

M.A ECONOMICS 2ND SEMESTER

ECOPG – 201

ECONOMIC GROWTH AND DEVELOPMENT

MODULE – 3

SOCIAL AND INSTITUTIONAL ASPECTS OF DEVELOPMENT

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Economic Development and Economic Growth

By a “developed” economy, people roughly mean ones with a high, persistently-growing per- capita income which is not simply based on resource extraction (i.e., oil) or remittances or rentierism – an industrial (or, if there is such a thing, post-industrial) economy which makes most of its participants reasonably and increasingly prosperous. While there are of course differences among them – the United States is not New Zealand, which is not Belgium, which is not Finland, which is not Japan – they are all more similar to each other than they are to the vast variety of “undeveloped”, “under-developed”, or (most optimistically) “developing” economies across the world. (Some people refer to the developed countries as “the North” and the others as “the South”; this drives me up the wall, if only from looking at where China and Australia are on the map.) Economies in the first category tend to stay there; so, sadly, do countries in the second. Development economics is the sub-discipline of economics which attempts to study how economies which have not attained this happy condition can be made to do so, and the factors which hold others back.

Normally in economic textbooks, growth and development are used synonymously, and this usage is widely acceptable. However, in particular, the two terms have been distinguished by different economists as follows:

1. To some economists, economic development refers to the process of expansion of backward economies, while economic growth relates to that of advanced economies.
2. **Schumpeter**, however, uses the term “economic development” as a spontaneous and discontinuous change in the stationary state which disturbs the equilibrium state previously existing. And the term “economic growth” is used to denote a steady and gradual change in the long run which comes through a general increase in the rate of saving and population in a dynamic economy.
3. **Prof. Kindleberger** has given the differences between growth and development as; “Growth may well imply not only more output and also more inputs and more efficiency, i.e., an increase in output per unit of input. Development goes beyond these to imply changes in the structure of outputs and in the allocation of inputs by sectors. By

analogy with human beings to stress growth involves focusing on height and weight, while to emphasize development, draws attention to the change in functional capacity in physical coordination. For example, growth without development—more and more steel in the Soviet Union or more and more coffee in Brazil—leads nowhere. It is virtually impossible to contemplate development without growth because change in function requires a change in size. Until an economy can produce a margin above its food, through growth, it will be unable to allocate a portion of its resources to other types of activity”.

4. To some, economic development is the outcome of conscious and deliberate efforts involved in planning. Economic growth, on the other hand, signifies the progress of an economy under the stimulus of certain favourable circumstances, e.g., the progress achieved by the United Kingdom during the Industrial Revolution.
5. In his simple words, **A. Maddison** says, “The raising of income levels is generally called economic growth in rich countries and in poor ones it is called economic development”. **Mrs. Hicks** has also expressed almost the same views and said that economic development refers to the problems of underdeveloped countries and economic growth to those of advanced countries she points out that the problems of underdeveloped countries are concerned with development of unused resources, even though their uses are well-known; while those of advanced countries are related to growth, most of their resources being already known and developed to a considerable extent.
6. According to **Prof. Mehta**, however, the term “growth” has quantitative significance. Growth suggests an increase in the quantity or volume of something. An increase in a country’s population, national income; per capita income, consumption, saving, investment, foreign trade etc. over a period, all imply growth. In economics, however, growth strictly means an increase in real income, trade etc. over a period, all imply growth. In economics, however, growth strictly means an increase in real income, gross and per capita. On the other hand, development is a process of expansion, fulfilling the desire to have an increase in national income. From the above will be clear, the distinction and interface of growth and development.

Difference between Economic Growth and Economic Development:-

The difference between economic growth and economic development are:

1. Economic Growth is quantitative while economic development is qualitative.
2. Economic growth is comparatively a narrow concept and development is much more comprehensive.
3. Economic growth refers to increase in the total output of final goods and services in a country over a long period of time. In contrast, economic development refers to progressive change in the socio-economic structure of the country. It includes gender equality, change in composition of output, shift of labour force from agriculture to other sectors.
4. Economic growth is easy to realize as only monetary aspect is involved. But, it is very difficult to attain the goal of development as it involves many socio-economic-political aspects.
5. Economic growth can easily be estimated by real GDP or Real Per Capita income. But it is very difficult to measure development as it has some aspects that can't be quantified. Economic development however is indicated by Human Development Index.
6. Economic growth can take place without Economic development; however, economic development can't take place without economic growth.

