Planning Commission - UNDP sponsored

"Strengthening State Plans for Human Development"

Training of Trainers Workshop on Human Development

MODULE: 3

Measuring Human Development

15th January 2007 - 19th January 2007

Administrative Training Institute
Government of West Bengal
FC Block, Sector – III, Salt Lake
Kolkata – 700106
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Module 3

Measuring Human Development

Time – Three hours

Interactive Session – 2 Hrs

Exercise – 60 minutes

Learning Outcomes

Knowledge acquired through this module will allow the participants to:

- . Explain the Human Development Index
- Calculate HDI
- Interpret the situation of a country or region in terms of its HDI
- . Describe the relationship between HD and HDI
- Explain the Gender Related Development Index (GDI) & Gender Empowerment Measures (GEM)
- Describe Human Poverty Index

Emergence of HDI

Any measure that values a gun hundred times more than a bottle of milk is bound to raise serious questions. It is no surprise, then, that since the emergence of national income accounts, there has been a considerable dissatisfaction with gross national product as a measure of human welfare. The main drawback of GNP is that it does not take into account the non-monetised activities – household work, subsistence agriculture, unpaid services. And what is more serious, GNP is one dimensional: it fails to capture the cultural, social, political and many other choices that people make.

There has been a long search for more comprehensive measure of development that could capture all, or many more, of the choices people make – a measure that would serve as a better yardstick of the socio- economic progress of nations. The search for a new composite index of socio-economic progress began in earnest in preparing the Human Development Report under the sponsorship of UNDP. Several principles guided this search.

- . The new human development index (HDI) would measure the basic concept of human development to enlarge people's choices.
- . The new index would include only a limited number of variables to keep it simple and manageable.
- . A composite index would be constructed instead of plethora of separate indices
- . The new index would cover both social and economic choices
- . The methodology and coverage of HDI would be kept flexible – subject to gradual refinements as analytical critiques emerged and better data became available.
- Even though an index can only be as good as the data fed into it, a lack of reliable and up to date data series was not allowed to inhibit the emergence of the HDI. Instead, HDI country

rankings would act as a pressure point to persuade policy makers to invest adequate amounts in producing relevant data and to encourage international institutions to prepare comparable statistical data systems

The Human Development Indices

Even though quite a number of specific measures of HD have been presented or suggested in the literature, four of them have so far consolidated within the paradigm. These measures are the Human Development Index, the Gender-related Development Index, the Gender Empowerment Measure, and the Human Poverty Index.

a. The **Human Development Index (HDI)** was designed as a means to shift the emphasis from the narrow focus on economic growth (measured by GNP) to human progress and the widening of human choices, as well as to create debate on national and international policy options. HDI measures a country's total achievement in three dimensions of HD: longevity, knowledge, and a decent level of living. As variables it uses life expectancy at birth, educational achievement (literacy and combined gross schooling ratio), and the real adjusted per capita income.

b. The **Human Poverty Index (HPI)** measures the extent of deprivation in HDI's three dimensions. For industrialized countries, it uses as variables the probability of dying before age 60, functional illiteracy, and the incidence of poverty and long-lasting unemployment. For developing countries, its variables are the probability of death before age 40, adult illiteracy, child malnutrition, and the percentage of population with no access to drinking water.

c. The **Gender-Related Development Index (GDI)** measures the achievement in the three dimensions and variables of HDI, but it adjusts their values according to the inequality existing between sexes: the higher gender inequality, the larger the retrogression in the country's HDI.

d. The **Gender Empowerment Measure (GEM)** assesses women's participation in economic and political life. As variables it uses the female share in Parliament as well as in the higher occupational categories, and the proportion between women and men's income. HDI, HPI and GDI refer to the same set of basic human choices (life expectancy, knowledge, and standard of living). The HD Reports and the HD academic community have explored additional dimensions, including human freedom, political democracy, inequality, poverty, technological advance, human rights, and governance. Yet an introductory course can only discuss the best known measure of HD, namely, the HDI.

