
Why Multidimensional Poverty?

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Nuevas Metodologías para Entender la Pobreza en Chile

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Traditional Monetary Poverty

Longstanding concept

Dating back to Booth and Rowntree (Foster, 1984)

Official methods in many **countries**

Complementary **global** methods

World Bank's \$1.25 a day

FGT: P_0, P_1, P_2

Colossal effort

Remarkable collection of data points over time and space

Traditional Monetary Poverty

Note

There is **more to poverty** than inadequate monetary resources

Eg

Capability deprivations

Sen (eg, Foster and Sen 1997)

Heckman (eg, Heckman and Mosso 2014)

Basic **social services**

Human and social **rights**

Traditional Monetary Poverty

Alternative question

Should poverty refer only to those advantages that can be valued in **monetary** terms?

Many voices, including those of the poor, would say **no**

Practical issues

Thin markets

Health insurance in the US

Housing in developing countries

PPP and other index problems

How to value money over time and space?

Missing markets

Malnourished children in India

Another Voice

“The task, then, for the governments of the developing countries is to reorient their development policies in order to attack directly the personal poverty of the most deprived 40% of their populations. This the governments can do without abandoning their goals of vigorous overall economic growth. But they must be prepared to give greater priority to **establishing growth targets in terms of essential human needs: in terms of nutrition, housing, health, literacy, and employment** - even if it be at the cost of some reduction in the pace of advance in certain narrow and highly privileged sectors whose benefits accrue to the few.

Such a reorientation of social and economic policy is primarily a political task, and **the developing countries must decide for themselves if they wish to undertake it**. It will manifestly require immense resolve and courage.”

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Robert McNamara (1972, p. 30)

Revealed Preference

Many countries **are** deciding for themselves!

Countries with their own MPIs	Date
Mexico	2009
Bhutan	2010
Colombia	2011
Philippines	2014
Vietnam	Soon
El Salvador	Soon
Honduras	Working
Costa Rica	Working
Dominican Republic	Working
South Africa, China, and many others....	

Shared methodology with country to country technical support
Multidimensional Poverty Peer Network

Multidimensional Poverty

Longstanding concept

Implicit in Booth and Rowntree (Foster, 1984)

Official methods in several **countries**

Complementary **global** method

UNDP's Multidimensional Poverty Index (**MPI**)

Colossal joint effort by HDRO and OPHI

Remarkable collection of results over time and space

Outline: Why Multidimensional Poverty?

Poverty Measurement

- Unidimensional

- Multidimensional

Examples

- MPI

- Mexico

- Colombia

Conclusions

Poverty Measurement

Traditional poverty framework of Sen (1976)

Two steps

Identification: “Who is poor?”

Targeting

Aggregation “How much poverty?”

Evaluation and monitoring

Unidimensional Poverty Measurement

Typically uses **poverty line** for identification

Poor if income below the cutoff

Example: Income distribution $\mathbf{x} = (7,3,4,8)$ poverty line $\mathbf{p} = 5$

Who is poor?

Unidimensional Poverty Measurement

Typically uses **poverty line** for identification

Poor if income below the cutoff

Example: Income distribution $\mathbf{x} = (7,3,4,8)$ poverty line $\mathbf{p} = 5$

Who is poor?

Typically uses **poverty measure** for aggregation

Formula aggregates data to poverty level

Examples: Watts, Sen

Example: **FGT** $P_a(x; \rho) = m(g_1^a, \dots, g_n^a) = m(g^a)$

Where: g_i^α is $[(p - x_i)/p]^\alpha$ if i is poor and 0 if not, and $\alpha \geq 0$ so that

$\alpha = 0$ headcount ratio

$\alpha = 1$ per capita poverty gap

$\alpha = 2$ squared gap, often called FGT measure

Unidimensional Poverty Measurement

Example

Incomes $x = (7, \underline{1}, \underline{4}, 8)$

Poverty line $p = 5$

Deprivation vector $g^0 = (0, 1, 1, 0)$

Headcount ratio $P_0(x; p) = m(g^0) = 2/4$

Normalized gap vector $g^1 = (0, 4/5, 1/5, 0)$

Poverty gap = HI $= P_1(x; p) = m(g^1) = 5/20$

Squared gap vector $g^2 = (0, 16/25, 1/25, 0)$

FGT Measure $= P_2(x; p) = m(g^2) = 17/100$

Multidimensional Poverty Measurement

How to evaluate poverty with many dimensions?

Aggregation focus of previous work

Atkinson (2003), Bourguignon and Chak (2003)

Not **identification**

All use cutoffs to identify **deprivations**

Then identify **poor** in one of two ways

Poor if have *any* deprivation (union)

Poor if have *all* deprivations (intersection)

Problem

Impractical when there are many dimensions

Need intermediate approach

AF Methodology

Alkire and Foster (2011) methodology addresses these problems

It specifies an **intermediate** identification method that is consistent with **ordinal** data often found

Dual cutoff identification

Deprivation cutoffs $z_1 \dots z_j$ one per each of j deprivations

Poverty cutoff k across aggregate weighted deprivations

Idea

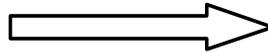
A person is poor if multiply deprived enough

Example

AF Methodology

Deprivation Matrix

$$g^0 = \begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 \\ 1 & 1 & 1 & 1 \\ 0 & 1 & 0 & 0 \end{bmatrix} \quad \begin{bmatrix} 0 \\ 2 \\ 4 \\ 1 \end{bmatrix}$$



Censored Deprivation Matrix, $k=2$

$$g^0(k) = \begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 \\ 1 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix} \quad \begin{bmatrix} 0 \\ 2 \\ 4 \\ 0 \end{bmatrix}$$

Identification Who is poor?

If poverty cutoff is $k = 2$

Then the two middle persons are poor

Now censor the deprivation matrix

Ignore deprivations of nonpoor

AF Methodology

If data cardinal, construct two additional censored matrices

Censored Gap Matrix

$$g^1(k) = \begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 0.42 & 0 & 1 \\ 0.04 & 0.17 & 0.67 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

Censored Squared Gap Matrix

$$g^2(k) = \begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 0.42^2 & 0 & 1^2 \\ 0.04^2 & 0.17^2 & 0.67^2 & 1^2 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

Aggregation

$$M_{\alpha} = \mu(g^{\alpha}(k)) \text{ for } \alpha \geq 0$$

Adjusted FGT M_{α} is the mean of the respective censored matrix

AF Methodology

Note

The poverty measures with $\alpha > 0$ use gaps, hence require **cardinal** data

Impractical given typical data quality

Focus here on measure with $\alpha = 0$ that handles **ordinal** data

Adjusted Headcount Ratio M_0

Practical and applicable

Adjusted Headcount Ratio

$$\text{Adjusted Headcount Ratio} = M_0 = HA = m(g^0(k))$$

	Domains	c(k)	c(k)/d	
$g^0(k) =$	$\begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 \\ 1 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix}$	$\mathbf{0}$		Persons
		$\underline{2}$	$2 / 4$	
		$\underline{4}$	$4 / 4$	
		$\mathbf{0}$		