Economic	Development	Economic Growth
Concept:	Normative concept	Narrowed concept than economic development
Scope:	Concerned with structural changes in the economy	Growth is concerned with increases in the economy's output
Growth:	Development relates to growth of human capital indexes, a decrease in inequality figures, and structural changes that improve the general population's quality of life	Growth relates to a gradual increase in one of the components of Gross Domestic Product: consumption, government spending, investment, net exports

Implication:	It implies changes in income, saving and investment along with progressive changes in socio-economic structure of country (institutional and technological changes)	It refers to an increase in the real output of goods and services in the country like increase the income in savings, in investment etc.
Measurement:	Qualitative. HDI (Human Development Index), gender-related index (GDI), Human poverty index (HPI), infant mortality, literacy rate etc.	Quantitative Increase in real GDP.
Effect:	Brings qualitative and quantitative changes in the economy	Brings quantitative changes the economy

HUMAN DEVELOPMENT INDICES

Economists have tried to measure social indicators of basic needs by taking one, two or more indicators for constructing composite indices of human development. We study below the Physical Quality of Life Index (PQLI) of Morris and the Human Development Index (HDI) as developed by the United Nations Development Programme (UNDP).

1. PHYSICAL QUALITY OF LIFE INDEX (PQLI)

The Physical Quality of Life Index was the most serious challenge to GNP per capita as the index of development. It was invented by M.D. Morris in 1979. He constructed a composite Physical Quality of Life Index (PQLI) relating to 23 developing countries for a comparative study. He combined three component indicators to measure performance in meeting the most basic needs of the people. These are:

- Infant Mortality Rate
- Life Expectancy at Age One
- Basic Literacy Rate

This index represents a wide range of indicators such as health, education,

drinking water, nutrition and sanitation. The PQLI shows improvement in the quality of life when people enjoy the fruits of economic progress with **increase in life expectancy (LE), fall in infant mortality rate (IMR) and rise in basic literacy rate (BLR).**

Each indicator of the three components is placed on a scale of zero to 100 where *zero* represents an absolutely defined *worst* performance and 100 represents an absolutely defined *best* performance. The PQLI index is calculated by averaging the three indicators giving equal weight to each and the index is also scaled from 0 to 100.

If the indicators of life expectancy and basic literacy rate are *positive*, the *best* performance is shown as the *maximum* and the *worst* as the *minimum*. Infant mortality rate being a *negative* indicator, for this the *best* indicator is shown as the *minimum* and the *worst* as the *maximum*. To find out the achievement level of the positive variable, its minimum value is deducted from its actual value and the balance is divided by the difference (range) between maximum value and minimum value i.e.

$$\text{Achievement Level} = \frac{\text{Actual Value} - \text{Minimum Value}}{\text{Max. Value} - \text{Min. Value}}$$

To find out the achievement level for a *negative* indicator, its actual value is deducted from its maximum value and the balance is divided by the difference (range) between maximum value and minimum value i.e.

$$\text{Achievement Level} = \frac{\text{Max. Value} - \text{Actual Value}}{\text{Max. Value} - \text{Min. Value}}$$

For life expectancy and infant mortality rate, there is no natural maximum and minimum value. But there is need to select the right values.

According to Morris, each of the three indicators measures results and not inputs such as income. Each is sensitive to distribution effects. It means that an improvement in these indicators signifies an increase in the proportion of people benefiting from them. But none of the indicators depends on any particular level

of development. Each indicator lends itself to international comparison.