Calculating the Human Development Index

As stated, three major options are chosen for HDI:

a. Long lasting and healthy life,

b. Access to knowledge, and

c. Resources for a decent life

These options are selected for several reasons:

They are essential to any human life

- . They are fairly independent from each other
- . They cover most the spectrum of "things human beings have a good reason to value and
- to desire"
- . Relevant statistics are available for almost any country and for many populations of interest

To capture the three dimensions above the following variables are used:

a. For long lasting and healthy life, life expectancy at birth, precisely defined as "the average number of years a newborn can expect to live in a cohort subject to the prevailing age-specific mortality rates in the society and moment under consideration".

b. For access to knowledge,

- . Adult (over age 15) literacy rate, where literacy is understood as "the capability of reading, writing and understanding a simple and short text on everyday life"; and Combined gross enrollment ratio for population aged 6 to 23, where the combined gross enrollment ratio is the total number of students enrolled in primary, secondary or tertiary formal education divided by the total population in the corresponding ages.

c. For resources for a decent life, the per capita income expressed both in US dollars and in purchasing power parity - PPP- units.

- . The per capita income is the total value of the final goods and services produced by a country in a given period, divided by the total population at mid-year.
- The per capita income, usually expressed in nominal US dollars, fails to consider the inter-country variations in the cost of living. Units of purchasing power parity (PPP) are used to correct this deficiency. The correction is based on calculating the international or average price of a large series of goods and services in different countries, and in applying those standard prices to the goods and services of the country in question. Notice that in choosing these variables, conceptual problems do arise. In fact, it can be questioned whether or not life expectancy is the best measure of a long lasting and healthy life; whether or not access to knowledge could be measured with variables better than literacy and schooling, or if the resources for a decent life could be better measured with indicators other than the per capita income in PPP.

The several goals of HD "cannot be reduced to a single variable or merely to a number"; and "the range of HD choices is, in principle, endless". Both statements seemingly run in the face of the HDI, which pins HD down to a number and is based in but three human choices.

The concept of HD is much broader than the three dimensions included in the HDI. For example, the HDI does not reflect political participation, governance issues or gender inequalities. This is largely because of the difficulty of adequately capturing such complex aspects of HD in a single index, and due to the absence of some generally agreed and unambiguous indicators. A fuller picture of a country's level of HD requires an analysis of other HD indicators and information as well.

Furthermore, HDI cannot be used as a measure of HD change in the short-run, as the effect of policies to impact two of the HDI indicators-adult literacy and life expectancy-will only be felt long after having put these policies in place. As a result of this lag time, the HDI best captures long-run changes in a country's HD situation.

Rather than a paralyzing criticism, the above points should be taken as cautionary notes in using and interpreting the HDI (and the remaining measures of HD). For one thing, these indices do not claim to reflect the full range of HD choices; they select a few yet highly relevant choices.

Then, they do not aim at measuring the "true" development of any one country but, instead, at ranking countries according to their HD status. Lastly, in their coming out but with a number, the indices are not meant to ignore HD's multidimensionality; they simply improve upon standard, unidimensional measures of development.

Group Exercise No. 1 – Time: 60 minutes

Provide the participants with the worksheets to calculate HDI. Demonstrate the manner in which HDI is calculated. Ask the participants to calculate the HDI and discuss the values. Rank the States according to the HDI. Highlight the States with the highest and the lowest values.

Value addition of HDI

The HDI is a measure that can capture the attention of policy makers, media and NGOs and expand the debate beyond the more usual economic statistics to focus instead on human outcomes.

The HDI can also provide a basis for questioning national policy choices.

- The **Philippines** 1999 report on education spurred debates on educational reforms in the country's Senate and Executive Cabinet, and the 1997 report led to Presidential directive mandating all local governments to devote at least 20 per cent of the revenue to HD priorities. The President also asked the National Statistical Coordination Board to include the Human Development Index (HDI) in the system of statistics to track variations across provinces.
- Japan and South Korea have adopted the HDR's Gender Empowerment Measure in
- the formulation of national legislation.
- In **India**, human development analysis and priorities have become an integral part of national and provincial government planning. The Tenth Five Year Plan (2002-2007) accords high priority to human development at the provincial level. An example is that of the government of Maharashtra using the HDI to initiate action research on low HDI districts and the specific aspects that contributed to their low human development status so that effective policy action may be initiated.

The HDI can also highlight wide differences within countries, between provinces or states, across gender, ethnicity, and other socioeconomic groupings. Highlighting internal disparities along these lines has raised national debate in many countries.

