Full Length Research Paper

Statistical measurement of educational development of school education at state level

Vishal D. Pajankar[1]*, Pranali[2] and P. G. Khot[2]

[1]National Council of Educational Research and Training, New Delhi, India.
[2]Rashtrasant Takadoji Maharaj Nagpur University, Nagpur, India.

Education especially school education is one of the very important components of social development. Since independence, education has been visualized in government policies as a precursor to national development as well as to better quality of life. Due to the initiative taken by the states and centre, education system in India has expanded exponentially over the past years, but its current achievement is grossly inadequate in realizing its potential greatness. Social development is not pre-determined but is a continuous process of improvement of level of living. The level of development cannot be fully estimated by a single indicator. Moreover, a number of indicators when analyzed individually do not provide an integrated and easily comprehensible picture of reality and thus need to be analyzed together. Therefore, the study has worked out the status of development in school education on the basis of a number of their developmental indicators. Narain et al. (1991) estimated the level of socio-economic development for different states for the year 1971 - 1972 and 1981 - 1982. The study revealed that there were wide disparities in the level of development among different states. Narain et al. (2007) evaluated the composite indices of development in respect of agricultural, infrastructural and socio-economic sectors for 282 districts. The present study has designed 'weighted composite index'. The level of development has been estimated with the help of weighted composite index based on optimum combination of all the developmental indicators.

Key words: Composite index, weighted composite index, development indicators.

INTRODUCTION

Since 1990, the United Nations annually ranks all member countries in the world on the basis of health, education and income; the three essential aspects of human development. The human development index decides the relative rank of a country's achievement with the above aspects in a concise manner. It helps to locate the countries with immediate concerns as well as prioritize the relevant policy areas globally. A well designed public policy and programme can advance human development even without high levels of income or economic growth (United Nations Development Programme, 2004). Nevertheless, the national level figure of the index has its own limitations in the policy formulation, especially for a large country like India where socio-cultural, demographic and economic milieus are diversified. To minimize such limitations, one needs to adopt a measure that can capture disparities in aspects of human wellbeing where appropriate policy actions are urgent at the level of the smallest possible administrative unit.

In accordance with the constitutional commitment to ensure free and compulsory education for all children up to the age of 14 years, provision of universal elementary education has been a salient feature of national policy since independence. This resolve has been spelt out emphatically in the National Policy of Education (NPE), 1986 and the Programme of Action (POA), 1992. The 86th Constitutional Amendment Act, 2002 made education a

---

*Corresponding author. E-mail: vdp1234@rediffmil.com or vishal1819@gmail.com.

fundamental right for children within the age group of 6 - 14 years. The Government of India launched a programme, Sarva Shiksha Abhiyan (SSA) in 2000, a holistic and convergent programme to achieve the long cherished goal of Universalisation of Elementary Education of Satisfactory Quality by 2010. The SSA is an effort to recognize the need for improving the performance of school system and to provide community owned quality elementary education in a mission mode.

The assessment of the current state of development of population stabilization efforts along with overall human development of the districts of India was studied by Ram and Shekhar (2006). The study reiterates that not only are inter-state differentials substantial, but within a state, districts also vary considerably by their achievements in socio-demographic, health and social infrastructure development. The level of socio-economic development was estimated for different states for the year 1971 - 1972 and 1981 - 1982 by Narain et al. (1991). The study revealed that there were wide disparities in the level of development among different states. Narain et al. (2007) evaluated the composite indices of development in respect of agricultural, infrastructural and socio-economic sectors for 282 districts. Raju et al. (2008) made the index on educational development and highlight the inter-state disparity in development of elementary school education. The study used the method by accommodating expert driven weights in an equal weighting method. The present research work is an extension of this study.

As development is a multidimensional process its impact cannot be fully captured by any single indicator. Statistical measurement of educational development in different spheres is important. But a number of indicators when analyzed individually do not provide an integrated and easily comprehensible picture of reality. Hence, there is a need for building up a composite index of systemic quality/educational development based on various indicators. On the basis of this index various states and union territories (UTs) can be compared to know where they stand in terms of systemic quality / educational prosperity in comparison to other states and UTs. In view of this background a need is felt to compare various state/UTs with respect to their educational prosperity using an appropriate composite index.

COMPONENT INDICATORS

1. Access to school within a walking distance (1 km for primary level and 3 km for upper primary level)

Access to school within a walk-able distance is measured by percentage population of children having access to primary schools within 1 km and percentage population of children having access to upper primary schools within 3 km at primary and upper primary levels, respectively. The relevant data was culled from 7th All India School Education Survey (7th AISES) conducted by National Council

of Educational Research and Training (NCERT 2007a) with reference date as September 30, 2002.

2. Enrolment ratio

Enrolment ratio, being a measure of participation of children in school education, has been considered to be a component indicator of the model to be developed. It has been measured by gross enrolment ratio at primary and upper primary levels. The relevant data was taken from the 7th AISES of NCERT (2007b).

