

Chapter III

Research Questions, Methodology And Data Sources Of The Present Study

3.1: Introduction

The HDI published by the UNDP in different HDRs articulated researchers the dynamics of development and the linkage between economic growth and social concern. It established that development is not merely expansion of income and wealth but a process of enlarging people's choices. The three essentials adopted in the construction of HDI being long and healthy life, acquisition of knowledge and access to resources for a decent standard of living.

Human development issues have admittedly strong regional and global dimensions. Out of every seven persons in the world, one being an Indian is enough reason to examine the Indian perspective of human development. India accounts for almost half of the world population and is classified under 'low human developed' category in the HDRs, on the basis of HDI. Raising the level of development of India's population by the end of the century is being pursued in an environment of democratic policy and consequently in a framework of human freedom (Dalal, 1991). If India is able to move from the low human developed scale to the medium human developed scale, the global human development landscape would undergo radical changes.

3.2 Methodology used for the computation of HDI in the present study:

In the construction of HDI, the HDRs of the UNDP has used three dimensions e.g. adjusted real per capita GDP at PPP dollars, life expectancy and educational attainment. In case of income it has assumed the diminishing marginal utility of income with the well-known Atkinson formula taking utility of income as $w(y) = \{1/(1-e)\}y^{1-e}$ and the parameter e is the elasticity of marginal utility of income. The income range is divided into multiples of international poverty line y^* . For income between y^* and $2y^*$, e is set to be $1/2$; for income between $2y^*$ and $3y^*$, e is set to be $2/3$ and so on. Before constructing this, the GDP per capita of each country is converted into PPP dollars. In contrast to the earlier Reports, the

HDR 1995 used real GDP per capita rather than GNP per capita to minimise distortions in income ranking due to exchange rate fluctuations.

In all the HDRs, India's rank was shown at the low human developed category. So also its income was always below y^* .

a) In our analysis we shall use the poverty level in the context of Indian poverty line and then use the formula provided by the UNDP. Actually when we use the poverty line concept in the Indian context we use this in terms of Indian Rupee and we do not convert it in PPP dollars. This is because the State per capita real SDP is always below the international poverty line even for the richest State of India.

b) We shall also convert the State per capita SDP in real PPP dollars to have an international comparison. That is, we put the States among the countries of the World according to the respective HDIs calculated in our study.

c) We shall also use the logarithms of per capita SDP in a separate study to calculate the HDI of major States. This is because it was observed that in case of the absence of proper income distribution data the log value of income can capture income distribution to some extent (Kakwani, 1993).

d) In our study we shall use the per capita net SDP at current prices, although some researchers are in favour of using this at constant prices (Dutta *et al.*, 1994). We use current price data because we want to have a comparison among the States and in case of constant price data, the inflationary variable among the States would be avoided. We want to take care of the inflation rate within the States which may differ from the other and this object is fulfilled by the current prices of the variable concerned.

As far as education is concerned, the UNDP preferred to use the term 'educational attainment', as the combination of two variables. Upto 1994 in the calculation of educational attainment the UNDP used literacy rate with 2/3 rd weight and mean year of schooling with 1/3rd weight. But due to the lack of data the UNDP avoided mean year of schooling and instead used the gross enrolment ratio at primary, secondary and tertiary level, again with the same weight.

a) In India the literacy data is published by the Census of India, which is the main source of this indicator. The Ministry of Human Resource Development, Government of India publishes data on gross enrolment rate by various categories like primary, secondary and high school level annually. Gross enrolment is calculated as the ratio of total number of students

enrolled in the relevant stage by the estimated population in a specific age group. But it is shown that in many States this ratio is higher than 100%, which was used as maximum in the UNDP Report (1995). Hence there is a problem in using this ratio in our study. Also there are reasons to believe that this ratio is sometimes over inflated for various reasons (Shiva Kumar, 1996). Therefore we shall avoid using this data in our study.

b) Mean year of schooling data is not published in India in a form that can be used for the construction of HDI. So it is to be calculated by the researchers. Again the relevant data needed to calculate the mean year in schooling is absent at the State level. Hence we also avoid this variable.

c) In our study the 'educational attainment' will be indicated by the percentage of literates in the respective States. This is the method used in the HDR 1990 with full weight only on the percentage of literates in the country. So with full weight on percentage of literates within the State we shall calculate the educational attainment indicator.