H = multidimensional headcount ratio = 1/2

A = average deprivation share among poor = 3/4

Multidimensional Poverty: Overview

Identification – Dual cutoffs

Deprivation cutoffs - each deprivation counts

Poverty cutoff - in terms of aggregate deprivation values

Aggregation – Adjusted FGT

Reduces to FGT in single variable case

Natural **generalization** of FGT to multidimensional case

Adjusted Headcount Ratio

Concept - Poverty as **multiple deprivations**

Mirrors identification used by **NGOs** – BRAC

Depends on **joint** distribution

Ordinal data

Dirt floors vs covered floors

Qualitative data into quantitative data

Transparent

Defined by variables, deprivation cutoffs,
deprivation values, poverty cutoff

Can be replicated and tested for robustness

Adjusted Headcount Ratio

Has been implemented

Cross country – MPI in the HDR's since 2010

Country – Mexico, Bhutan, Colombia, etc.

State/Metro – Sao Paulo, Minas Gerais, Ho Chi Minh City (next week)

Other measures – Gross National Happiness Index (Bhutan), Women's Empowerment in Agriculture Index (USAID/IFPRI), Service delivery performance measure (Allwine and Foster, 2011)

Example 1: - Global MPI

Headline number for communication and monitoring
Coordinated dashboard for policy analysis

Example 1 – Global MPI

Description

Internationally **comparable** index of **acute** poverty
100+ developing countries.

Launched 2010 in **UNDP's** *Human Development Report* (HDR)
Updated 2011, 2013 and 2014.

Methodology is being **adapted** for national poverty measures –
Using better indicators for country's own policy context.

SDG discussion include monetary and multidimensional poverty
Separate indicators and targets

Example 1 – Global MPI

Data Sources

Global Surveys

Demographic & Health Surveys (**DHS** - 52)

Multiple Indicator Cluster Surveys (**MICS** – 34)

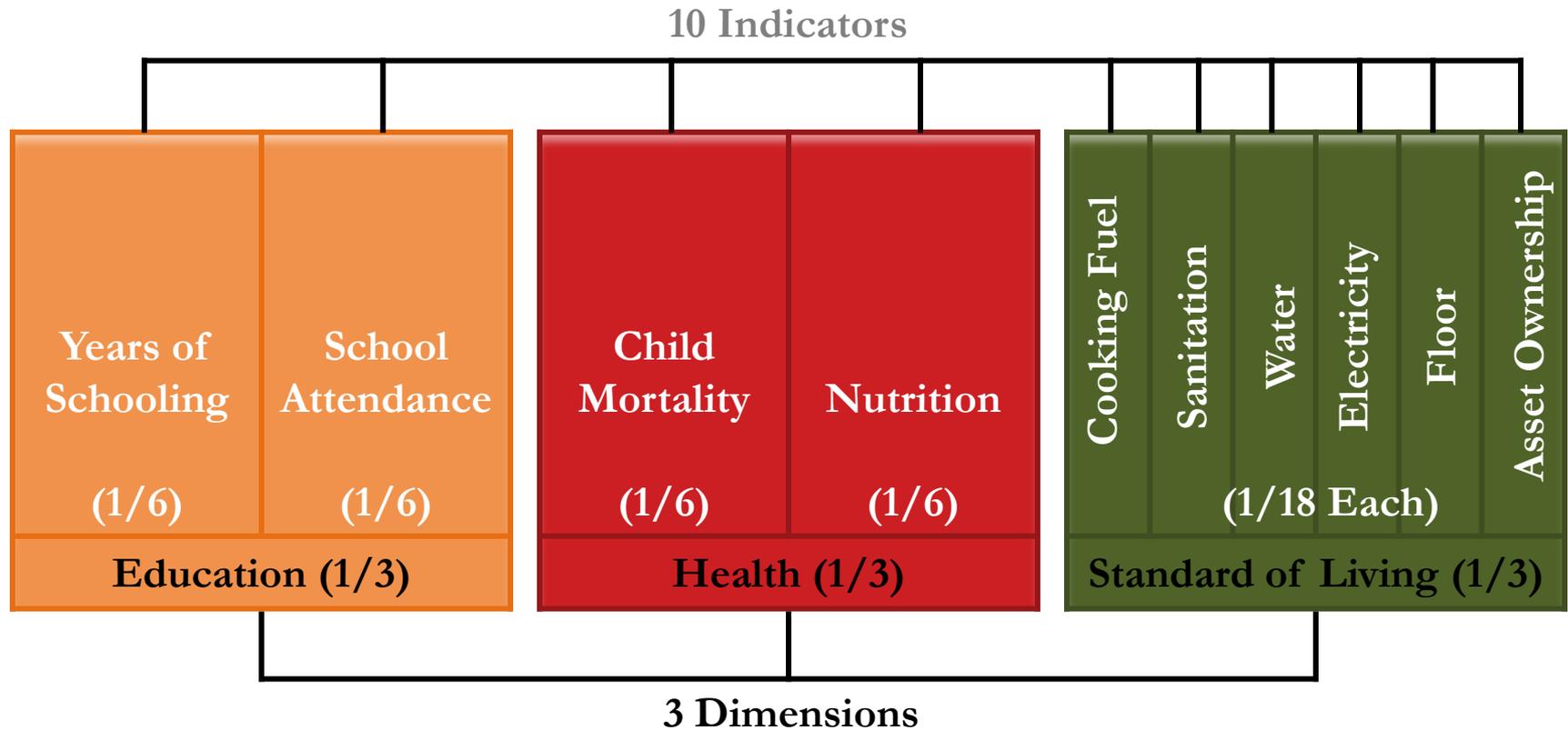
World Health Survey (**WHS** – 16)

Country Surveys

Urban Argentina (ENNyS), Brazil (PNDS), Mexico (ENSANUT), Morocco (ENNVN/LSMS), Occupied Palestinian Territory (PAPFAM), and South Africa (NIDS).

Constraints: Data are 2002-2013. Not all have precisely the same indicators.