Taking Gabon’s infant mortality rate of 229 per thousand live births as the worst rate in 1950, Morris sets it at 0. At the upper end, the best achievement is set at 9 per thousand for the year 2000. Again, taking Vietnam’s life expectancy at age one as 38 years in 1950, Morris sets it at 0 of the life expectancy index. The upper limit is set at 77 years for men and women combined for the year 2000. Lastly, the basic literacy rate at 15 years is taken as the literacy index. This set of values is presented in Table 1.

Table 1: Maximum and Minimum Values of Component Indicators

<i>Dimension</i>	<i>Maximum</i>	<i>Minimum</i>	<i>Range</i>
Infant Mortality Rate	229	9	220
Life Expectancy at Age One	77	38	39
Basic Literacy Rate	180	0	100

On this basis, Morris presents the following correlation:

(N = 150)	Infant Mortality Rate	Life Expectancy
Life Expectancy at Age One	-0.919	- +
Literacy Rate	-0.919	0.897

The coefficient of correlation between life expectancy at age one and infant mortality is of a high degree and negative. Similar is the correlation between literacy and infant mortality rate *i.e.*, with literacy the infant mortality rate declines. The coefficient between literacy and life expectancy shows a high degree of positive correlation *i.e.*, with literacy, the life expectancy also increases. Morris regards life expectancy at age one and infant mortality rate as very good indicators of the physical quality of life. So are literacy and life expectancy. In fact, the literacy indicator reflects the potential for development. We present in Table 2 the PQLI performance and GNP per capita of two LDCs and two developed countries.

Table 2 : PQLI Performance and GNP Per Capita Growth Rate

Country	PQLI			Average annual GNP Per capita Growth Rate
	1950	1960	1970	
India	14	30	40	1.8
Sri Lanka	65	75	80	1.9
Italy	80	87	92	5.0
USA	89	91	93	2.4

Source : Morris D. Morris and M.B. McAlpin, *Measuring the Conditions of India's Poor*, 1982.

The above table reveals that India which Morris calls a “basket case” exhibited slow but not insignificant improvement in its PQLI from 14 to 40 over a period of two decades from, 1950 to 1970, despite its low growth in average GNP per capita of 1.8. On the other hand, Sri Lanka’s PQLI was much higher than India’s during this period, though its average GNP per capita was almost the same. Of the two developed countries, both Italy and USA had very high PQLI. But Italy’s average GNP per capita was more than double the USA. In this connection, Morris observes that here is no automatic link between GNP per capita and PQLI. In fact, the presence or absence of social relations, nutritional status, public health, education and family environment determine a society’s PQLI. Further, it takes considerable time to build institutional arrangements that can generate and sustain a high PQLI.

Limitations:

The PQLI tries to measure “quality of life” directly rather than indirectly. But it has its limitations.

1. Morris admits that PQLI is a limited measure of basic needs.
2. It supplements but does not supplant the GNP. It fails to dislodge GNP from its lofty perch.
3. It does not explain the changing structure of economic and social organization. It, therefore, does not measure economic development.

4. Similarly, it does not measure total welfare.

5. Morris has been criticized for using equal weights for the three variables of his PQLI which undermine the value of the index in a comparative analysis of different countries.

According to Meier, “Non-income factors captured by the PQLI are important, but so are income and consumption statistics and distribution-sensitive methods of aggregation that are ignored by it.”

Conclusion:

Despite these limitations, the PQLI can be used to identify particular regions of underdevelopment and groups of society suffering from the neglect or failure of social policy. It points towards that indicator where immediate action is required. The state can take up such policies which increase the PQLI rapidly along with economic growth.

CONSTRUCTION OF PQLI:

On the basis of the values of the component indicators given in Table 1, we can construct the PQLI on the basis of the three indices in the following manner:

$$\begin{aligned} \text{IMRI} &= \frac{229 - \text{Actual IMR}}{220} \\ \text{IMRI} &= \frac{229 - 67}{220} = 0.74 \quad \frac{\text{Infancy} - 38}{220} \\ \text{LEI} &= \frac{65 - 38}{39} = 0.69 \quad \frac{\text{vel} - 0}{39} \\ \text{BLI} &= \frac{65 - 0}{100} = 0.65 \\ \text{PQLI} &= \frac{\text{IMRI} + \text{LEI} + \text{BLI}}{3} = \frac{0.74 + 0.69 + 0.65}{3} \\ &= \frac{2.08}{3} = 0.69 \end{aligned}$$

We calculate the PQLI for India on the basis of 2001 Census data for these variables: IMR = 67, LE = 65 years, and BL = 65%.