For health related indicators, the UNDP has used unadjusted life expectancy at birth variable and this the only variable which is unadjusted.

a) In our calculation of the HDI for the States of India we shall be using the life expectancy data published by the Sample Registration System (SRS), India.

b) For the construction of HDI of the districts of West Bengal we shall take infant mortality rate (IMR) as the health related variable, as the life expectancy data at district level is not available.

With the help of the above three indicators we shall find out the maximum and the minimum values or the targets or the "goal posts" for each indicator. Then we shall use mainly the UNDP methodology of 1994 to construct the HDI to get the required results (sec 2.4 of the present study).

3.3: Objectives and Research Questions of the Study :

In this study the objective, to reiterate, is to construct a new development indicator of the major States of India as well as the districts of West Bengal with the help of the methodology used by the UNDP. This is mainly a disaggregated study or a micro level study.

In our study we shall construct the HDI of different States and also the districts of West Bengal to have a comparison among the States of India and among the districts of West Bengal in view of their human development achievements.

We shall also examine whether the States with higher per capita income offer higher HDI . For this purpose we first of all divide all the States of India into two groups on the basis of per capita net SDP. After the calculations of HDI we shall see whether the ranking on the basis of income and HDI changes or not. That is we shall examine how does the income level affect the human development level.

Another question we shall be examining is whether over time the States have been improving regarding human development and also how their ranking have been changing over time in respect of the HDI.

We shall also participate in the debate whether government actions do have significant role in improving the human development in the Indian context . For answering these queries we shall use the econometric method and interpretations used in earlier studies (Dutta *et al.*, 1994; Kakwani, 1993).

3.4: Methodology for HDI Construction Over time :

One problem in the construction of HDI over time is the fixation of goal posts. It has been explained in the previous chapter (Sec 2.6.3) that change in goal posts in the construction of HDI would under value the achievements of the respective indicators . To avoid this problem it has been suggested by the UNDP to have a fixed minimum and maximum value of each indicator.

In our study we intend to calculate the HDI of States of India for 1981 and 1991 and thus we shall follow the UNDP procedure (HDR 1995) to compare change in HDI values over time .

a) The maximum percentage literacy rate will be taken to be 100 and that of the minimum value will be taken to be zero.

b) For life expectancy at birth the maximum value is 85 years and the minimum value is 25 years.

c) In case of income we find that in 1980-81 the minimum per capita net State domestic product (SDP) is from Bihar and it is Rs. 530.00. So we shall take the minimum value as Rs . 500.00 which is very close (asymptotic) to the actual minimum value . The highest value of net SDP is offered by Delhi in 1991-92. It is Rs. 12389.00. We shall not consider and calculate the HDI value of Delhi, so this value will be taken to be the maximum . Further this is the actual maximum value of income which was not attained by any of the States of our study.

3.5: Further Modification of Development Indicator and its Methodology:

In the calculation of the HDI a related problem is that deprivation is defined to be linear in the difference between maximum and the actual value of the different variables used. Kakwani (1993) pointed out that for the non-income indicators there exist biological and physical limits to the maximum achievements possible. It is difficult for a country to achieve improvement in the indicator for which its performance is very near to the maximum value at current level than a country with a current level value far from the maximum value. A linear measure of deprivation does not take into account this problem.

