thresholds can be based on:

- Internationally agreed definitions (e.g. WHO, MDGs, UN Habitat, ILO, providing definitions on (un)improved water sources, (un)improved sanitation, malnutrition, crowding of dwellings, child labor, etc.);
- National norms, standards and legislation (concerning school enrolment, access to insurance, etc.);
- A continuum or relative approach to measure well-being.

Step-by-step Guidelines to MODA

Step 5 – CC-MODA APPLICATION

Table 3: Indicator thresholds for CC-MODA

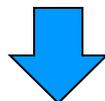
Dimensions	Indicators	Deprived if
1. Nutrition	Infant and young child feeding	Child under 6 months not exclusively breastfed; child between 6-59 months living in a household where children between 6-23 months are not provided with minimum meal frequency in the last 24 hours. WHO standards.
	Weight for height (wasting)	Child's weight for height is below minus two standard deviations from the international median. WHO standards.
2. Health	Immunization	Child aged 1-4 years has not received all 3 DPT vaccinations. WHO standards.
	Skilled assistance at birth	No or an unskilled birth attendant assisted with child's birth. WHO standards.
3. Education	Compulsory school attendance	Child of compulsory school age but not attending school. Country-specific data, retrieved from UNESCO.
	Primary school attainment	Child beyond primary school age with no or incomplete primary education. Country-specific data, retrieved from UNESCO.
4. Information	Availability of information devices	Family has not reported having any of the following: TV, radio, phone, mobile phone, and computer. MDG.
5. Water	Access to improved water source	Household's main source of drinking water is unimproved. WHO standards.
	Distance to water source	Time needed to collect water (go, get water, and come back) is more than 30 minutes. WHO standards.
6. Sanitation	Access to improved sanitation	Household usually uses unimproved toilet facility. WHO standards.
7. Housing	Overcrowding	Household has on average more than four people per sleeping room. UN-HABITAT, adjusted for the number of sleeping rooms only.
	Roof & floor material	Both roof and floor are made of natural material, which are not considered permanent. UN-HABITAT standards.
8. Protection from violence	Domestic violence	Child is living in a household where a child between 2 and 14 years experiences any type of physical abuse by parents.

Step-by-step Guidelines to MODA

Step 5 – CC-MODA APPLICATION

Table 3: Indicator thresholds for CC-MODA

Dimensions	Indicators	Deprived if
6. Sanitation	Access to improved sanitation	Household usually uses unimproved toilet facility. WHO standards.



What kind of toilet facility do members of your household usually use?	
Flush to piped sewer system	★
Flush to septic tank	★
Flush to pit latrine	★
Flush to somewhere else	✘
Ventilated improved pit latrine	★
Pit latrine with slab	★
Pit latrine without slab/ open pit	✘
Composting toilet	★
Bucket toilet	✘
Hanging toilet/hanging latrine	✘
No facility/bush/field	✘

Source: Standard DHS household questionnaire

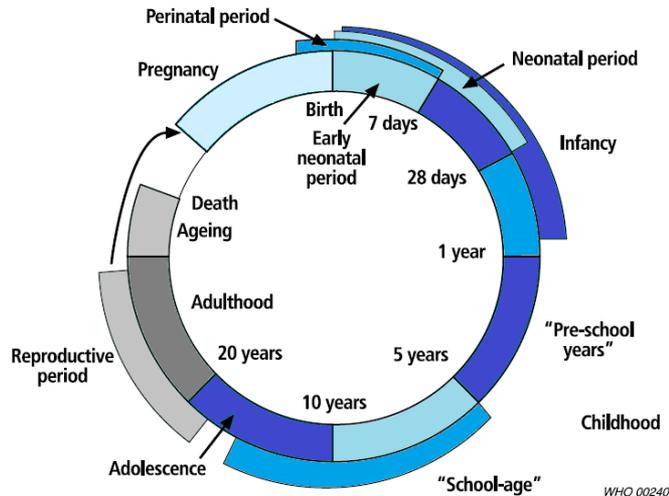
Step-by-step Guidelines to MODA

Step 6 - Decide upon the life-cycle stages and choose age group(s) for the multidimensional deprivation analysis

In line with UNICEF principles, children have different needs during the different stages of their lives.

Life-cycle approach: MODA analyzes separate age groups to reflect the different needs of early childhood, primary childhood and adolescence.