Thus the Physical Quality of Life Index for India in 2001 was 0.69.

HUMAN DEVELOPMENT INDEX (HDI)

HUMAN DEVELOPMENT INDEX (OLD), 1990-2009:

Mahbub-Ul-Haq invented the Human Development Index and UNDP incorporated it into its first Human Development Report in 1990. Since then, the UNDP has been presenting the measurement of human development* in its annual report. The HDI is a composite index of three social indicators : life expectancy, adult literacy and years of schooling. It also takes into account real GDP per capita. Thus, the HDI is a composite index of achievements in three fundamental dimensions : living a long and healthy life, being educated and having decent standard of living.

The HDI value of a country is calculated by taking three indicators :

1. **Longevity**, as measured by life expectancy at birth.
2. **Educational attainment**, as measured by a combination of adult literacy (two-thirds weight) and combined primary, secondary and tertiary enrolment ratio (one-third weight).
3. **Decent standard of living**, as measured by real GDP per capita based on purchasing power parity in terms of dollar (PPP\$).

Before the HDI is calculated, an index is created for each of these dimensions: Life Expectancy Index, Education Index and GDP Index. To calculate these indices, minimum and maximum values or goal posts are chosen for each indicator as shown in Table 3.

Table 3: Goalposts for Calculating the HDI (OLD, 1990-2009)

<i>Indicator</i>	<i>Max. Value</i>	<i>Min Value</i>
Life Expectancy at Birth (yrs)	85	25
Adult Literary Rate (%)	100	0
Combined Gross Enrolment Ratio (%)	100	0
GDP Per Capita (PPP US\$)	40,000	100

Performance in each dimension is expressed as a value between 0 and 1 by applying

the following formula :

$$\text{Dimension Index} = \frac{\text{Actual Value} - \text{Minimum Value}}{\text{Max. Value} - \text{Min. Value}}$$

The *HDI* is then calculated as a simple average of the three dimension indices.

The *HDI value* for each country indicates the distance it has travelled towards the maximum possible value of 1 and how far it has to go to attain certain defined goals : an average life span of 85 years, access to education for all and a decz. The HDI ranks countries in relation to each other. A country's *HDI rank* is within the world distribution *i.e.*, it is based on its HDI value in relation to each developed and developing country for which the particular country has travelled from the minimum HDI value of 0 towards the maximum HDI value of 1. Countries with an HDI value below 0.5 are considered to have a *low* level of human development, those between 0.5 to 0.8 a *medium* level, and those above 0.8 a *high* level. In the HDI, countries are also ranked by their GDP per capita.

The *Human Development Report*, 2004 presented the HDI values, HDI rank, and real GDP per capita ranks for the year 2002 relating to 177 developed and developing countries. Table 4 shows HDI values and HDI ranks for some of the countries.

Table : Human Development Index for Selected Countries, 2002 (Based on OLD calculation)

COUNTRY	HDI Value	HDI Rank	GDP per capita Rank - HDI rank
1. High Human Development			
<i>Norway</i>	0.956	1	1
<i>Australia</i>	0.946	3	9
<i>USA</i>	0.939	8	-4
<i>Japan</i>	0.938	9	6
<i>United Kingdom</i>	0.936	12	8
<i>France</i>	0.932	16	0
<i>Costa Rica</i>	0.834	45	14
2. Medium Human Development			
<i>Russian Federation</i>	0.795	57	3
<i>Malaysia</i>	0.793	59	-2
<i>Mauritius</i>	0.785	64	-15
<i>China</i>	0.745	94	5
<i>Sri Lanka</i>	0.740	96	16
<i>India</i>	0.595	127	-10
<i>Bhutan</i>	0.536	134	0
<i>Nepal</i>	0.504	140	11
3. Low Human Development			
<i>Pakistan</i>	0.497	142	-7
<i>Uganda</i>	0.493	146	4
<i>Zimbabwe</i>	0.491	147	-25
<i>Kenya</i>	0.488	148	11
<i>Nigeria</i>	0.466	151	?
<i>Tanzania</i>	0.407	162	15
<i>Zambia</i>	0.389	164	3

