

Cross District Variations in Social Sector Development in Assam

Deb Kumar Chakraborty

Reader & Head, Department of Economics, Dibrugarh University, Dibrugarh, Assam

E mail dkchakraborty@rediffmail.com

1. Introduction

The conventional approach to economic development suggests that availability and utilization of natural resources is necessary for economic development. However, it is to be noted that utilization depends on efficiency in the use of land, labour and other natural resources. And, that efficiency originates from proper utilization of human resources in the form of social capital formation. Here comes the utility and reliability of an alternative model based on synergy between social sector development and economic development. It is found that conventional approach is not that much applicable for the Asian countries, for example, Japan had witnessed the economic growth not due to the excess natural resources defying the conventional approach. East Asian tigers like South Korea, Taiwan, Singapore, Hong Kong and the countries like Malaysia, Thailand, Indonesia, Vietnam and the Philippines grew rapidly with limited resources (Bhattacharya, 2008). It is believed that the social development might have contributed to the egalitarian growth in most of the East Asian countries. Spread of education improves skill of labour and ultimately it helps in diffusion of technology from top to bottom. The synergy between economic and social development not only improved productivity of labour and capital but also led to a balanced growth (Bhattacharya, 2008). Balanced growth is pre requisite condition for reduction of disparities, particularly for an underdeveloped economy like that of Assam.

The very concept of capital had to undergo a serious change, with the convergence of human capital. Further it was realized that the concept of human capital has a reasonable interface with the newly growing literature of human development. Now economists are visualizing beyond human capital and formulate the concept of social capital, which in sense more or less is built on the concept of human capital. According to human capital theory, expenditure on schooling, health, training, mobility, etc. constitutes investment in human beings, which enhance the capabilities of the people as producers and consumers in the labour market, in the households and societies at large.

In several studies, role of social sector has been discussed in explaining expanding economy (Kruger and Lindhal, 2001; Barro, 2001).

It can be viewed as a kind of investment that promotes innovation in the subsequent stages of the economy (Youngson, 1967) and for enhancing quality of life (Kumar and Narwade, 2001). There are both forward and backward linkages between the economic and social infrastructures used in the process of development (Borah and Goswami, 2001). The human capital formation and intersectoral knowledge spillover and diffusion of innovation are interlinked with the provision of social infrastructure. They have the public goods characteristics of externalities (Sengupta, 1998). Unlike general inputs of production, which are accounted by and large in the variable cost of production, social infrastructure, generally, does not vary with the volume of production. If, on the other hand, the scale of production or the state of technology is altered, the infrastructure shall vary with the volume of production. Under such circumstances, the level of infrastructure may be quite inadequate. With limited resources to take care of this important element of growth, the question of making a balance in infrastructure arises. Such balance is required for efficient use of resources. For an economically retarded state like Assam, the development of infrastructure and commensuration of its various types are of utmost important. Increasing need for the economies to compete in the open architecture of globalization is putting additional pressure to provide efficient, quality-oriented and cost-effective infrastructures.

In such a scenario it is important to identify the backward districts in terms of overall social sector development. This is likely to be helpful for the planners to chalk out a meaningful strategy to curb the problems of social sector and promote balanced development in the state. Against this backdrop, the

present paper aims at mapping the levels of social sector development in 23 districts of Assam and ranking their levels of social sector development.

3. Methodology and data

A plethora of studies have analysed the inter-region and intra-region levels, trends and nature of social development; among which some studies had also analysed the extent and causes of regional disparities regarding human resource development. All these studies reveal that there is no universally acceptable method available to measure the composite index at country or regional level. Moreover, the indicators vary from one society to other because of the differences in social customs and believe.

For the purpose of ranking the districts on the basis of social sector development, the method of Principal Component Analysis (PCA) is used to construct the composite indices of development. Technically, a principal component can be defined as a linear combination of optimally-weighted observed variables. This method provides a better system of composite classificatory indices. PCA is a multivariate statistical technique used to reduce the number of variables in a data set into a smaller number of 'dimensions'. The weights for each principal component are given by the eigenvectors of the correlation matrix, or if the original data were standardized, the co-variance matrix. The components are ordered so that the first component explains the largest possible amount of variation in the original data, subject to the constraint that the sum of the squared weights is equal to one. At the same time we can use the component matrix to determine the relative factor score among the variables to have a composite value. In order to evaluate the dimensions of social sector development at district level, method of Kaiser's Varimax Rotation has been applied.