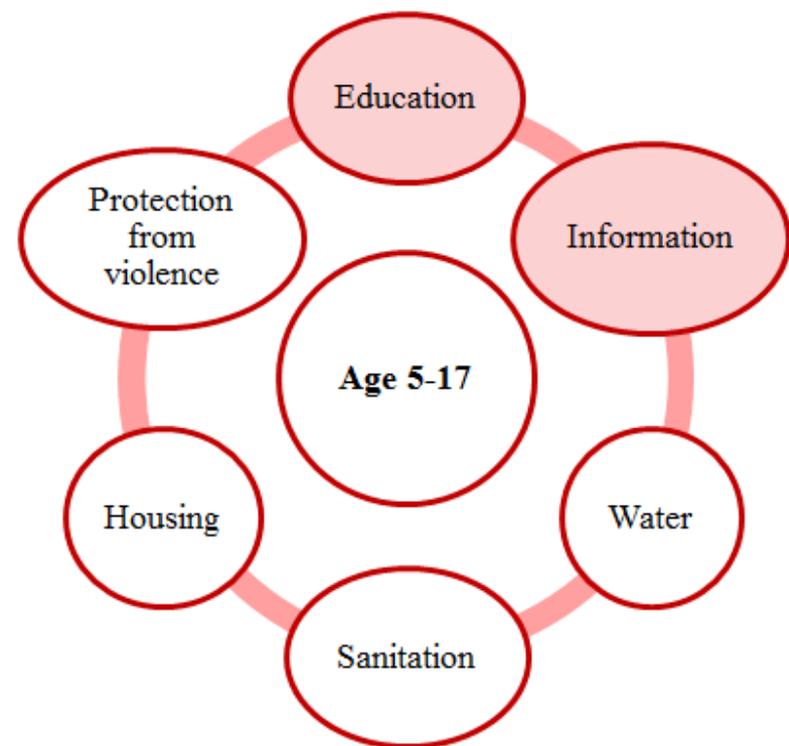
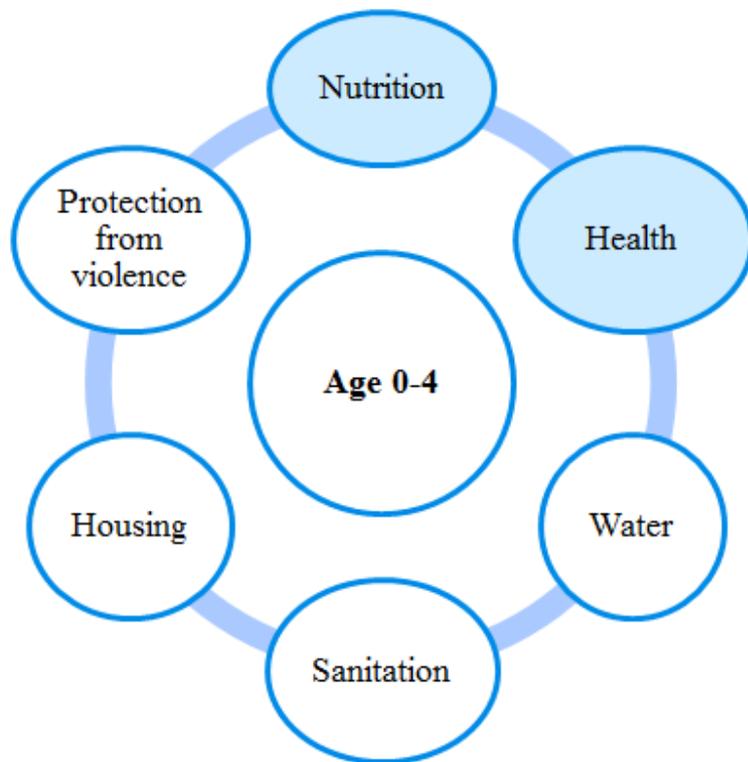
Main stages of an individual's life-cycle



Step-by-step Guidelines to MODA

Step 6 – CC-MODA APPLICATION

Life-cycle stages and dimensions used for the CC-MODA analysis



Step-by-step Guidelines to MODA

Step 7 - Decide whether to impute values on other members of the same household

It may occur that questions of interest have answers only for part of an age group (e.g. for only one child in each household). For example questions on child discipline in the MICS are only asked about one child between 2 and 14 years per household. In such an event, the following choices can be made:

- Assign indicator values only to children who have information on the indicator
- Assign indicator values to all children of the same household
- Assign indicator values to some children of the same household, imputing data only on those who belong to the same gender/(age) group

Step 8 - Perform a correlation test and select the final indicators

Step-by-step Guidelines to MODA

Step 9 - Decide how to weight indicators and how to aggregate them into dimensions

Aggregation methods:

- Union approach; $y_k = 1$ if $D_i \geq 1$,
 $y_k = 0$ if $D_i < 1$
- Intersection approach; $y_k = 1$ if $D_i = d$,
 $y_k = 0$ if $D_i < d$
- Intermediate cut-off approach; $y_k = 1$ if $D_i \geq K$,
 $y_k = 0$ if $D_i < K$

where y_k is the deprivation status of a child i depending on the cut-off point K ; D_i is the number of deprivation each child i experiences; d is the total number of possible deprivations.

