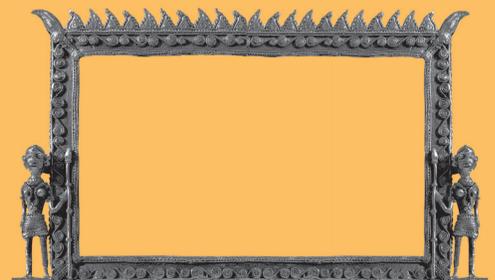




Technical Note





Technical Note

Calculating 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 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 Net State Domestic Product (NSDP)

Before the HDI is calculated, an index needs to be created for each of these dimensions. To calculate these indices — the health, 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 general formula:

$$\text{Dimension index} = \frac{\text{Actual value} - \text{Minimum value}}{\text{Maximum value} - \text{Minimum value}}$$

The income index is calculated using the following formula:

$$\text{Income index} = \frac{\log(\text{actual value}) - \log(\text{minimum value})}{\log(\text{maximum value}) - \log(\text{minimum value})}$$

Calculating the HDI for Chhattisgarh

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

The following indicators have been used to calculate the HDI for Chhattisgarh.

- Infant mortality rate (IMR)
- Literacy rate (with two-thirds weight) and the combined primary, secondary and tertiary gross enrolment ratio (with one-third weight)
- Per capita income

Maximum and minimum values for each dimension are predefined. These are explained in the table on next page.

Goalposts for calculating the HDI for Chhattisgarh

Indicator	Maximum value	Minimum value
Infant mortality rate (IMR)	120	0
Literacy rate (%)	100	0
Combined gross enrolment ratio (%)	100	0
Per capita DDP in Rs. (at 1993-94 prices)	35000	6000

Owing to data constraints, minor changes were made with respect to the indicators used in calculating the HDI for Chhattisgarh. The indicators used are:

- Infant mortality rate (IMR)
- Literacy rate (with two-thirds weight) and the combined primary, secondary and tertiary gross enrolment ratio (with one-third weight)
- Per capita income

While the formula used for calculating the education and income indices is the same as explained above, since IMR is a deprivation indicator, the formula used is –

$$\text{Health Index} = \frac{1 - (\text{Actual value} - \text{Minimum value})}{\text{Maximum value} - \text{Minimum value}}$$

i) Estimation of Infant Mortality Rate

The Sample Registration System (SRS) provides State level data for IMR. As per the SRS 2003, the IMR of Chhattisgarh in 2002 was 73 per 1000 live births. In the absence of district level IMR data for Chhattisgarh, the primary data collected through Part 1 of the *Jan Rapat* has been used to arrive at district level IMRs while retaining the overall IMR figure given by SRS of 73 per 1000 live births.

ii) Calculating the Education Index

Data from the Census of India, 2001, on the literacy rate, and data from the Department of Education, Government of Chhattisgarh for the combined gross enrolment ratio has been used to compute the education index.

iii) Estimation of District Income

The methodology used to arrive at district-wise income estimates is described below:

A. Primary Sector

A.1 Agriculture (including livestock)

The district-wise area and production figures on agricultural product is available. However, district-wise price data was not available for all the districts. Hence, the weighted average price for the State was used to estimate the gross value of output for the districts, for which price data was not available.

A.2 Forestry and Logging

District-wise data on forest produce and its prices was available. Based on these, the State GDP was allocated among districts.

A.3 Fishing

In this sector also the district-wise data was available and it was utilised to estimate Gross Value Added (GVA) for the districts.

A.4 Mining and Quarrying

The Indian Bureau of Mines (IBM), Nagpur, provides data on production and value of major minerals. However, district-wise data on major minerals was not available. District-wise data on production and value of major minerals was obtained from the Directorate of Geology and Mining (DGM) and was utilised for estimating district-wise income from major minerals. The figures from DGM and IBM on the major minerals were not comparable, hence the DGM figure were normalised according to

proportion of different minerals as per IBM. In case of minor minerals, the figures published by the Directorate of Geology and Mining were available district-wise, which were used for estimation of GDP from this sector.

B. Secondary Sector

B.1 Manufacturing Registered

The State income from manufacturing registered sector was apportioned to the districts according to the relative work force as per 1991 Census (excluding house hold industries sector) in the total manufacturing sector.

B.2 Manufacturing Unregistered

The same methodology as for B-1 was adopted for this sector.

B.3 Construction

The State income was distributed among the districts according to the relative strength of the work force in the construction sector as per the 1991 Census.

B.4 Electricity Gas and Water Supply

District-wise wages and salaries of CGSEB were not available. However, district-wise consumption of electricity was available, which was used as an indicator to apportion State income among the districts. The GVA from the thermal power plant of NTPC situated at Korba was assigned to this district entirely.

For the gas sector, the number of bio-gas plants operative in the district was used for apportioning State income among districts.

For the water supply sector, district-wise number of workers in this sector according to the Census of Government employees was taken as an indicator.

C. Tertiary Sector

C.1 Railway

The length of railway tracks in different districts was taken as an indicator to distribute State income among the districts.

C.2 Transport by Other Means and Storage

State income from the storage sector is quite low and data on number of warehouse units are not available, hence, for this entire sector, district-wise indicators were generated from the number of registered motor vehicles in the respective districts.

C.3 Communication

For this sector the number of telephone connections in various districts was used to apportion State income among the districts.

C.4 Trade, Hotel and Restaurants

District-wise number of workers as per the 1991 Census in the trade and commerce sector was used to arrive at district-wise income for this sector.

C.5 Banking and Insurance

The State income was apportioned among the districts according to the number of bank branches operating in various districts.

A better indicator would have been district-wise wages and salaries but this data was not readily available.

C.6 Real Estate, etc

The State income from this sector was distributed among the districts as per the number of dwellings in the various districts as per the 1991 Census.

C.7 Public Administration

The State income for this sector was distributed among the districts according to the number

of Government employees in various districts in the State as per the 2001 Census by the Directorate of Economics and Statistics (DES), Chhattisgarh.

C.8 Other Services

The State income for this sector was distributed among the districts according to the number of Government employees in various districts, in various sub-sectors, as per the Census of Government employees carried out by the DES.

Recasting the Income Index and Estimating an Alternate HDI

As indicated, an alternate HDI has been estimated by recasting the income index for the State. The methodology used is similar to that followed for estimating the HDI as

explained earlier, except that the income from the mining and quarrying sector has not been taken into account while estimating district income.

The goalposts used are given in the Table below:

Goalposts for calculating Alternate HDI

Indicator	Maximum value	Minimum value
Infant mortality rate (IMR)	120	0
Literacy rate (%)	100	0
Combined gross enrolment ratio (%)	100	0
Per capita DDP Rs. (at 1993-94 prices)	35,000	6000

It is important to mention here that the same goalposts have been used to estimate the Alternate HDI for consistency.