Constructing the MPI - Overview

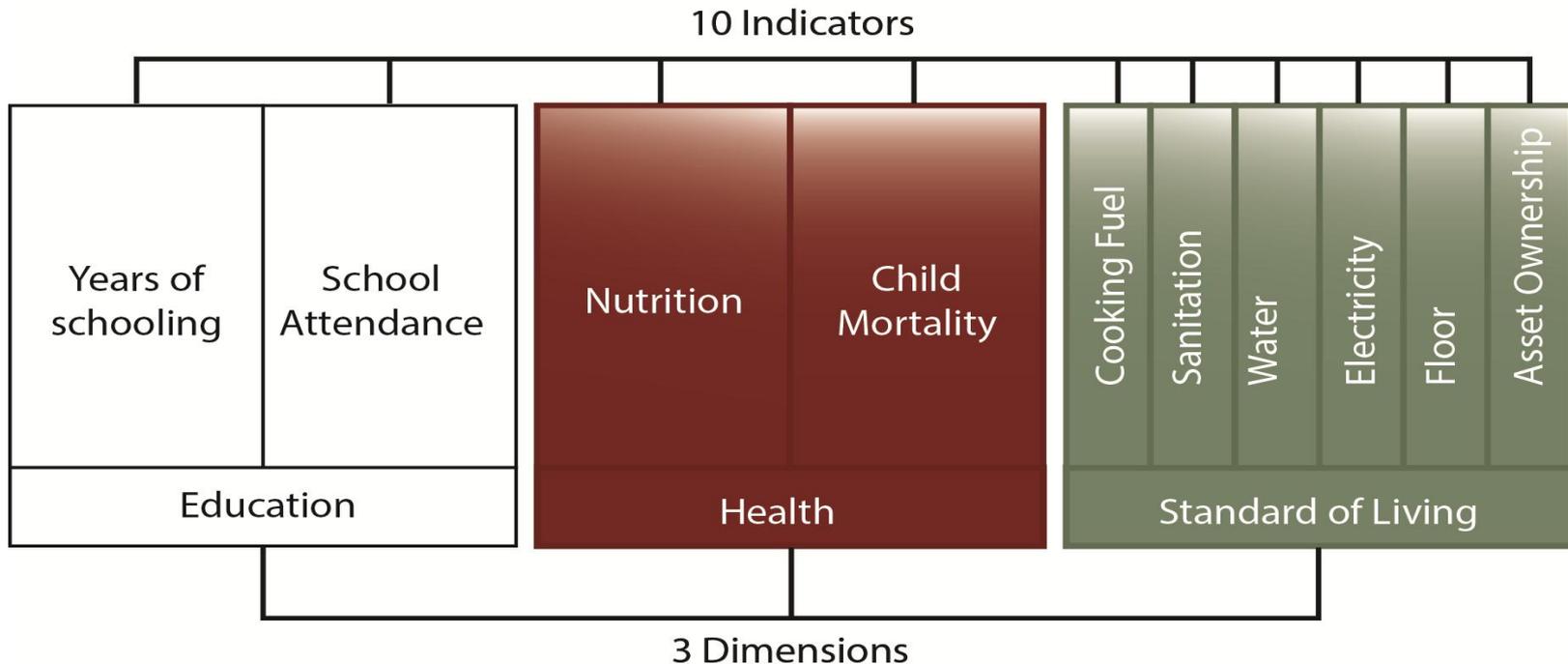


Constructing the MPI



1. Build a deprivation score for each person

Ex: Nathalie faces multiple deprivations in health and living standards

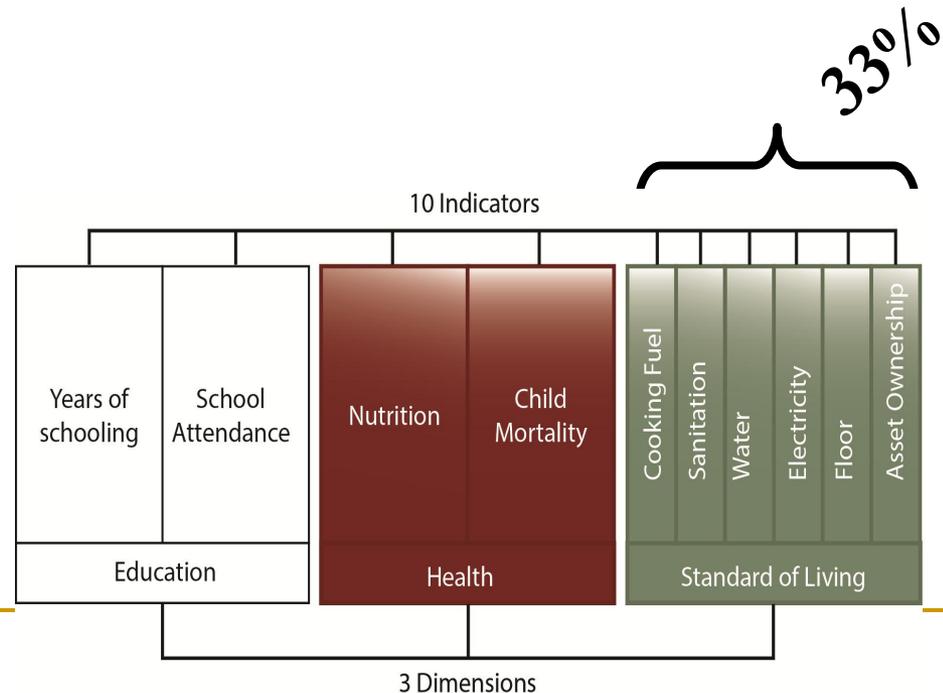


Constructing the MPI

2. Identify who is poor

A person is multidimensionally poor if deprived in 33% or more of the dimensions.

Ex: Nathalie's deprivation score is 67% > 33% so Nathalie is poor



Constructing the MPI

3. **Compute** $MPI = M_o$ as the product of two components:

$$MPI = H \times A$$

Incidence H

percentage of people who are poor

Intensity A

average percentage of dimensions in which poor people are deprived

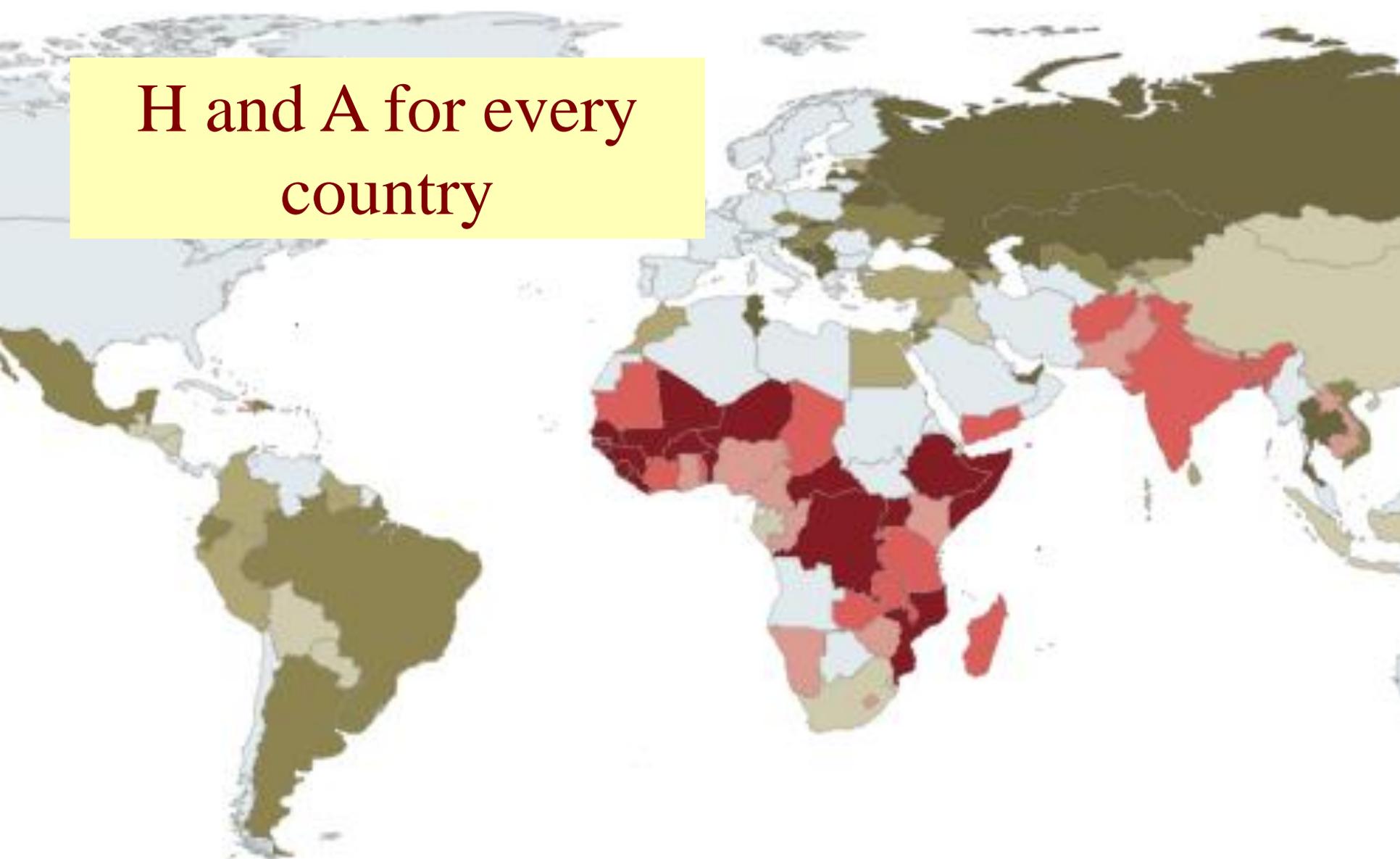
Counting
Methods
(NBI)

Axiomatic
Methods
(FGT)

AF
Methodology
 M_0

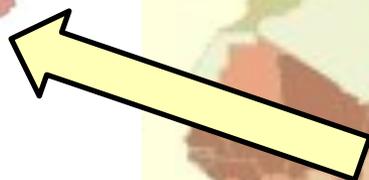
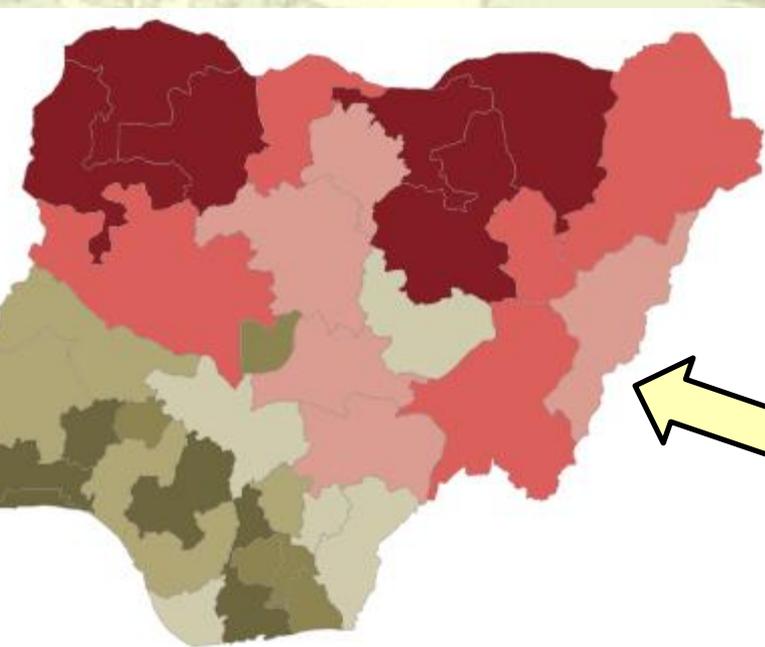
Following Atkinson 2003

H and A for every
country



11.03 11.04 - 29.41 29.42 - 49.57 49.58 - 69.43 69.44 - 89.3 Missing Value

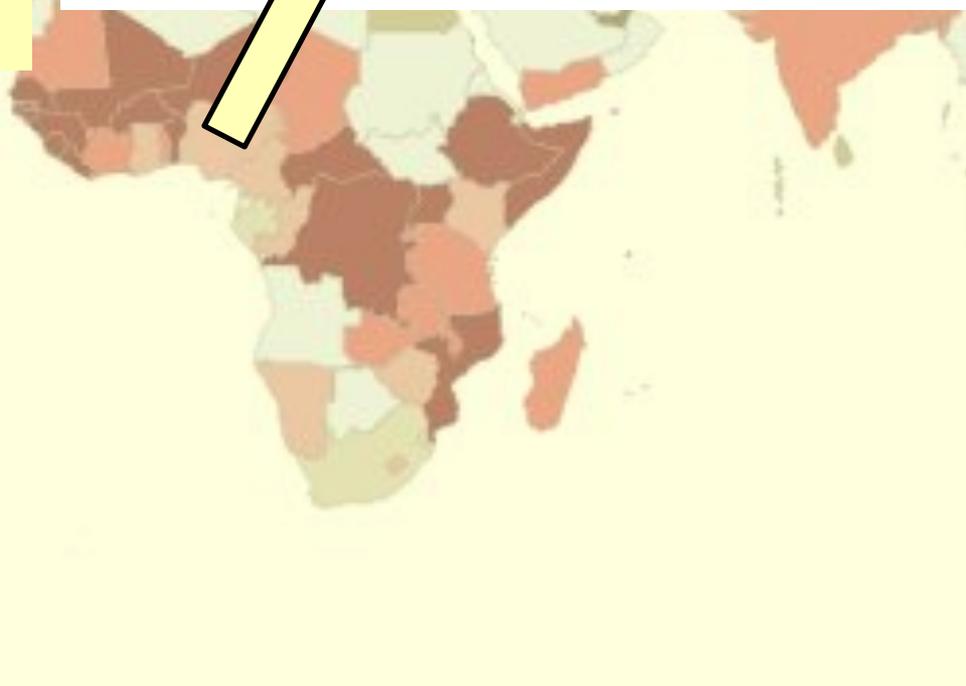
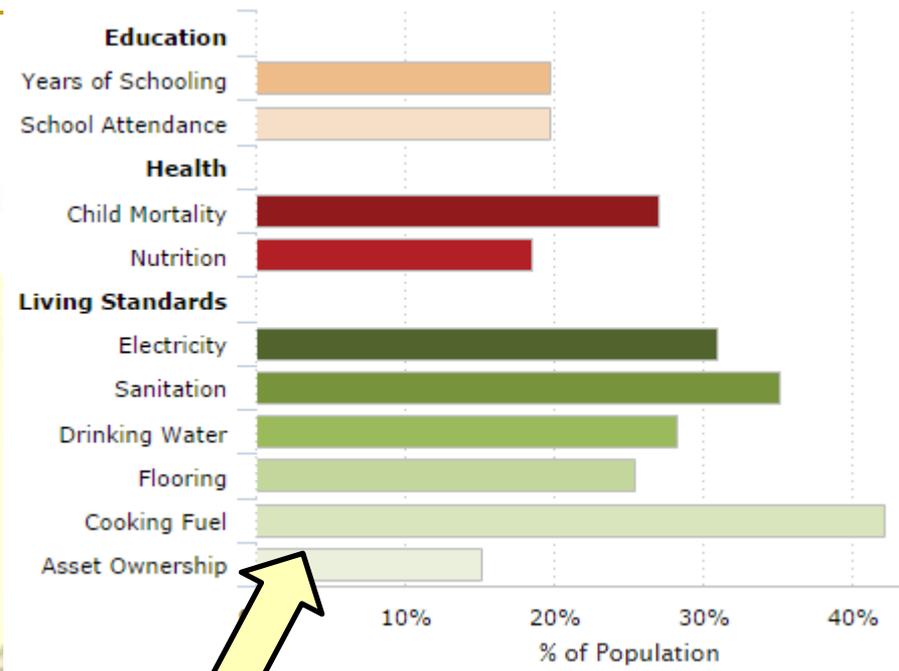
Disaggregated data by region