Kakwani (1993) suggested an alternative axiomatic procedure for deriving indices of achievement for indicators which have asymptotic limits. Let us take x to be some non income indicator for which higher level is desirable. Let the asymptotic upper limit be M , which x can never reach but comes very close to M . Let m be the lower limit for x . The problem considered by Kakwani is to define an appropriate index $Q(x_1, x_2, M, m)$ to measure the achievement of a country when the value of the indicator moves from x_1 to x_2 . Kakwani's improvement index is defined as

$$Q(x_1, x_2, M, m) = f(x_2, M, m) - f(x_1, M, m)$$

where $f(x_2, M, m)$ and $f(x_1, M, m)$ are the value of the achievement index. In order that achievement index lies between 0 and 1, Kakwani specifies

$$f(x, M, m) = \{g(M-m) - g(M-x)\} / g(M-m)$$

$f(x, M, m)$ will lie between 0 and 1 for all $g(x)$ provided $g'(x) > 0$ for $x > 0$ and $\lim_{x \rightarrow 0} g(x) = 0$ as x approaches to 0.

The higher the values of x , the more difficult it is to record a further increase. In order to incorporate this into achievement index, it is sufficient to make g a concave function. A class of concave functions which has been widely used in economic literature of in equality was provided by Atkinson and used by Kakwani

$$g(x) = \{1/(1-c)\} / X^{1-c} \quad \text{for } 0 < c < 1 \\ = \text{Ln}(x) \quad \text{for } c = 1$$

which provides a class of achievement functions

$$f(x, M, m) = \{(M-m)^{1-c} - (M-x)^{1-c}\} / (M-m)^{1-c}, \quad \text{for } 0 < c < 1, \\ = \{\text{Ln}(M-m) - \text{Ln}(M-x)\} / \text{Ln}(M-m) \quad \text{for } c = 1$$

where Ln stands for natural logarithms. Given the achievement index above, the improvement indices can be derived as

$$Q(x_1, x_2, M, m) = \frac{\{(M - x_1)^{1-e} - (M - x_2)^{1-e}\}}{(M - m)^{1-e}} \text{ for } 0 < e < 1$$

$$= \frac{\text{Ln}(M - x_1) - \text{Ln}(M - x_2)}{\text{Ln}(M - m)} \text{ for } e = 1$$

Kakwani concluded that the improvement index based on $e = 1$ would also satisfy all the axioms he started with. It has also been pointed out that at a different value of $e = 0.5$, used for the same empirical study, the results did not change significantly and all the conclusions remained the same.

a) In our study we shall be introducing the achievement indices and the improvement indices for all the major States of India for which data are available. Although it was suggested to be used for non-income indicator, in our study we shall calculate the two indices for income variable also. The two time points in our study are 1981 and 1991 as before.

b) As pointed out by Kakwani, the results and conclusions did not differ with the value of $e = 1$ or $e = 0.5$, in our study we shall use the value of $e = 1$ and as a result we shall calculate the above indices on the basis of natural logarithms.

3.6 : Introduction of New Indicators:

Different economists and researchers have pointed out that some important new indicators to be introduced in the construction of modified HDI (Dasgupta, 1990 ; Rao, 1991 ; Kelley, 1991 ; Desai, 1991). They have pointed out that the non-introduction of some important dimensions like political and civil freedom or rights made the HDI a defective indicator as an index of human development. The different HDRs (1993,94, 95) also acknowledged this defect. Similarly the issue of environmental sustainability has been ignored so far (HDR, 1994, Anand and Sen, 1994, 8).

Dasgupta (1990, 1993) presented an inter-country comparison of the quality of life with six variables including per capita income, life expectancy, infant mortality rate, adult literacy, index of political rights and index of civil rights. The value of last two variables were collected from the variable. compendium of Taylor and Jodice (1983) . Political rights are considered to be the rights of the citizens to play a part in determining who governs their country and what the laws are and will be. Civil rights are the rights the individual has vis-avis the State . That is it measures the extent to which people, because they are protected by an independent judiciary which are openly able to express their opinion without fear of reprisals.

Diamond *et al.* (1986,1990) regarded the level of political and civil liberties as the third important dimension of democracy. But the appropriate data needed for the construction of the indices at micro-level are not usually available. Again , these are published by international institutions for selected countries. In the context of India such a ready index is not available at State level.