CC-MODA uses the union approach to aggregate indicators in dimensions, because each deprivation is relevant to the well-being of the child.

Step-by-step Guidelines to MODA

Step 10 - Decide how to weight dimensions

Weights can be used to indicate the relative importance of different deprivations. The following weighting methods are used:

- Equal weighting;
- Data driven weighting (e.g. frequency based, most favorable, statistical and regression based weighting);
- Normative-based weighting.

CC-MODA does not assign any explicit weights to dimensions when counting the deprivations each child suffers from. It should be noted that implicitly equal weights are assigned. This method is chosen, because it reveals exactly which deprivations children are facing, making severity and overlap analyses feasible and transparent.

Step-by-step Guidelines to MODA

Step 11 - Decide upon the identification method of the multidimensionally deprived children

- For the identification of the multidimensionally deprived, the number of deprivations a child experiences is compared to a cut-off point.
- The union ($0 < K \leq 1$), intersection ($K = d$) and intermediate cut-off approach ($0 < K \leq d$) can be used
- MODA presents the outcomes for all possible cut-off points, thus incorporating all three methods.

Step-by-step Guidelines to MODA

Single Deprivation Analysis: Analysis by Indicator and by Dimension

Step 12 - Estimate a child deprivation headcount ratio for each indicator and dimension

$$h_{j,r} = \frac{q_{j,r}}{n_r}$$
$$q_{j,r} = \sum_{i=1}^{n_r} y_j$$

where

$h_{j,r}$ - headcount ratio of children deprived in dimension j of the reference population r ;

q_j - number of deprived children in dimension j of the reference population r ;

n_r - total number of children in the reference population r ;

y_j - deprivation status of child i in dimension j , with $y_j = 1$ if $x_j < Z_j$ (deprivation) and $y_j = 0$ if $x_j \geq Z_j$ (no deprivation);

x_j - value of dimension j for child i ;

Z_j - threshold of the dimension j .

Step-by-step Guidelines to MODA

Step 13 – Select profiling variables and construct a profile of the deprived children for each dimension

- Profiling aims at defining who are the children with a higher probability of being deprived in a specific dimension
- The selection of profiling variables is guided by:
 - The objective of the analysis
 - Data availability
 - The applicability of criteria of relevance, variance, coverage, absence from bias and parsimony

Step-by-step Guidelines to MODA

Multiple Overlapping Deprivation Analysis: Deprivation Count

Step 14 - For each child, estimate the number of dimensions in which (s)he is deprived

A child-centred multidimensional approach means that the total number of deprivations of each child should be counted in order to identify children with 0, 1, 2, 3, 4, .., d deprivations. Counting deprivations should happen firstly for each individual separately to inform about the breath of deprivation for each child.

	Nutrition	Health	Water	Number of deprivations
	✗	✗	✓	2
	✓	✗	✓	1
	✓	✓	✓	0
	✗	✗	✗	3

The deprivation count uses the following formula:

$$D_i = \sum_{j=1}^d y_j$$

where

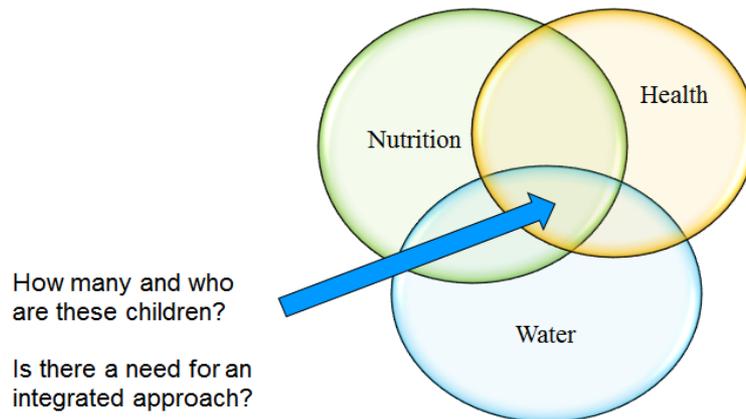
D_i – total number of dimensions each child i is deprived in; with $y_j = 1$ if child i is deprived in the dimension j ; $y_j = 0$ if child i is not deprived in dimension j .