3. Equity in educational opportunities

The sub-components that jointly represent the main component of 'Equity in Educational   Opportunities' are:

Gender equity: Gender equity is measured by percentage of girls' enrolment at primary and upper primary levels. Classes' I-V and classes' VI-VIII are considered as primary and upper primary levels, respectively, for this indicator. The data was taken from the 7th AISES of NCERT (2007b).

Social equity: Social equity cannot be measured by percentage of scheduled castes (SC)/scheduled tribes (ST) of children who enrolled at primary and upper primary levels as their prevalence varies from state to state. Unlike the gender of a child it is not a naturally determined phenomenon. Hence gross enrolment ratio (GER) is considered in this study. The data of these indicators has been taken from selected education statistics - 2002 - 2003 of Ministry of Human Resource Development (MHRD 2004). It is worth mentioning at this juncture that GER is more than 100 in case of certain state / UTs on account of over age and under age children enrolment. For practical purposes GER is taken as 100 for those state / UTs. The social equity, finally, is measured by the simple average of GER of SC children and GER of ST children at primary and upper primary levels separately. The GER for ST in state/UTs with no SC population for example Nagaland is considered similarly, for the state / UTs not having ST population for example Punjab, the GER for SC is considered.

Equity with regard to children with special needs: There was equity with regard to children with special needs; by equity it means educational opportunities for disabled children. Been a natural phenomenon, the state-to-state variation in prevalence of disabled children is not expected to be significant; the sub-component can be measured by percentage of disabled children in the total enrolment at primary and upper primary levels separately. Data for this indicator was taken from the 7th AISES of NCERT (2007c).

EMPIRICAL ANALYSIS

For the study, data from various sources were taken into

Table 1. Educational development at elementary level - interstate perspective.

States/Uts	Primary stage		Upper primary stage		Elementary stage	
	Di	Rank	Di	Rank	Di	Rank
Andhra Pradesh	0.65301	25	0.59240	15	0.62271	21
Arunachal Pradesh	0.46915	5	0.42114	2	0.44515	2
Assam	0.41084	4	0.56997	14	0.49041	5
Bihar	0.47897	9	0.48697	4	0.48297	3
Chhattisgarh	0.59970	20	0.50161	5	0.55065	13
Goa	0.57723	19	0.74956	30	0.66340	28
Gujarat	0.73029	30	0.70680	27	0.71854	31
Haryana	0.57385	18	0.65897	22	0.61641	20
Himachal Pradesh	0.47670	8	0.69783	26	0.58727	16
Jammu and Kashmir	0.48088	10	0.56438	13	0.52263	10
Jharkhand	0.34910	2	0.32021	1	0.33465	1
Karnataka	0.66164	26	0.66540	23	0.66352	29
Kerala	0.50553	14	0.77184	32	0.63868	24
Madhya Pradesh	0.54844	17	0.53137	9	0.53990	12
Maharashtra	0.63029	23	0.67167	24	0.65098	25
Manipur	0.69394	28	0.51218	7	0.60306	17
Meghalaya	0.78463	32	0.60975	17	0.69719	30
Mizoram	0.89596	35	0.74473	29	0.82035	34
Nagaland	0.73600	31	0.53315	10	0.63457	23
Orissa	0.53082	16	0.53400	11	0.53241	11
Punjab	0.60050	21	0.64523	20	0.62287	22
Rajasthan	0.47321	7	0.51866	8	0.49593	6
Sikkim	0.48754	12	0.50701	6	0.49727	7
Tamil Nadu	0.64839	24	0.67454	25	0.66146	27
Tripura	0.66214	27	0.65394	21	0.65804	26
Uttar Pradesh	0.48627	11	0.48105	3	0.48366	4
Uttranchal	0.52568	15	0.62314	18	0.57441	15
West Bengal	0.60542	22	0.60792	16	0.60667	19
A & N Islands	0.47205	6	0.54198	12	0.50701	8
Chandigarh	0.49114	13	0.63119	19	0.56116	14
D & N Haveli	0.81324	33	0.72463	28	0.76894	32
Daman & Diu	0.40069	3	0.80883	33	0.60476	18
Delhi	0.29071	1	0.74981	31	0.52026	9
Lakshadweep	0.87156	34	0.94475	35	0.90815	35
Pondicherry	0.70219	29	0.85068	34	0.77643	33

consideration. The data were obtained from census of India 2001, Seventh All India School Education Survey conducted by NCERT with reference date 30th September 2002 and DISE's Elementary Education in India – Analytical Report 2006 - 2007. The study was used to measure the educational development of various states / UTs at elementary level school education. The study utilizes data on various types of socio economic indica-

tors involved in the elementary stage school education. The method of analysis are stated below

Let $[X_{ij}]$, i = 1, 2, ...,n (number of area unit); j = 1, 2, ...,k (number of indicators), is a data matrix that comes from different units of measurement and the objective is to arrive arrive at a single composite index. There is a need for standardization of the indicators.