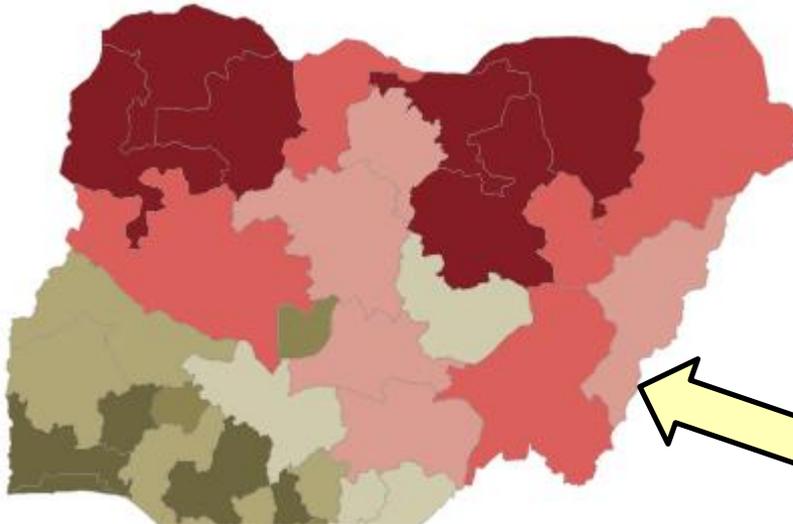
11.03 11.04 - 29.41 29.42 - 49

12.82 - 13.4 13.41 - 14.97 14.98 - 17.73 17.74 - 22.44 22.45 - 27.11 27.12 - 44.6 Missing