- In the **Egypt** HDR 1999, HDI revealed that Upper Egypt region was far behind Cairo in every dimension of human development. This led to a formal policy discussion of resource allocation between the governors of 17 provinces in the country and the entire resource allocation pattern was changed to funnel more funds to the Upper Egypt region.
- In **Brazil,** the large State of Minas Gerais, disaggregated the human development index for all its municipalities. It then introduced the so called "Robin Hood Law" that ensures that more tax revenues are allocated to those of its municipalities that rank low on the index, as well as perform poorly on a number of other social and environmental indicators. The central government is now planning to use a modified version of the human development index, in combination with other indicators, to allocate resources to all of the country's more than 5,000 municipalities. No longer will population size be used as the only criteria when resource allocations to municipalities are determined. Instead the budgets will depend on their level of human development.

Human Development and HDI

Ironically, the human development approach to development has fallen victim to the success of human development index. The HDI has reinforced the narrow, oversimplified interpretation of the human development concept as being only about expanding education, health and decent living standards. This had obscured the broader, more complex concept of human development as the expansion of capabilities that widen the peoples choices to lead lives that they value. Despite careful efforts to explain that the concept is broader than the measure, human development continues to be identified with the HDI- while political freedoms, participating in the life of one's community and physical security are often overlooked. But such capabilities are as universal and fundamental as being able to read or to enjoy good health. They are valued by all people- and without them all choices are foreclosed. They are not included in the HDI because they are difficult to measure appropriately, not because they are less important to human development. Always remember that HDI is just a summary measure and does not provide a comprehensive picture of human development in any situation.

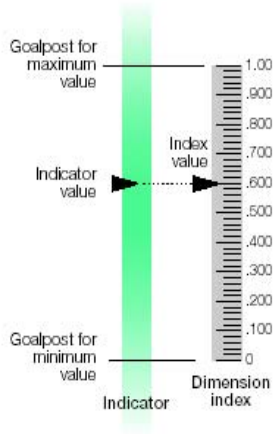
Annexure

The human development index (HDI)

The HDI is a summary measure of human development. It measures the average achievements in a country in three basic dimensions of human development:

- A long and healthy life, as measured by life expectancy at birth.
- Knowledge, as measured by the adult literacy rate (with two-thirds weight) and the combined primary, secondary and tertiary gross enrolment ratio (with one-third weight).
- A decent standard of living, as measured by GDP per capita (PPP US$).

Before the HDI itself is calculated, an index needs to be created for each of these dimensions. To calculate these dimension indices —the life expectancy, education and GDP indices—minimum and maximum values (goalposts) are chosen for each underlying indicator.



Performance in each dimension is expressed as a value between 0 and 1 by applying the following general formula:

$$\text{Dimension index} = \frac{\text{actual value} - \text{minimum value}}{\text{maximum value} - \text{minimum value}}$$

The HDI is then calculated as a simple average of the dimension indices. The box at right illustrates the calculation of the HDI for a sample country.

Goalposts for calculating the HDI

Indicator	Maximum value	Minimum value
Life expectancy at birth (years)	85	25
Adult literacy rate (%)	100	0
Combined gross enrolment ratio (%)	100	0
GDP per capita (PPP US$)	40,000	100

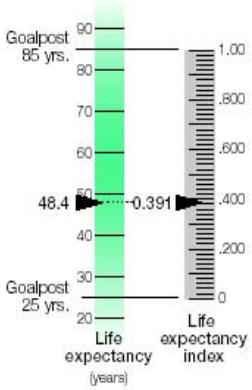
Calculating the HDI

This illustration of the calculation of the HDI uses data for South Africa.

1. Calculating the life expectancy index

The life expectancy index measures the relative achievement of a country in life expectancy at birth. For South Africa, with a life expectancy of 48.4 years in 2003, the life expectancy index is 0.391.