Step-by-step Guidelines to MODA

Multiple Overlapping Deprivation Analysis: Overlap Analysis

Step 16 - Carry out a deprivation overlap analysis analyzing the overlap and non-overlap of deprivations

- Determining which deprivations a child experiences simultaneously;
- Pointing towards sectors in need for an integrative approach.



Step 17 - Construct a profile of the children in the deprivation overlaps

Step-by-step Guidelines to MODA

Multiple Overlapping Deprivation Analysis: Identification of the multidimensionally deprived children

Step 18 - Estimate the multidimensional child deprivation headcount ratio (H) for each age group using various cut-off points

$$H = \frac{q_K}{n_a}$$
$$q_K = \sum_{i=1}^n y_K$$

where

H - multidimensional child deprivation headcount ratio according to cut-off point K in age-group a ;

q_K - number of children affected by at least K deprivations in the age-group a ;

n_a - total number of children in the age-group a ;

y_K - deprivation status of a child i depending on the cut-off point K ;

D_i - number of deprivations each child i experiences;

K - cut-off point.

Step-by-step Guidelines to MODA

Step 19 - Estimate the average intensity of deprivation (A) among the deprived for each age group using various cut-off points

$$A = \frac{\sum_1^{q_K} c_K}{q_K \times d}$$

Where

A - average intensity of multidimensional deprivation according to the cut-off point K for the age-group a ;

q_K - number of children affected by at least K deprivations in the age-group a ;

d - total number of dimensions considered per child within the relevant age-group a ;

c_K - number of deprivations each multi-dimensionally deprived child i experiences, with $c_K = D_i * y_K$.

Step-by-step Guidelines to MODA

Step 20 - Estimate the adjusted multidimensional child deprivation headcount ratio (M_0) for each age group using various cut-off points

$$M_0 = H * A = \frac{\sum_1^{q_K} c_K}{n_a * d}$$

where

M_0 - adjusted multidimensional child deprivation headcount ratio among children affected by at least K deprivations in age group a ;

c_K - number of deprivations each multidimensionally deprived child i experiences, with $c_K = D_i * y_K$.

Optional - Estimate H, A, and M_0 for the entire child population

Step 21 - Construct a profile of the multidimensionally deprived children, calculating H and M_0 at subnational and subgroup level

Step-by-step Guidelines to MODA

Step 22 - Decompose each adjusted deprivation headcount ratio M_0 by (1) subgroup and (2) dimension

(1) The decomposition by subgroup can be calculated using the following formula:

$$\frac{M_{0_1} \left(\frac{n_1}{n}\right)}{M_0} + \frac{M_{0_2} \left(\frac{n_2}{n}\right)}{M_0} = 1$$

(2) The contribution of each dimension j to the overall deprivation level is expressed as a share of the total adjusted headcount ratio M_0 and can be defined as follows:

$$P_j = \frac{\sum_{i=1}^n (y_j * y_k)}{n_a * d * M_0}$$

where

P_j – contribution of dimension j to the adjusted headcount ratio M_0

$\sum_{i=1}^n (y_j * y_k)$ – total number of children i deprived in dimension j while also being deprived multidimensionally according to the cut-off point K

$y_j=1$ if child i is deprived in dimension j , and $y_j=0$ if child i is not deprived in dimension j

$y_k=1$ if child is multidimensionally deprived with $D_i \geq K$ and $y_k = 0$ if child is not multidimensionally deprived with $D_i < K$

d – total number of dimensions used in the analysis

n_a – total number of children of the relevant age group a .

Step-by-step Guidelines to MODA

**Optional – Analysis of other fields of child well-being:
Monetary poverty analysis**

Decide upon the measurement of monetary poverty

Estimate the number of children living in financially poor families

Profile the monetary poor

Step-by-step Guidelines to MODA

Optional – Field Overlap Analysis:

Overlap Analysis between different fields of child well-being

Study the overlap between the different fields of child well-being chosen for the analysis, and profile each overlap/non-overlap group

For example, if two fields of poverty are considered - monetary poverty and deprivation - four groups can be profiled:

1. Neither monetary poor nor deprived;
2. Deprived only;
3. Monetary poor only; and
4. Deprived and monetary poor simultaneously.