Composition of poverty by dimension

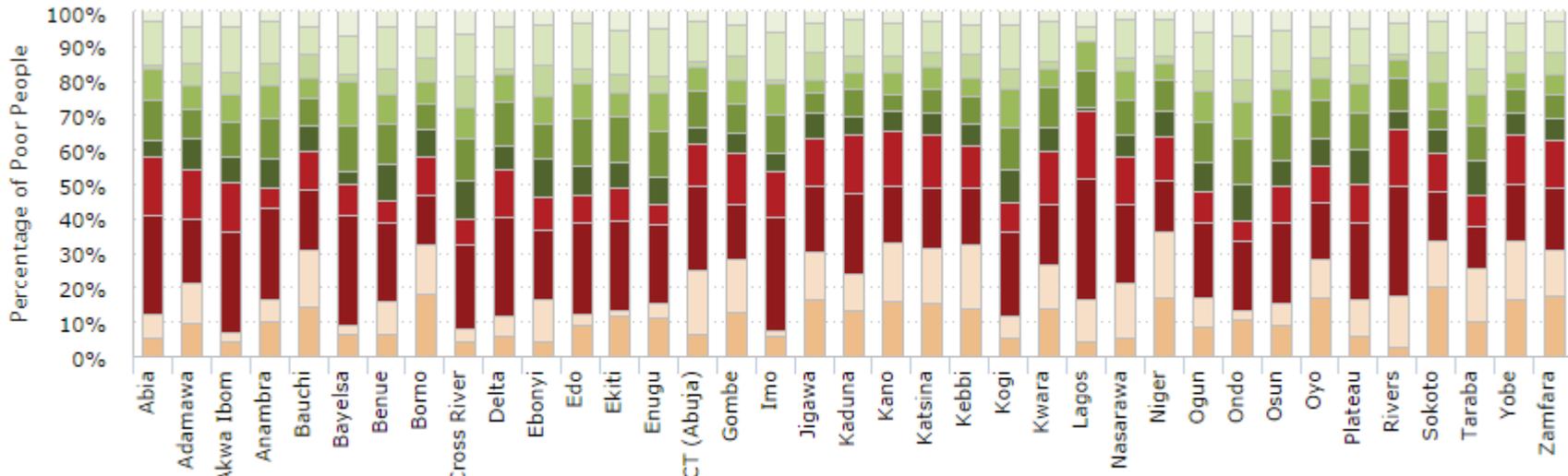


Composition by region and dimensions

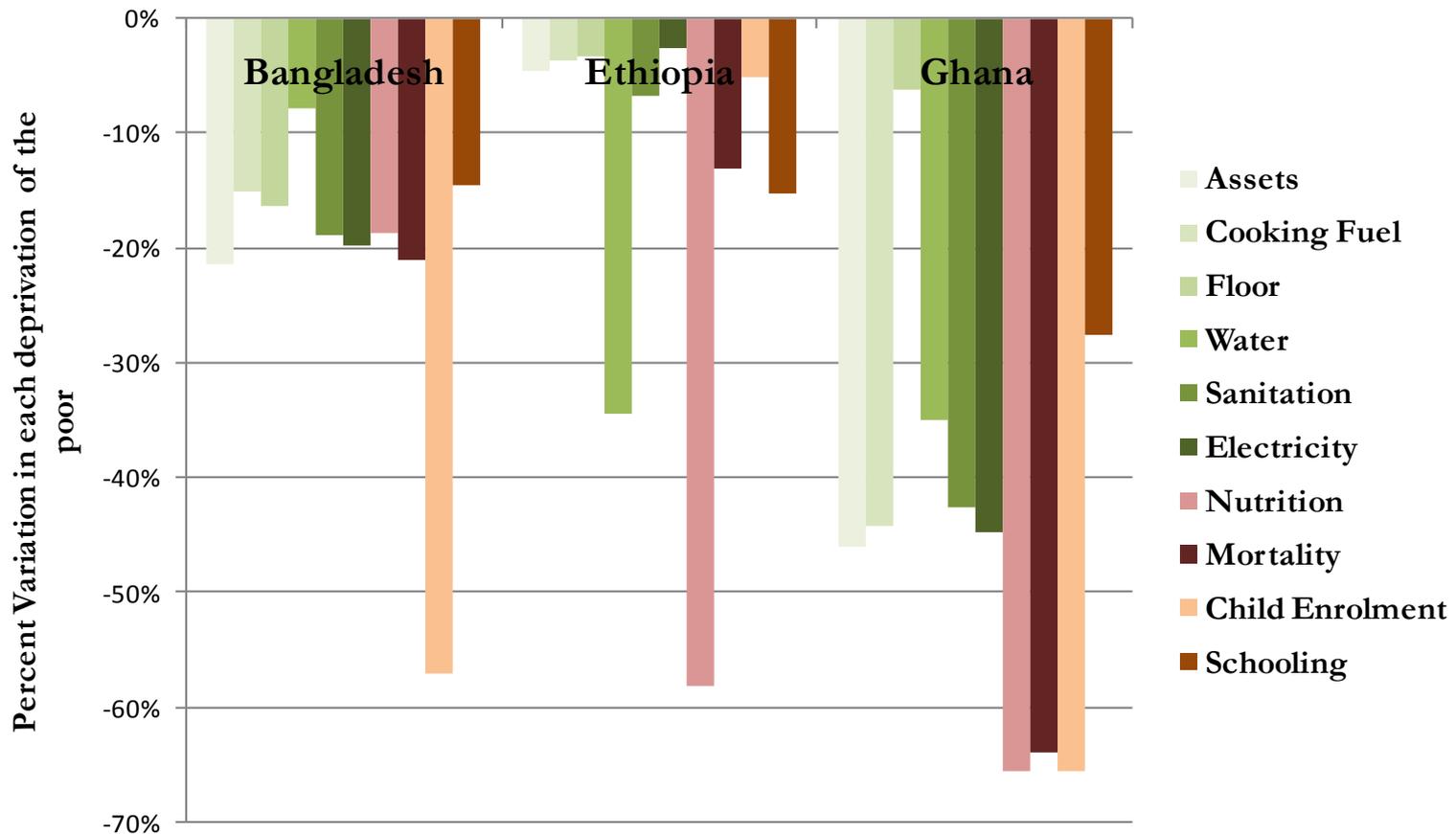


Percentage Contribution of Each Indicator to the MPI at the Sub-national Level

OPHI MPI 2014



Progress over Time Bangladesh improved school attendance, Ethiopia nutrition and water, Ghana many at the same time.



The MPI is like a high resolution lens...



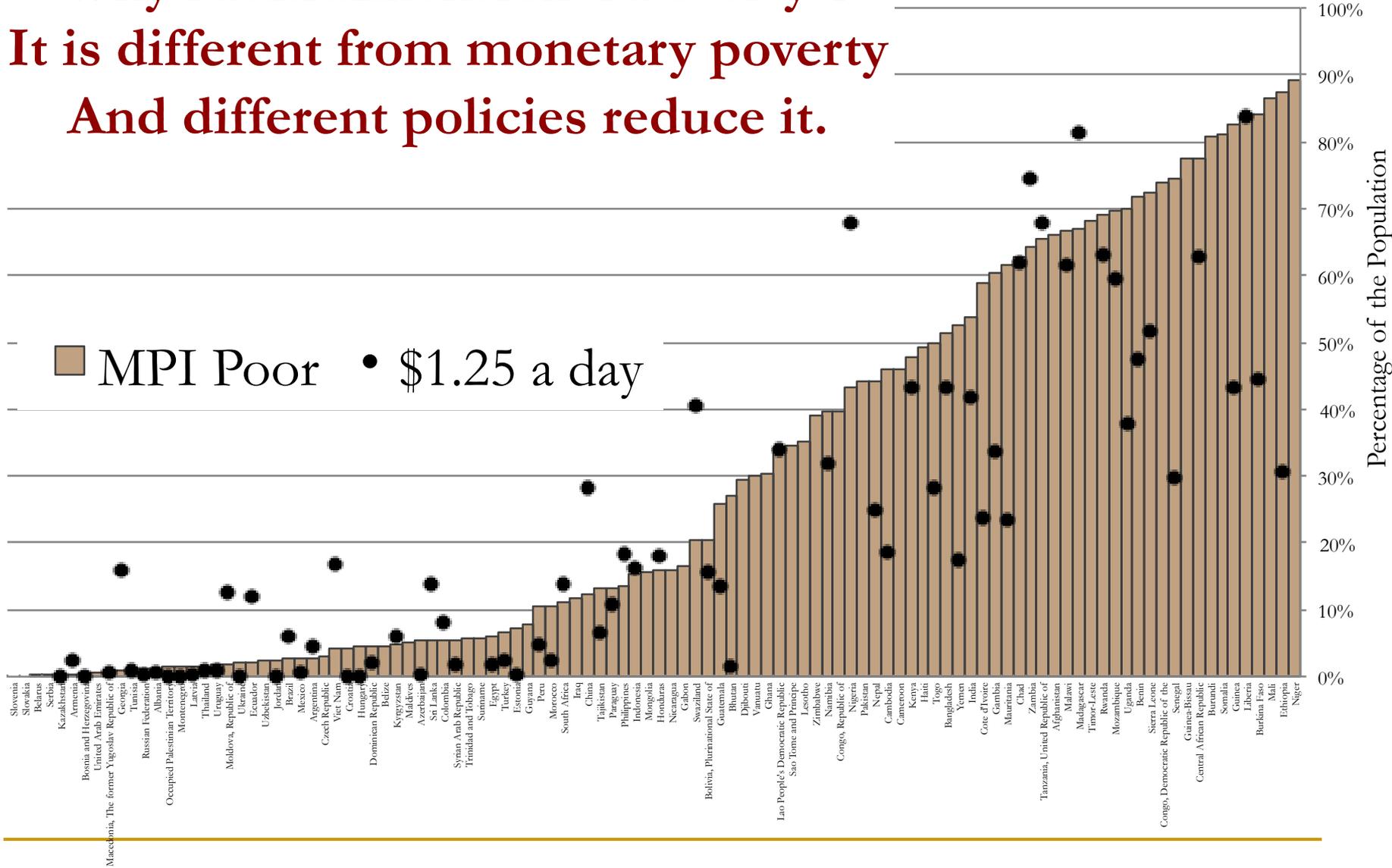
The MPI is like a high resolution lens...

You can zoom in



Why Multidimensional Poverty?²

It is different from monetary poverty
And different policies reduce it.