Of the 177 countries for which the HDI was calculated, 55 were in the high development category (with an HDI value of 0.80 or more); 86 in medium category (0.5 to 0.79); and 36 in the low category (less than 0.50), Norway, Australia and USA led the HDI

rankings in the high HD category. In the *medium* category, Bulgaria led with HDI rank of 56, Sri Lanka 96, India, 127, Bhutan 134, Bangladesh 138, and Nepal 140. In the Low category, Pakistan led with 142 rank, Uganda 146, Zimbabwe 147, Nigeria 151, Tanzania 162 and Zambia 164. Thus the DHI reveals wide disparities in global human development. For instance, Norway's HDI value of 0.956 was more than three times of Sierra Leone's of 0.273 which was at the bottom.

The HDI reveals that countries can have similar GDP per capita levels but different HDI values or similar HDI values but very different GDP per capita levels. Thus the HDI ranking of countries differ significantly from their ranking by GDP per capita. Countries whose GDP rank is higher than their HDI rank have considerable *potential* for distributing the benefits of higher incomes more equitably. But they have been less successful in channelising economic prosperity into better lives from their people. Of the 177 countries in 2002, there were 71 such countries whose HDI rank was lower than their GDP per capita rank. Prominent among them were Algeria (-103), India (-10), USA (-4), Pakistan (-7) and Zimbabwe (- 25). On the other hand, countries whose HDI rank is higher than their GDP rank, suggest that they have effectively *made use* of their incomes to improve the lives of their people. There were 106 such countries in 2002. Prominent among them were Cuba (39) and Tajikistan (45).

It is said that the DHI led to the dethronement of GDP per capita. As a matter of fact, these two concepts do not measure the same thing. The HDI tries to measure the level of human capabilities, the set of choices available to people. On the other hand, GNP per capita is an indicator of well being, utility or welfare, the subjective enjoyment people get from consumption. Thus the HDI is an alternative measure of development. It supplements rather than supplants GNP per capita measure of development and provides different information from GNP per capita.

Limitations:

The HDI is not free from certain limitations.

1. It is a *crude index* which attempts to catch in one simple number a complex reality about human development and deprivation, according to Prof. Amartya Sen.

2. The three indicators are not the only indicators of human development. There can be others like infant mortality, nutrition, etc.

3. The HDI measures relative rather than absolute human development so that if all countries improve their HDI value at the same weighted rate. The low human countries will not get recognition for their improvement.

4. The weighting scheme for calculating the four components of HDI seems arbitrary.

5. Even giving equal (1/3rd) weight to each of the very different three indices for calculating the HDI is arbitrary. To the extent one component index has a different variance than another, equal weights seem unsatisfactory and unjustify.

6. A country having high HDI may shift the focus from the high inequality, unemployment and poverty found within it.

Conclusion:

Despite these weaknesses, by measuring average achievements in health, education and income, the HDI provides a better picture of the state of a country's development than its income alone.

CONSTRUCTION OF HUMAN DEVELOPMENT INDEX (Based on OLD calculation)

The HDI is based on three indicators : longevity, as measured by life expectancy at birth; educational attainment, as measured by a combination of adult literacy (two-thirds weight) and combined primary, secondary and tertiary enrolment ratios (one-third weight); and standard of living, as measured by real per capita (PPP\$).

For the construction of the index, fixed minimum and maximum values have been set for each of these indicators :

(i) **Life expectancy at birth** : 25 years and 85 years for calculating the Life expectancy Index.