Vanhanen (1991) presented an alternative measure of democracy by two indicators, competition and participation. Vanhanen asserted that the political and civil liberties are positively correlated with the indicators of electoral competition. It has been argued that the political and civil liberties are important characteristics of democracy but it is not necessary to measure their existence by a separate indicator as the level of competition and the index of democratisation indicate their existence or non-existence indirectly. In this study the share of smaller parties in the votes pooled in parliamentary or presidential election or in both is the measure of degree of competition. On the other hand the percentage of population who actually voted in the same elections is used to measure the degree of participation . Vanhanen constructed the index of democratisation with different weights to the above two indicators for 147 countries in the world.

Another issue which is challenging in modern world is that of the environment and the sustainable development . The HDRs referred to this issue time and again but it was not included in the construction of HDI of different countries. The idea of sustainable development arose essentially from the concerns relating to the over exploitation of natural and environmental resources (Anand and Sen , 1994(8)). However in the economic literature its importance has also been considered in economic development perspective particularly by Dasgupta (1993).

In our study for the construction of the modified HDI of the States of India we shall consider the above two issues separately.

a) We shall consider the construction of HDI at first with a fourth indicator of political right exercised by the people of the State in the State Assembly elections. This we shall do for the States where data are available. This is the indicator used by Vanhanen (1991) in the name of "participation" , in his study for the construction of index of democracy. Following Vanhanen we shall use this to indicate the political right . Vanhanen pointed out that participation can be indirectly used to measure political liberty. From the available data we shall find out the asymptotic limits of this variable and the same methodology will be followed to include this indicator in the modified HDI of States of India.

b) In order to capture the environmental issue we shall consider the degradation of renewable resources, viz, the forest cover. We shall use the percentage of forest area to total geographical area as a proxy of environmental indicator . Again with the help of asymptotic limits and the same methodology we shall add this indicator into the construction of modified HDI of the States of India.

3.7: Data Source Of The Present Study

India is one of the few countries in the world that can take pride of possessing a fairly decent statistical base on different socio-economic indicators which are also disaggregated by sex, groups, regions etc. (HDR 1993). Different social and economic data are collected and published by different State and Central Government departments. The Central Statistical Organisation (CSO) undertakes the task of coordination of official economic and social statistics. The Census and Sample Registration System (SRS) of the office of the Registrar General and Census Commission and National Sample Survey Organisation (NSSO) are the main source of the data based on nation wide sample surveys on different quantitative and qualitative dimensions of socio-economic development in India. Again , before the presentation of annual budget before the Parliament , the Government of India publishes the Economic Survey in which the socio-economic data are published to explain the trend of Indian Economy. It is one of the sources to find out the data on socio-economic aspects.

However, the data collected and published by different official agencies are scattered over a number of sources. Again, due to the absence of uniformity and periodicity and such other issues any standardised presentation of data is very difficult. Some researchers have also raised doubts about the reliability of data. (Dutta *et al.*, 1994; Kurien 1983)

In our study we shall use the data published by the different departments of the Central and the State Governments. In our analysis of the HDI of the districts of West Bengal we shall use the different departmental sources of the Government of West Bengal. We shall also depend on the various Economic Surveys of the Government of India and the Economic & Political Weekly (EPW) Research Foundation . EPW Research Foundation publish data periodically in a consolidated form collected from different sources. We shall also borrow the published data used by different researchers in this particular area of research.

In the construction of the HDI, the UNDP has been using five different indicators so far, concentrated in three indices . These are the per capita income, life expectancy at birth, literacy rate, mean year of schooling and student enrolment ratio at primary , secondary and tertiary level.

It was claimed in the HDR 1993 that India is one of the few countries in the world where disaggregated HDI can be formed due to strong data base. But at the micro-level there are serious problems of collecting such data from reliable sources. Hence in our study we have to leave aside the last two indicators among the five used by the UNDP at State level. At the district level the problem is more serious. In the construction of the HDI of the districts of West Bengal we have to use the infant mortality rate (IMR) instead of life expectancy data even for 1981 due to the non-availability of this data at district level.