Example 2: National Methodologies

Motivations

Show **progress** quickly and directly (Monitoring/Evaluation)

Inform **planning** and focus **policy**

Target poor people and communities more effectively

Reflect poor people's **own** understandings of poverty

Cases of National MPIs

Mexico December 2009

Colombia August 2011

Others in progress

- Slides drawn from government agencies
 - Available on agency websites
-

Example 2.1 - Mexico

Good **Governance** in Bad Times



Consejo Nacional de Evaluación
de la Política de Desarrollo Social

Multidimensional Poverty in Mexico Methodology & results

First released December, 2009

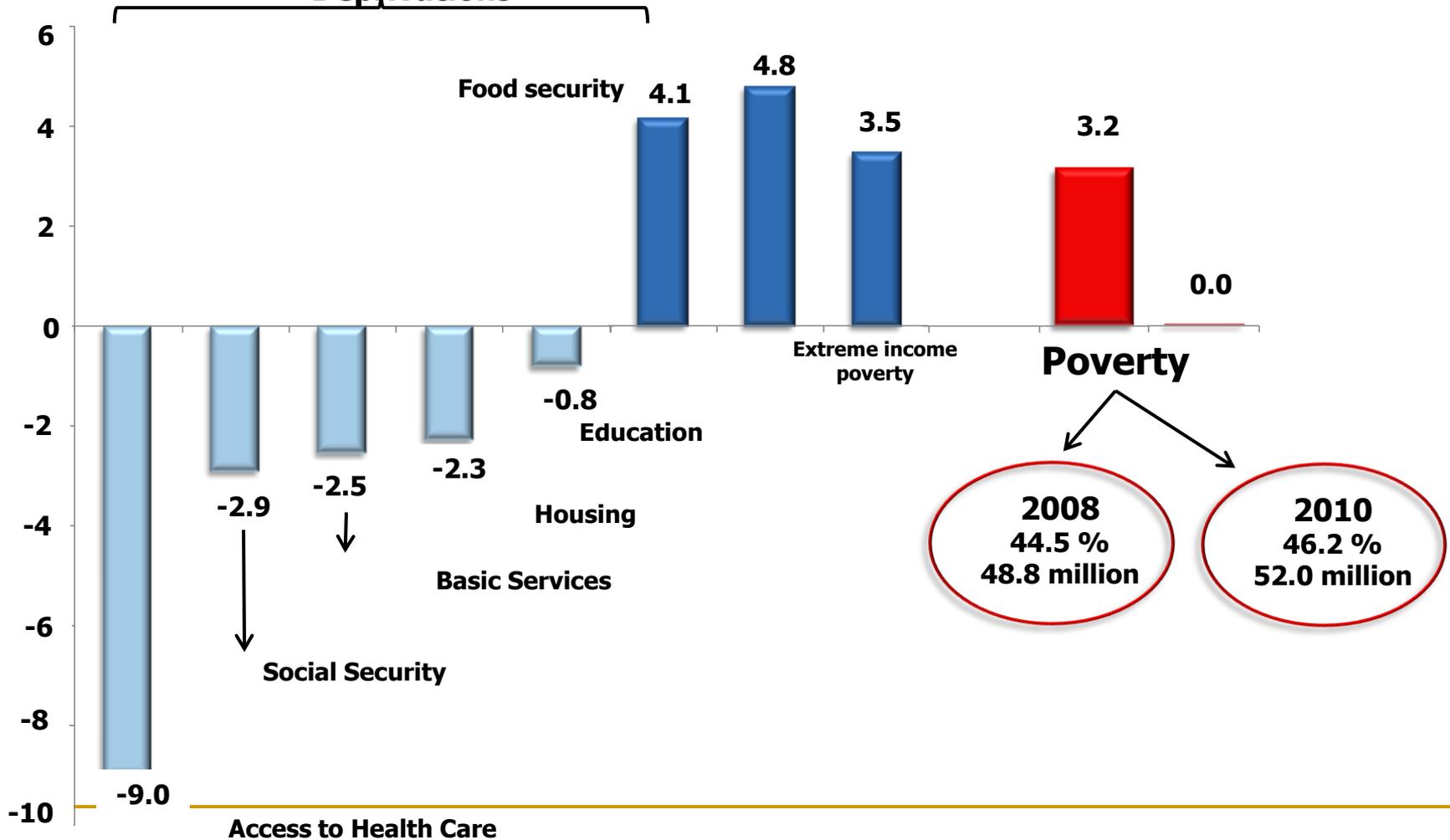
www.coneval.gob.mx

Change in the Number of Poor People in Mexico 2008-2010

Millions of people

Social Deprivations

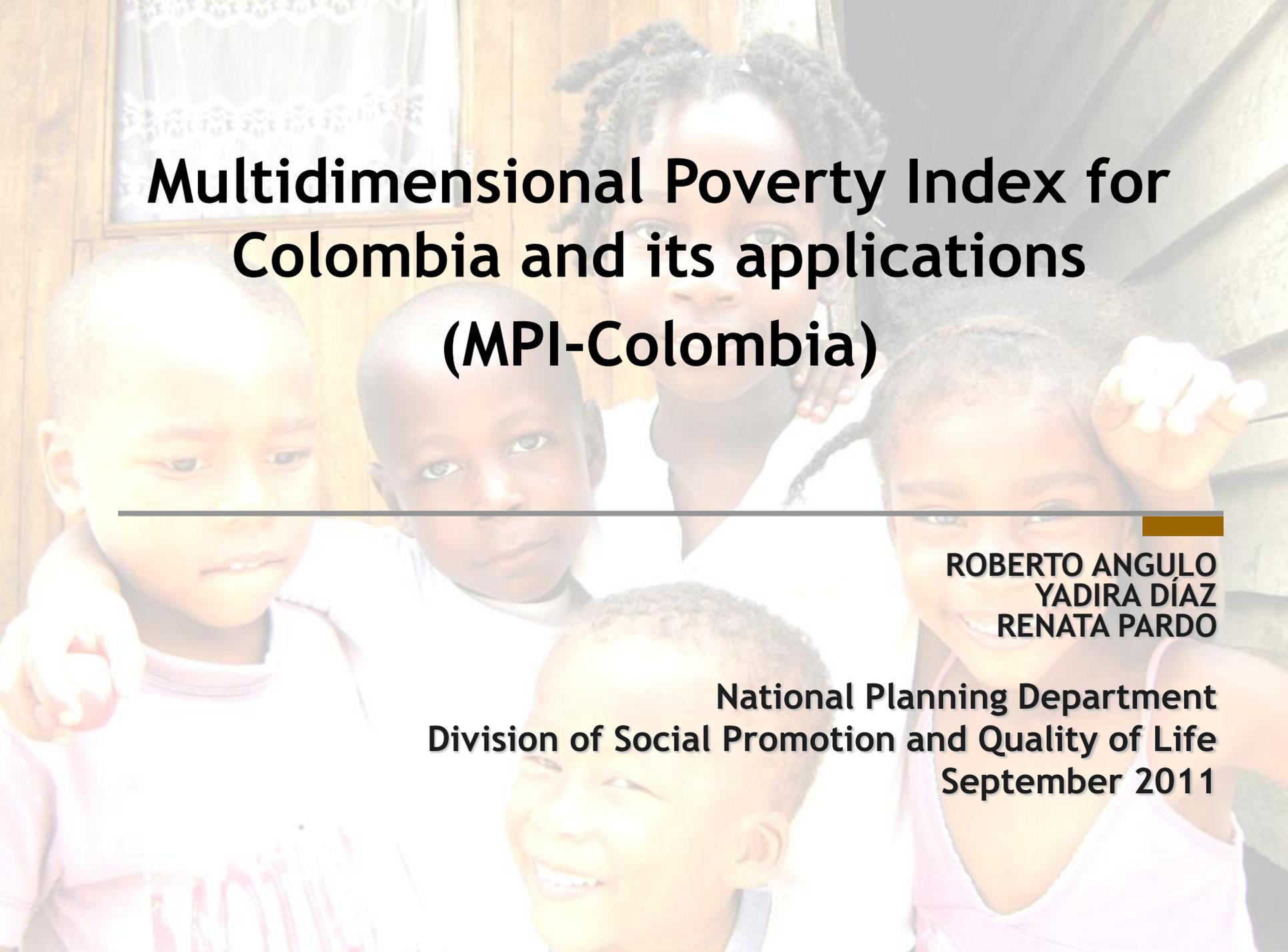
Income Poverty



Example 2.2 - Colombia

Coordinating Action



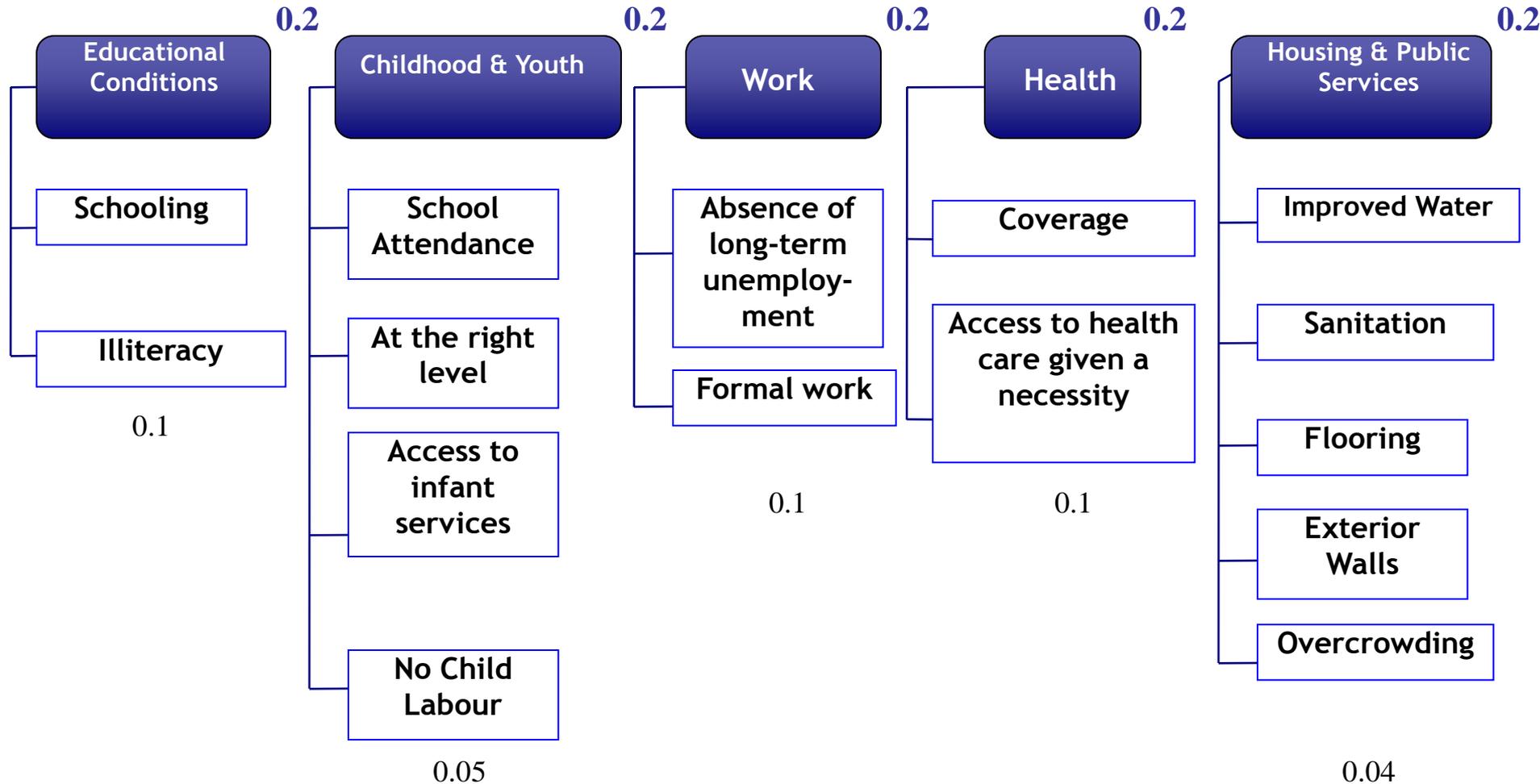


Multidimensional Poverty Index for Colombia and its applications (MPI-Colombia)

**ROBERTO ANGULO
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**National Planning Department
Division of Social Promotion and Quality of Life
September 2011**

Dimensions, Variables and Weights MPI-Colombia



Poverty committee

Coordinating and monitoring poverty reduction

■ Leaders

- Counselor for the Presidency
- National Planning Department

■ Permanent members

- Ministry of Health
- Ministry of Labor
- Ministry of Housing
- Ministry of Agriculture
- Ministry of Education
- Ministry of Finance



MANDATORY PRESENCE
The President of Colombia

Summary: Two Measurement Technologies

Two forms of technologies for evaluating poverty

- for identification and aggregation

1 Unidimensional methods apply when:

Single welfare variable – eg, calories

Variables can be combined into an aggregate variable – eg, expenditure, income

2 Multidimensional methods apply when:

Variables cannot be meaningfully aggregated – eg, sanitation conditions and years of education

Desirable to leave variables disaggregated because sub-aggregates are policy relevant – eg food and nonfood consumption

Summary

The AF methodology:

Presents **complementary** picture of poverty

Includes other key, non-monetary **dimensions**

Policy relevant tool

Dimensions can embody country specific policies and **priorities**

Show **progress** quickly and directly (Monitoring/Evaluation)

Inform planning and **coordinate** action

Target poor people and communities more effectively

Reflect poor people's **own understandings** of poverty

Facilitates deeper understanding and policy analysis

HA; Decompositions by subgroup, **breakdown** by dimension; **changes**

Thank you
