

Construction of Human Development Index (HDI) for districts of Karnataka based on NFHS-IV data

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Abstract

Background: The Human Development Index (HDI) is a composite measure of life expectancy, education and per capita income indicators, which are used to rank countries. A country scores higher HDI when lifespan is higher, literacy rate is higher and GDP per capita is higher.

Objective: To construct HDI for districts of Karnataka based on NFHS-IV data.

Methodology: Based on the district level NFHS-IV household data, HDI scores were calculated. The methodology put forward by United Nations Development Programme (UNDP) was adopted. Health index is measured in terms of life expectancy at birth. Education index is calculated based on adult literacy rate. Living standard index is measured in terms of availability of resources like water, toilet, cooking fuel, electricity, type of house and income level. The HDI is computed as the geometric mean of these three indices.

Results: Based on the HDI scores, districts are ranked. The number of districts belonging to very high, high, moderate and low human development are 3 (10%), 13(43.3%), 13(43.3%) and 1(3.3%) respectively. Udupi district ranked first in terms of overall human development where as Yadgir ranked least.

Keywords. Human development index; Life expectancy

Introduction

Human Development Index (HDI) is a composite measure of indicators of basic human needs namely health, education and per capita income.¹ The index was first developed by Pakistani economist Mahbub Ul Haq in 1990 and later by Indian economist Amartya Sen. This index helps to assess the performance of a country with respect to other countries in terms of development. United Nations Development Program (UNDP) publishes global HDI report where countries are ranked according to their development. A country with a higher development will have a better rank in HDI. India ranks 130 out of 189 countries according to UNDP's HDI report 2019. In India HDI for states is published by NITI aayog.

Karnataka is one of the 29 states of India. It is located in south western part of India. It was formed in November 1, 1956, originally known as the State of Mysore. The capital of Karnataka is Bengaluru. Karnataka comprises of 30 districts with 227 talukas. As per the information from Census 2011, Karnataka has population 6.11 crores. The area of the state is about 190000 sq.km as it is 8th largest state of India in terms of area.²

The National Family Health Survey (NFHS) is one of the largest surveys conducted in India by International Institute of Population Sciences (IIPS), Mumbai. NFHS provides information about population, health and nutrition status for all the states and union territories of India. Its recent round is NFHS-IV, which was conducted in 2015-16. Fieldwork of NFHS-IV was conducted from 20 January 2015 to 4 December 2016 covering 601509 households, 699686 women and 112122 men. It collected data on 114 key indicators. NFHS-IV provided

the district level data for important indicators.³

Human Development Index measures the average achievement in human development and assigns ranking to countries.⁴ Similarly, human development index can be calculated for states, districts and talukas. In this paper, human development index for districts of Karnataka is constructed based on district level data from NFHS-IV.

Objective:

To construct human development index for districts of Karnataka based on NFHS-IV data.

Data and Methodology:

The National Family Health Survey-IV (NFHS-IV) district level household data was used to construct Human development index for 30 districts of Karnataka state. For the statistical analysis, Microsoft Excel-2007 and EZR version 1.37 were used.

The methodology put forward by United Nations Development Programme (UNDP) was adopted for the construction of HDI. The human development index is computed based on three indices namely Living standard index (LSI), Education index (EI) and Health index (HI). The geometric mean of these three indices gives the Human Development Index (HDI).⁴

$$\text{HDI} = (\text{LSI} \times \text{EI} \times \text{HI})^{1/3}$$

Living standard index (LSI) is computed as geometric mean of 6 dimensions. The 6 dimensions are proportion of households having source of water facility (I_1), proportion of households having toilet (I_2), proportion of households having access to electricity (I_3), proportion of households having access to cooking fuel (I_4), proportion of households having pucca house (I_5) and proportion of households having at least middle class status (I_6).

$$\text{LSI} = (I_1 I_2 I_3 I_4 I_5 I_6)^{1/6}$$

Education index (EI) is computed in terms of proportion of literates among population aged 7 and above (proportion ranging from 0 to 1).

Health index (HI) is measured in terms of life expectancy at birth (LEB). It is calculated as follows:

Where, max (LEB) is maximum life expectancy at birth that is 85 years and min (LEB) is minimum life expectancy at birth that is 25 years. Life expectancy at birth was computed by constructing complete life tables using age at death of each district.

Interpretation of HDI

Human Development Index ranges from 0 (minimum human development) to 1 (maximum human development). Further, HDI value of 0 – 0.540 signifies low human development, 0.541 – 0.699 signifies moderate human development, 0.7 – 0.79 signifies high human development and 0.791 – 1 signifies very high human development.

Results

The HDI for 30 districts for Karnataka is provided in table 1. Among the 30 districts, 3 (10%) belonged to very high human development, 13 (43.33%) belonged to high human development, 13 (43.3%) belonged to moderate human development and 1 (3.3%) district belonged to the category of low human development. From the table 1, it can be seen that, HDI score is maximum for Udupi and minimum for Yadgiri, which is the only district belonging to low human development category. Living standard index score is maximum for Bengaluru and minimum for Yadgiri. Health index score is maximum for Ramanagara and minimum for Bengaluru Rural. Education index score is maximum for Bengaluru and minimum for Yadgiri.