$$\text{Life expectancy index} = \frac{48.4 - 25}{85 - 25} = 0.391$$

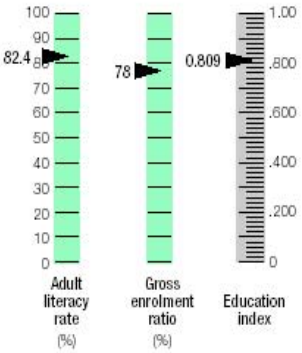


2. Calculating the education index

The education index measures a country's relative achievement in both adult literacy and combined primary, secondary and tertiary gross enrolment. First, an index for adult literacy and one for combined gross enrolment are calculated. Then these two indices are combined to create the education index, with two-thirds weight given to adult literacy and one-third weight to combined gross enrolment. For South Africa, with an adult literacy rate of 82.4% in 2003 and a combined gross enrolment ratio of 78% in the school year 2002/03, the education index is 0.809.

$$\text{Adult literacy index} = \frac{82.4 - 0}{100 - 0} = 0.824$$

$$\text{Gross enrolment index} = \frac{78 - 0}{100 - 0} = 0.780$$

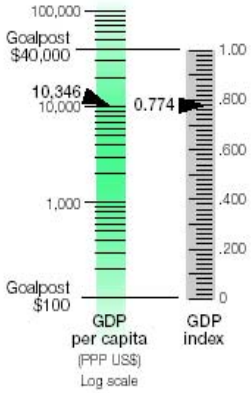


$$\text{Education index} = 2/3\ (\text{adult literacy index}) + 1/3\ (\text{gross enrolment index})$$
$$= 2/3\ (0.824) + 1/3\ (0.780) = 0.809$$

3. Calculating the GDP index

The GDP index is calculated using adjusted GDP per capita (PPP US$). In the HDI income serves as a surrogate for all the dimensions of human development not reflected in a long and healthy life and in knowledge. Income is adjusted because achieving a respectable level of human development does not require unlimited income. Accordingly, the logarithm of income is used. For South Africa, with a GDP per capita of $10,346 (PPP US$) in 2003, the GDP index is 0.774.

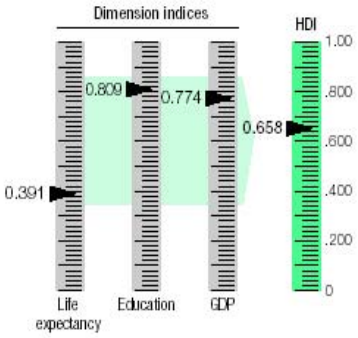
$$\text{GDP index} = \frac{\log(10{,}346) - \log(100)}{\log(40{,}000) - \log(100)} = 0.774$$



4. Calculating the HDI

Once the dimension indices have been calculated, determining the HDI is straightforward. It is a simple average of the three dimension indices.

$$\text{HDI} = 1/3\ (\text{life expectancy index}) + 1/3\ (\text{education index}) + 1/3\ (\text{GDP index})$$
$$= 1/3\ (0.391) + 1/3\ (0.809) + 1/3\ (0.774) = 0.658$$



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 without sustainable access to 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.

Originally, the measure of deprivation in a decent standard of living also included an indicator of access to health services. But because reliable data on access to health services are lacking for recent years, in this year's Report deprivation in a decent standard of living is meausred by two rather than three indicators—the percentage of the population without sustainable access to an improved water source and the percentage of children under weight for age.

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 (aged 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.

Unweighted average = 1/2 (population without sustainable access to an improved water source) + 1/2 (children under weight for age)

A sample calculation: Angola

Population without sustainable access to an improved water source = 50%

Children under weight for age = 31%

Unweighted average = 1/2 (50) + 1/2 (31) = 40.5%

2. Calculating the HPI-1

The formula for calculating 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 without sustainable access to an improved water source and children under weight for age

α = 3

A sample calculation: Angola

P_1 = 48.1%

P_2 = 33.2%

P_3 = 40.5%

$$\text{HPI-1} = [1/3 (48.1^3 + 33.2^3 + 40.5^3)]^{1/3} = 41.5$$

Calculating the HPI-2

The formula for calculating 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 = Adults lacking functional literacy skills

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

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

α = 3

A sample calculation: United States

P_1 = 11.8%

P_2 = 20.0%

P_3 = 17.0%

P_4 = 0.7%

$$\text{HPI-2} = [1/4 (11.8^3 + 20.0^3 + 17.0^3 + 0.7^3)]^{1/3} = 15.4$$

Why α = 3 in calculating the HPI-1 and HPI-2

The value of α has an important impact on the value of the HPI. If α = 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 Angola, the example used for calculating the HPI-1, it would be 48, 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).