(ii) **Adult literacy** : 0% and 100% for calculating the education Index.

(iii) **Combined gross enrolment ratio (0% and 100%)**

(iv) **Real GDP per capita (PPP\$):** \$100 and \$40,000 (PPP US\$) for calculating GDP Index.

For any component of the HDI, individual indices can be computed by applying the formula:

$$\text{Dimension Index} = \frac{\text{Actual Value} - \text{Minimum Value}}{\text{Max. Value} - \text{Min. Value}}$$

1. Life Expectancy Index. If the life expectancy at birth of a country is 78 years, then the life expectancy index for that country would be

$$\text{Life Expectancy Index} = \frac{78 - 25}{85 - 25} = \frac{53}{60} = 0.884$$

2. Education Index. The education Index is the combination of adult literacy index and gross enrolment index. If the adult literacy rate of this country is 92, then its adult literacy index would be

$$\text{Adult Literacy Index} = \frac{92 - 0}{100 - 0} = 0.920$$

If the combined gross enrolment in this country is 60, then its gross enrolment index would be

$$\begin{aligned} \text{Gross Enrolment Index} &= \frac{60 - 0}{100 - 0} = 0.600 \\ \text{Education Index} &= \frac{2}{3} (\text{Adult Literacy Index}) \\ &\quad + \frac{1}{3} (\text{Gross Enrolment Index}) \\ &= \frac{2}{3} (0.920) + \frac{1}{3} (0.600) = 0.813 \end{aligned}$$

3. GDP Index. The GDP per capita (PPPUS\$) of this country is \$8,840, then the GDP index would be

$$\text{GDP Index} = \frac{\log(8,840) - \log(100)}{\log(40,000) - \log(100)} = \frac{\log 8740}{\log 39,900} = 0.748$$

4. Human Development Index. The HDI is a simple average of the Life Expectancy Index, Education Index and adjusted GDP per capita (PPP\$) Index. It is derived by dividing the sum of these three indices by 3,

$$\begin{aligned} \text{HDI} &= 1/3 (0.884) + 1/3 (0.813) + 1/3 (0.784) \\ &= 0.295 + 0.271 + 0.249 = 0.815 \end{aligned}$$

This country comes under the category of high human development.

Human Development of Index (New HDI, 2010 onwards) :

In October 2010, the United Nations Development Program (UNDP) disseminated the revised methodology of the **Human Development Index (HDI)** and added three indices, namely, **Inequality in Human Development Index (IHDI)**, the **Gender Inequality Index (GII)** and the **Multi-dimensional Poverty Index (MPI)** to the family of human development indices. These changes were justified on grounds of measuring deprivation, poverty and inequality in the state of human development within and across countries. Here a comparison is made in the estimated HDI using the old and new (revised) methodology.

Introduction :

In last six decades, there has been significant advancement in theoretical understanding and methodological innovation in the field of development studies. The theoretical understanding has shifted from growth-oriented approach (by rapid industrialisation) in 1950s and 1960s to the basic minimum need approach (eradication of poverty and hunger) in 1970s, formation and expansion of human capital in 1980s, and human development paradigm in 1990s. The human development report, a milestone of human development paradigm, is a regular annual feature since its first publication in 1990 and most widely used.

Since the launch of first human development report by UNDP in 1990, the human development indices, namely the Human Development Index (HDI), the Gender Development Index (GDI) and the Human Poverty Index (HPI-1, HPI-2) were popular

cutting across the disciplines: among academia, researchers, planners and program managers. The concept of human development and the composite indices of human development were integrated into the standard texts of many disciplines and widely used in planning and programme implementation at the sub-national level. A unique feature of these composite indices is the simplicity in measuring the multi-dimensionality of development. Many of the federal and state governments took active interest and prepared the human development report at the national and sub-national levels.