The present study is primarily based on secondary data. Data have been collected from Census reports, Statistical documents published by the Government of Assam and Elementary Education report published by NCERT.

4. The State of Social Sector:

The slow pace of economic development and mass poverty get reflected in poor social indicators of development such as low levels of achievement in education and health. Assam ranks 12 among 16 States when ordered in the descending order of Human Development Index (HDI). The social infrastructure especially those on health and education play an important role in augmenting development. The usefulness of education and its role in economic development is widely recognized. Investment in quality education leads to human capital formation in a proper way.

A steady improvement in the provision of social infrastructure or the social overhead capital is noticed in the state of Assam over the years. But, health and educational services in Assam still suffers from (a) poor quality of Government service delivery (b) inadequate and poor infrastructure (c) lack of quality choices to the people (d) partial exclusion of the poor to the expensive privately provided services.

4.1. Health:

Good health is a prerequisite to keep the manpower productive and efficient. Frequent illnesses and inadequate nutrition put adverse impact on the incomes of households making them vulnerable. Good health not only increases productivity and earnings of an individual but also improves the overall quality of life and the socio-economic development of the society. Good health can be ensured through the provision of adequate and quality oriented social overheads. Though the share of SDP spent on health services in Assam is quite high, above the average of all North Eastern states, however, the expenditures do not get translated into better health indicators.

At present, the health infrastructure which is available in Assam is not adequate. Health and family welfare services are provided in the state in addition to private hospitals through a network of sub-centres, primary health centres, CHCs, hospitals and dispensaries. The present network of health delivery institutions can be seen in table 2. However, during the last decade, large number of private hospitals (some of them are having adequate modern facilities) have emerged in the state.

Table 2: Health Infrastructure in Assam

Health Facility	Number
Medical College	3
State Level Hospital	1
District Hospital	20
Sub Divisional Hospital	3
CHC	93 (FRU-32)
Block PHC	149
State Dispensary	239
Subsidiary Health Centre	71
Mini PHC	380
Sub-Centre	4592
B.Sc. Nursing College	1
GNM Training Centre	15
ANM Training Centre	18

Source: www.nrhmassam.in

The health infrastructure in Assam also exhibits wide spatial variation (table 3). Hospital bed per thousand populations is found to be lowest in Cachar district and highest in North Cachar Hills district.

Table 3: District-wise Health Infrastructure in Assam, 2006

District	Hospital	PHC	Dispensaries	Sub-Centres	CHC	Bed	Bed per thousand population
Dhubri	1	23	21	303	6	422	0.26
Kokrajhar	2	37	25	198	3	414	0.46
Bongaigaon	-	23	20	95	4	156	0.17
Goalpara	1	17	22	192	1	260	0.32
Barpeta	1	41	9	351	6	340	0.21
Nalbari	1	42	14	280	9	512	0.45
Kamrup	1	51	50	338	9	648	0.26
Darrang	1	35	11	322	7	352	0.23
Sonitpur	2	28	20	325	5	504	0.30
Lakhimpur	1	23	5	183	5	292	0.33
Dhemaji	1	9	5	88	3	208	0.36
Morigaon	1	13	19	111	2	178	0.23
Nagaon	1	38	22	464	9	524	0.23
Golaghat	1	32	14	212	5	410	0.43
Jorhat	1	24	10	149	4	472	0.47
Sivasagar	1	30	10	227	2	308	0.29
Dibrugarh	-	37	4	180	5	192	0.16
Tinsukia	1	14	5	236	4	244	0.21
Karbi Anglong	1	35	13	159	5	454	0.56
NC Hills	1	12	2	73	2	178	0.95
Karimganj	1	16	9	232	1	160	0.16
Hailakandi	1	8	3	103	1	154	0.28
Cachar	-	22	18	288	2	152	0.11
Total	22	610	331	5109	100	7534	0.28

Source: Economic Survey, Assam 2007-08, Government of Assam.

