The human poverty index for developing countries (HPI-1)

While the HDI measures average achievement, the HPI-1 measures *deprivations* in the three basic dimensions of human development captured in the HDI:

- A long and healthy life—vulnerability to death at a relatively early age, as measured by the probability at birth of not surviving to age 40.
- Knowledge—exclusion from the world of reading and communications, as measured by the adult illiteracy rate.
- A decent standard of living—lack of access to overall economic provisioning, as measured by the unweighted average of two indicators, the percentage of the population not using an improved water source and the percentage of children under weight-for-age.

Calculating the HPI-1 is more straightforward than calculating the HDI. The indicators used to measure the deprivations are already normalized between 0 and 100 (because they are expressed as percentages), so there is no need to create dimension indices as for the HDI.

The human poverty index for selected OECD countries (HPI-2)

The HPI-2 measures deprivations in the same dimensions as the HPI-1 and also captures social exclusion. Thus it reflects deprivations in four dimensions:

- A long and healthy life—vulnerability to death at a relatively early age, as measured by the probability at birth of not surviving to age 60.
- Knowledge—exclusion from the world of reading and communications, as measured by the percentage of adults (ages 16–65) lacking functional literacy skills.
- A decent standard of living—as measured by the percentage of people living below the income poverty line (50% of the median adjusted household disposable income).
- Social exclusion—as measured by the rate of long-term unemployment (12 months or more).

Calculating the HPI-1

1. Measuring deprivation in a decent standard of living

An unweighted average of two indicators is used to measure deprivation in a decent standard of living.

$$\text{Unweighted average} = 1/2\ (\text{population not using an improved water source}) + 1/2\ (\text{children under weight-for-age})$$

A sample calculation: Bolivia

Percentage of population not using an improved water source = 15%

Percentage of children under weight-for-age = 8%

$$\text{Unweighted average} = 1/2\ (15) + 1/2\ (8) = 11.3\%$$

2. Calculating the HPI-1

The formula used to calculate the HPI-1 is as follows:

$$\text{HPI-1} = [1/3\ (P_1^{\alpha} + P_2^{\alpha} + P_3^{\alpha})]^{1/\alpha}$$

Where:

P_1 = Probability at birth of not surviving to age 40 (times 100)

P_2 = Adult illiteracy rate

P_3 = Unweighted average of population not using an improved water source and children under weight-for-age

$\alpha = 3$

A sample calculation: Bolivia

$P_1 = 15.5\%$

$P_2 = 13.3\%$

$P_3 = 11.3\%$

$$\text{HPI-1} = [1/3\ (15.5^3 + 13.3^3 + 11.3^3)]^{1/3} = \mathbf{13.6}$$

Calculating the HPI-2

The formula used to calculate the HPI-2 is as follows:

$$\text{HPI-2} = [1/4\ (P_1^{\alpha} + P_2^{\alpha} + P_3^{\alpha} + P_4^{\alpha})]^{1/\alpha}$$

Where:

P_1 = Probability at birth of not surviving to age 60 (times 100)

P_2 = Percentage of adults lacking functional literacy skills

P_3 = Percentage of population below income poverty line (50% of median adjusted household disposable income)

P_4 = Rate of long-term unemployment (lasting 12 months or more)

$\alpha = 3$

A sample calculation: Canada

$P_1 = 8.1\%$

$P_2 = 14.6\%$

$P_3 = 11.4\%$

$P_4 = 0.5\%$

$$\text{HPI-2} = [1/4\ (8.1^3 + 14.6^3 + 11.4^3 + 0.5^3)]^{1/3} = \mathbf{10.9}$$

Why $\alpha = 3$ in calculating the HPI-1 and HPI-2

The value of α has an important impact on the value of the HPI. If $\alpha = 1$, the HPI is the average of its dimensions. As α rises, greater weight is given to the dimension in which there is the most deprivation. Thus as α increases towards infinity, the HPI will tend towards the value of the dimension in which deprivation is greatest (for Bolivia, the example used to calculate the HPI-1, would be 15.5, equal to the probability at birth of not surviving to age 40).

In this Report the value 3 is used to give additional but not overwhelming weight to areas of more acute deprivation. For a detailed analysis of the HPI's mathematical formulation, see Sudhir Anand and Amartya Sen's "Concepts of Human Development and Poverty: A Multidimensional Perspective" and the technical note in *Human Development Report 1997* (see the list of selected readings at the end of this technical note).