Despite its popularity, the HDI has been criticized for its narrow focus and non-inclusion of critical dimensions such as employment, environment, arbitrary weighting of components, possibility of substitution between the dimensions and inability to measure inequality in the distribution of human development within a country (Kelley 1991, Srinivasan 1994, Ranis, Stewart and Samman 2006). The non-inclusion of key variables such as political freedom, human rights, environmental sustainability and people's self respect have been listed as the missing dimensions of human development. The possibility of substitution among the three dimensional indices (for example, a decline in life expectancy can be offset by the increase in GDP per capita) has been emphasized. It was also outlined that the components and indicators are not responsive to short-term policy changes. The HDR, 2006 stated the need for measuring the inequalities in the HDI for evidence-based planning (UNDP 2006).

Some of these criticisms of the HDI were addressed in the Human Development Report 2010 that brought about major changes in the variables and methodology in the construction of HDI. While applauding the progress in human development during the last two decades, the Report outlines the increasing inequality across and within the countries. To capture the growing inequality in human development, it added following three indices, to the family of Human Development Indices.

- *Inequality in Human Development Index (IHDI)*,
- *the Gender Inequality Index (GII) and*
- *the Multi-dimensional Poverty Index (MPI)*

Changes in methodology and addition of new indices were justified to capture the distribution of well-being for inequality, gender equity and poverty (UNDP 2010).

The objectives of this paper are: (1) to outline the merits and limitations of the variables and data constraints in the construction of human development indices; (2) to compare the HDI using both the old and new methodologies.

Measurement of the Human Development Index – A Theoretical Perspective

In this section we present the indicators and methodology used in the construction of the old and new human development indices and the data constraints in measuring the IHDI and GDI.

Dimensions of the Human Development Indices: Old and New

The old and new HDI used only three dimensions of development, namely, health, knowledge and income. There was no addition to the existing dimensions in the revised HDI. The latter has often been criticized for its narrow focus and for missing critical dimensions like employment and environment.

We classify the differences in the old and new indices into three categories:

- i) Change of variables.
- ii) Change of lower and upper limit of the variables.
- iii) Change in methodology.

For the purpose of comparison, the variables and the methodology used in the computation of HDI are presented in a tabular form (Table 1).

Dimensional Index of Health

In the dimension of health, both the indices (old and new HDI) used the life expectancy at birth, the summary measure of health. The justification for it is the intrinsic value of longevity, association of long life with adequate nutrition, good health, and education and its linkages with other valued goals (UNDP 1990). In the new index, the lower limit of life expectancy at birth was 25 compared to 20 years in old index. Similarly, the upper limit in new index has been fixed at 85 years compared to 82.5 years in old index. The lower limit of life expectancy (new) was based on long-run historical trends and the upper limit on the observed values of Japan (2010). This was essentially changed to integrate the observed values of life expectancy at birth across the globe. Methodology in the construction of dimensional index of health remained the same.

In the Indian context, life expectancy at birth at the state level is usually provided by the Sample Registration System (SRS) and is used in compiling the state level human development report. Some researchers used indirect methods (from the children ever born and children surviving using the UN MORTPACK) or the regression method (Mohanty and Ram 2010) to estimate life expectancy at birth in

districts of India.

Table : Methodology Used to Construct the Old and New Human Development Index Dimensions / HDI

Dimensions / HDI	Indicator (Old HDI, 1990-2009)	Methodology (Old HDI, 1990-2009)
Health	Life expectancy at birth ($e^0_{0,i}$)	$I_{Health} = e^0_{0,i} - 25 / (85 - 25)$
Income	GDP Per capita in purchasing power parity (US \$)	Dimension index of income = $\text{Log}(\text{GDPI}) - \text{log}(100) / (\text{Log}(40,000) - \text{Log}(100))$
Knowledge	1. Adult Literacy Rate 2. Gross Enrolment Ratio (GER)	Step 1: i) Adult literacy Index = $(\text{ALR}_i - 0) / 100$ ii) GER index = $(\text{GER}_i - 0) / 100$

Step 2:

$$\text{Index of knowledge } (I_{\text{Knowledge}}) = 2/3 (\text{Adult literacy index}) + 1/3 (\text{GER index})$$

$$\text{Human Development Index (HDI)} = 1/3 (I_{\text{Health}} + I_{\text{Knowledge}} + I_{\text{Income}})$$