Let $[Z_{ij}]$ denotes the matrix of standardized indicators, where i = 1,2,…,n and j = 1, 2, …, k. The best state for each indicator is identified and from this the deviations of the value for each state are taken. This procedure is to be adopted for all the indicators under study. They are defined as:

$$C_i = \left\{ \sum_{j=1}^{k} \left(Z_{ij} - Z_{0j} \right)^2 \right\}^{1/2}$$

Where Z_{oj} is the standardized value of the jth indicator of the best state and C_i denotes the pattern of development of ith state. The composite index of development is now computed for each state using the following formula.

$$D_i = \frac{C_i}{C}$$

Where

$$C = \overline{C} + 2S$$

Where $\overline{C}$ is the mean of C_i

S is the standard deviation of C_i

The value of composite index is non-negative and it lies between 0 and 1. The value of index closer to zero indicates the high level of development while the value of index closer to one indicates the low level of development.

FINDINGS AND DISCUSSION OF THE STUDY

The composite indices of development in respect of education development – elementary school education have been calculated for all 35 states/UTs. It would be of interest to examine the level of development separately for different states.

The measurement of educational development in respect of accessing school, gross enrolment ratio and equity has been identified at primary and upper primary stages of schooling in India. The study also identified the educational development at elementary stage of school education. Average rank of a state over primary and upper primary levels has been used to depict the situation at elementary level. The corresponding results are presented in Table 1.

The ranking of states with regard to educational development at elementary level shows that Jharkand is at top position in the country followed by Arunachal Pradesh (2nd), Bihar (3rd), Uttar Pradesh (4th), Assam (5th), Rajesthan (6th); Sikkim (7th); Andaman and Nikobar Island (8th); Delhi (9th) and Jammu and Kashmir (10th). The state / UTs which are in the range of 26th to 35th may be considered that educational development is utterly poor in respect of accessing of school, gross enrolment ratio and equity. In this category, Lakshdweep is in 35th position followed by Mizoram (34th); Pondicherry (33rd); Dadar and Nagar Hawali (32nd) and Meghalaya (31st).

At primary stage of school education, Delhi is in the 1st position showing highest level of educational development. Jharkhand is in 2nd position while Daman and Diu is in 3rd position. The other states/UTs with better development in primary education are Assam (4th); Arunachal Pradesh (5th); Andaman and Nicobar Island (6th); Rajesthan (7th); Himachal Pradesh (8th); Bihar (9th) and Jammu and Kashmir (10th). The states/UTs which are very low in primary education in, respectively, defined conditions are Nagaland (31st); Meghalaya (32nd); Dadar and Nagar Haweli (33rd); Lakshadweep (34th) and Mizoram (35th).

At upper primary stage, Jharkhand jumped to 1st position followed by Arunachal Pradesh (2nd); Uttar Pradesh (3rd); Bihar (4th) and Chhattisgarh (5th). The other states/UTs with better development in upper primary stage schooling are Sikkim (6th); Manipur (7th); Rajesthan (8th); Madhya Pradesh (9th) and Nagaland (10th). The states/UTs which are very poor in upper primary stage schooling are Delhi (31st); Kerala (32nd); Daman and Diu (33rd); Pondicherry (34th) and Lakshadeep (35th).

REFERENCES

MHRD (2004). Selected Educational Statistics - 2002-03, MHRD, Govt. of India, New Delhi.

Narain P, Rai SC, Shanti S (1991). Statistical Evaluation of Development on Socio-Economic Front Journal of Indian Society of Agriculture Statistics, 43 (3): 329-345.

Narain P, Sharma SD, Rai SC, Bhatia VK (2007). Statistical Evaluation of Social Development at District Level Journal of Indian Society of Agriculture Statistics, 61 (2): 216-226.

NCERT (2007). Seventh All India School Education Survey - Schooling Facilities in Rural Area National Council of Educational Research and Training, New Delhi.

NCERT (2007). Seventh All India School Education Survey - Enrolment in Schools. National Council of Educational Research and Training, New Delhi

NCERT (2007). Seventh All India School Education Survey – Schools for Physically Challenged Children. National Council of Educational Research and Training, New Delhi. (in-print)

NCERT (2007). Seventh All India School Education Survey - Database. National Council of Educational Research and Training, New Delhi

Raju BMK, Singh A, Bansal (2008). Development of Educational Development Index (EDI), Research Project Report, National Council of Educational Research and Training, New Delhi.

Ram F, Shekhar C (2006). Ranking and Mapping of Districts: Based on Socio-ecnomic and Demographic Indicators, Research Project Report, International Institute of Population Sciences, Mumbai.