Table 1: HDI for districts of Karnataka

| DISTRICT | LSI | HI | EI | HDI | RANK |
|------------------|-------|-------|-------|-------|------|
| UDUPI | 0.891 | 0.863 | 0.761 | 0.837 | 1 |
| BENGALURU URBAN | 0.962 | 0.689 | 0.866 | 0.831 | 2 |
| DAKSHINA KANNADA | 0.884 | 0.804 | 0.793 | 0.826 | 3 |
| UTTARA KANNADA | 0.789 | 0.781 | 0.745 | 0.771 | 4 |
| DHARWAD | 0.722 | 0.833 | 0.740 | 0.764 | 5 |
| SHIMOGA | 0.816 | 0.711 | 0.758 | 0.760 | 6 |
| KODAGU | 0.833 | 0.705 | 0.725 | 0.752 | 7 |
| CHIKMAGALORE | 0.736 | 0.790 | 0.714 | 0.746 | 8 |
| HASSAN | 0.735 | 0.824 | 0.683 | 0.745 | 9 |
| MYSORE | 0.812 | 0.761 | 0.662 | 0.742 | 10 |
| DAVANGERE | 0.787 | 0.758 | 0.681 | 0.741 | 11 |
| CHAMRAJANAGAR | 0.662 | 0.752 | 0.812 | 0.740 | 12 |
| MANDYA | 0.741 | 0.897 | 0.606 | 0.739 | 13 |
| HAVERI | 0.695 | 0.795 | 0.702 | 0.729 | 14 |
| RAMANAGARA | 0.760 | 0.915 | 0.532 | 0.718 | 15 |
| KOLAR | 0.766 | 0.712 | 0.653 | 0.709 | 16 |
| TUMKUR | 0.674 | 0.715 | 0.701 | 0.696 | 17 |
| BELGAUM | 0.716 | 0.712 | 0.608 | 0.684 | 18 |
| BENGALURU RURAL | 0.764 | 0.603 | 0.687 | 0.682 | 19 |
| GADAG | 0.645 | 0.738 | 0.657 | 0.679 | 20 |
| KOPPAL | 0.654 | 0.792 | 0.586 | 0.672 | 21 |
| CHIKBALLAPUR | 0.700 | 0.754 | 0.575 | 0.671 | 22 |
| GULBARGA | 0.684 | 0.780 | 0.587 | 0.663 | 23 |
| BIDAR | 0.645 | 0.795 | 0.564 | 0.661 | 24 |
| BIJAPUR | 0.591 | 0.898 | 0.588 | 0.660 | 25 |
| CHITRADURGA | 0.639 | 0.687 | 0.649 | 0.658 | 26 |
| BAGALKOT | 0.646 | 0.687 | 0.598 | 0.643 | 27 |
| BELLARI | 0.723 | 0.650 | 0.546 | 0.635 | 28 |
| RAICHUR | 0.599 | 0.697 | 0.476 | 0.584 | 29 |
| YADGIRI | 0.496 | 0.788 | 0.377 | 0.528 | 30 |

In above table, red font colour signifies very high human development, green font colour signifies high human development, blue font represents moderate human development and black font represents low human development

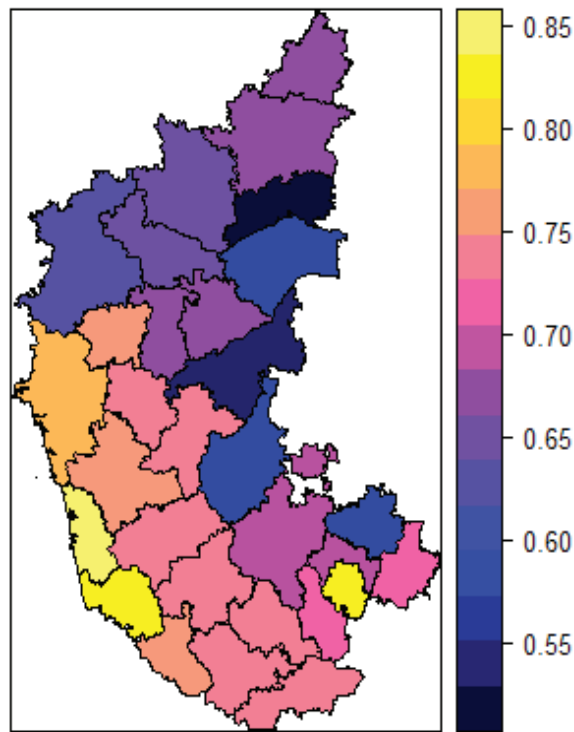


Figure1: Figure of Karnataka showing the human development index score

Discussion

Human Development Index (HDI) reflects the status of well-being and economic development of a geographic entity – country, state, district etc relative to others. Many policy decisions are made looking into the HDI. In this study HDI was constructed for 30 districts of Karnataka state using NFHS-IV as the data source. This index can be used to identify where the districts are lagging behind in developmental process.

As per the HDI, Udupi district was ranked first among all the 30 districts of Karnataka state. This can be attributed to presence of good quality health care facilities, educational institutions and better transport facilities. Further, Udupi is one of the best tourist hotspots and religious destinations of India. Yadgiri was ranked last as it has least HDI value. This may be due to the fact that Yadgiri is recently formed district, developmental programs are still at infancy.

As per the Human Development Index across districts of Karnataka, 2011 reported in Economic Survey of Karnataka 2015-16,⁵ Bengaluru Urban has been ranked first among 30 districts with HDI score of 0.928, whereas Udupi is positioned at 3rd place with HDI score 0.675. Raichur is in the last place with HDI score 0.165. In Economic survey of Karnataka 2015-16, living standard indicators used were access to cooking fuel, toilet, pucca house, water, electricity, percentage of non-agricultural workers to total workers and taluk level per capita income. Education indicators used were literacy rates and gross enrollment rates. Health indicators used were child mortality rate and maternal mortality rate. The methodology used in this paper is almost same as that of Economic Survey of Karnataka 2015-16, except in health index, instead of maternal mortality rate and child mortality rate, life expectancy at birth is used and in education index, only literacy rates are used.

Ethical Clearance: not applicable as the study is based on a secondary publicly available/open source data

Funding Source: None

Conflict of Interest: None

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