Dimensions / HDI	Indicators (New HDI, 2010)	Methodology (New HDI, 2010)
Health	Life expectancy at birth ($e^0_{0,i}$)	$I_{\text{Health}} = e^0_{0,i} - 20 / (82.5 - 20)$
Income	GNI per capita (PPPUS\$)	Dimension index of income = $\frac{\ln(\text{GNI}_i) - \ln(163)}{\ln(108,211) - \ln(163)}$
Knowledge	1. Mean years of schooling 2. Expected years of schooling	i) $I_{\text{Knowledge } 1} = \text{Mean Years of schooling} - 0 / (13.2 - 0)$ ii) $I_{\text{Knowledge } 2} = (\text{Expected years of schooling} - 0) / (20.6 - 0)$ in school-year t $I_{\text{Knowledge}} = \frac{\sqrt{I_{\text{Knowledge } 1} + I_{\text{Knowledge } 2}} - 0}{0.951 - 0}$
HDI		$\sqrt[3]{I_{\text{Health}} * I_{\text{Knowledge}} * I_{\text{Income}}}$

*Expected years of schooling = $\sum E_{i,i} / P_{i,i}$

$E_{i,i}$ = Enrolment of the population of age i (i=a, a+1,.....), $P_{i,i}$ = Population of age i in school-year t

Dimensional Index of Income

In the income domain, while the old HDI used the GDP per capita, the new HDI used the GNI per capita. The replacement of GNI per capita to GDP per capita may be considered an improvement at the national level. However, the differences in GDP per capita and GNP per capita are small in the Indian context (2753 Vs. 2870 US\$ in 2007) and may not affect the index value of income. The methodology to quantify the income dimension did not change. The new HDI used the natural logarithm (ln) of GNIPCI, while the old HDI used the log of GDPPCI. The logarithm of income, which gives lower weightage to a higher value and higher weightage to a lower value, is used on the basic premise that a minimum income is needed for a decent standard of living and that income is not the sum total of human existence. However, there may be some problems in estimating the State National Product Per capita in India. At the state level, the variable published is the State Domestic Product Per capita (SDPP), usually compiled by the respective state offices. The adjustments to the net factor income are usually not done to the state estimates on SDPP. Hence, the variable may have limited utility at the state level unless data are provided by adjusting the net factor income.

With respect to the lower and upper limits, the lower limit in the income domain increased from \$100 to \$163 (Zimbabwe 2008), while the upper limit increased from \$40,000 to \$108,211 (UAE 1980). Changes in the variables, upper and lower limits and the methodology reduced the dimensional index value of income by an order of 0.10-0.13 for India, but the overall ranking of the states was unchanged.

Dimensional Index of Knowledge

There were fundamental changes with respect to the methodology used in the construction of the dimensional index of knowledge. In the old HDI, the knowledge index was created by assigning two-third weight to adult literacy and one-third weight to the Gross Enrolment Ratio (GER). In the new index, the variables are replaced by “mean years of schooling” and “the expected years of schooling”. The mean years of schooling were calculated for adults aged 25 years and older who received some education in their life time. The change of this variable has implication for census and surveys in India. It is required that the census and surveys may need to modify the instrument to capture the years of schooling by age.

The second variable used in the construction of the new HDI is the “expected years of schooling”. Expected years of schooling is defined as “the number of years of schooling that a child of school entrance age can expect to receive if prevailing patterns of age-specific enrolment rates were to stay the same throughout the child’s life”. The latter are calculated for children in the age group of 6 to 18 who are currently enrolled in school age at all levels of education. The main objective of this indicator is to know the overall level of development of

an educational system in terms of the average number of years of schooling that it offers to the eligible population, including those who never enter school (UNESCO 2009).

Sample Questions :

1. How do you distinguish between economic growth and economic development?
2. What is Human Development Index? Explain.
3. Describe the dimensions and calculation of HDI.
4. What is physical quality of life index? Discuss the steps to calculate physical quality of life.

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