# National Development

Development

Development of a country, region or community is participatory growth in income in real terms in relation to size of the population.

Development is not simply an increase in aggregate income. It is the increment in real per capita income at constant prices, because rate of increase in aggregate income may be less than rate of increase in population.

Development of a country is not only due to economic growth in national income. It is an increase in quality of life, that is, increase in life expectancy, educational well-being and economic growth.

## Human development index (HDI)

HDI measures achievements of human development in three aspects: health, education and standard of living.

☐ The first component health is measured by health index

### Health Index

Health index is life expectancy at birth expressed as an index. Health index is obtained by,

$$H = \frac{actual\ \ value - minimum\ \ value}{maximum\ \ value - minimum\ \ value}$$

☐ The second component education is measured by education index.

### Education Index

It is based on -
i) Adult literacy
ii) Gross enrolment ratio (GER)

Adult literacy is the proportion of people aged above 15 who can read and write.

Gross enrolment ratio means the number of children enrolled in a level (primary/ secondary) regardless of age, divided by the population of age group that officially corresponds to the same level.

Education index is measured by,
$E = \frac{2}{3} Adult\ \ literacy + \frac{1}{3} Gross\ \ enorlment\ \ ratio$

where, $Adult\ \ literacy = \frac{actual\ \ value - minimum\ \ value}{maximum\ \ value - minimum\ \ value}$

and $Gross\ \ enorlment\ \ ratio = \frac{actual\ \ value - minimum\ \ value}{maximum\ \ value - minimum\ \ value}$

□ The component standard of living is measured by the income index.

### Income Index

Income index is based on per capita GDP and calculated by,

$$I = \frac{ln(actual\ \ value) - ln(minimum\ \ value)}{ln(maximum\ \ value) - ln(minimum\ \ value)}$$

□ Clearly, every dimension index lies between 0 and 1.

Finally HDI is obtained as,

$$HDI = \frac{H + E + I}{3}$$

Note: Development according to the values of HDI -

$HDI > 0.8 \Rightarrow$ high

$0.5 < HDI < 0.8 \Rightarrow$ moderate

$HDI < 0.5 \Rightarrow$ low

## Gender-related development index (GDI)

GDI is a gender sensitive measure by UNDP to asses overall development with a note on inequality. GDI is a gender adjusted HDI, measured in equally weighted components, same as HDI, but formulated in a way to take note of the gaps between men and women on each of the three components. The three components are health in terms of life expectancy at birth, education measured in terms of weighted average of adult literacy rate and enrolment ratio and standard of living in terms of per capita GDP. For each component of GDI, there is an equally distributed equivalent achievement (H, E and I in this case), which is defined as the level of achievement that, if attained equally by women and men, would be judged to be exactly as valuable socially as the actually observed achievement. When the achievements of men and women are different, higher the difference for a given mean, lower is the value of H, E and I. This value is expressed as function of female and male achievements (For health index, $H_f$, $H_m$; $0 \leq H_f, H_m \leq 1$, for education index, $E_f$, $E_m$; $0 \leq E_f, E_m \leq 1$ ) and proportion of female and male population ($p_f$, $p_m$; $p_m + p_f = 1$),

Equally distributed health index:

$$H = [P_f H_f^{1-\varepsilon} + P_m H_m^{1-\varepsilon}]^{\frac{1}{1-\varepsilon}}$$

where, $H_f$ and $H_m$ are the health index for female and male respectively.

Equally distributed education index:

$$E = [P_f E_f^{1-\varepsilon} + P_m E_m^{1-\varepsilon}]^{\frac{1}{1-\varepsilon}}$$

where, $E_f$ and $E_m$ are the education index for female and male respectively.

Equally distributed income index:

$$I = [P_f I_f^{1-\varepsilon} + P_m I_m^{1-\varepsilon}]^{\frac{1}{1-\varepsilon}}$$

where, $I_f$ and $I_m$ are the income index for female and male respectively.

$$GDI = \frac{H + E + I}{3}$$

Aversion to inequality can be controlled through $\varepsilon$ ($\varepsilon \geq 0$ & $\varepsilon \neq 1$) whose larger value implies a greater penalty for achievement gap by both genders. For no aversion, that is, if the aversion to inequality were zero, then H, E and I would be the weighted mean of the male and female achievements, which is equal to HDI, the average level of achievement. For moderate aversion to inequality $\varepsilon$ is set at 2, which makes H, E and I harmonic mean of the male and female values.