The position of rural areas of Assam in regards to health infrastructure is not adequate. Moreover, the private sector hospitals in Assam are unevenly distributed. A majority of the private sector hospitals are located in Guwahati and followed by Dibrugarh. It is because of the fact that both the cities possess one medical college each. In some of the districts there is not even a single private sector hospital. At present there are 131 private sector hospitals in Assam scattered over 13 districts (www.nrhmassam.in).

Setting aside the issue of the provision of physical infrastructure, it is generally viewed that the quality of service provision is low. Lack of adequate complementary economic infrastructure such as all weather roads, communication network, etc. makes health services effectively inaccessible to the rural people living in remote areas. Poor living conditions in villages with inadequate economic overhead facilities such as electricity, roads and sanitation work as disincentives for doctors and other paramedical staffs to work in rural areas.

4.2. Education:

As per 2001 census, the literacy rate is 64.28 per cent in Assam with wide district level variation. Assam ranks fifth among the northeastern states in the case of literacy and 24th among all the states of the nation. While male literacy in Assam is 71.93 per cent, the female literacy is only 56.03 per cent. In spite of a high share in expenditure on education in the state, the physical infrastructure facilities are found to be poor. The development of educational infrastructure during the period 1970-71 to 1998-99 is shown in table 4 below.

Table 4: Development of Educational Institutions in Assam (numbers).

Institutions	1970-71	1989-90	1992-93	1998-99
Primary School	17723	28875	28876	31888
Middle School	3092	5703	5703	8019
High & HS School	1346	3137	3467	4514
College (General)	98	179	217	341
Professional College	11	15	15	26
University	3	3	5	5

Source: Statistical Handbook, Assam, Government of Assam (various issues).

The expansion of educational institutes shows a record increase during the last three decades in Assam. But it should be noted that although, Assam possesses a large number of professional institutions, most of them could not come up to the required standard due to paucity of funds (Borah and Goswami, 2001). Nevertheless, the position of rural areas is comparatively worse in the matter of provision of educational infrastructure and it reflects widespread spatial variability. It can be seen from table 6 that in several districts, the percentage of inhabited villages having different types of educational institutions is found to be below the state averages. A majority of the villages of Assam do not have the higher and vocational educational infrastructures.

The poor performance on the educational front in the State as seen from the various indicators like literacy, etc. is despite the fact that the percentage of SDP devoted to education and per capita public expenditure on education have been consistently higher than the corresponding all India averages. The proportion of expenditure across different sub sectors of education, viz., primary, secondary, higher, etc. is more or less similar with some other states. In spite of a huge expenditure on education, the physical overhead facilities are found to be poor. This is due to lack of well drawn policy and proper execution.

4.3. Living Conditions:

Housing is one of the basic needs of human being. For a common man, owning a house of his or her own provides significant socio-economic security and dignity in society. For a shelterless person, possession of a house brings about a profound social change in his existence, thereby endowing him with an identity.

According to the 1991 Census, the rural housing shortage in India was 13.72 million consisting of 3.41 million households without houses and 10.31 million living in deplorable *kutcha* houses. The 1991 Census further indicates that about 40.82 per cent of the total of 112 million rural households stays in one-room dwellings, 30.65 per cent in two-room houses and 13.51 per cent in three-room houses or more. As per 1991 census, over 90 per cent of the rural houses in India have no provision for toilet. Poverty is the prime mover for such deplorable conditions. In 1998, the Government of India announced the National Housing and Habitat Policy with an aim at providing 'housing for all'. The Government is, thus committed to bring to an end to the homeless condition and the conversion of all unserviceable *kutcha* houses to *pucca*/semi *pucca* forms.

The United Nations call for global shelter strategy for the year 2000 was accepted by the Government of India and asked the different states to assist people to secure affordable shelter. The house listing operations of the 1991 census shows a dismal picture in Assam as compared to all India in respect of comfortable shelter. Out of 472175 urban households, 29.17 per cent have shortage of housing, while out of 3329445 rural households as many as 67.40 per cent have shortage of housing as against the national average of 12.08 per cent and 12.30 per cent respectively. Moreover, if we look at the percentage distribution of households living in different types of houses a dismal picture is apparent. Table 5 shows that as many as 70.22 per cent of households are living in *kutcha* houses, as against the national average of 27.44 per cent.

Table 5: Percentage Distribution of Households Living in Different Types of Houses, 1996

Type	Assam	All India
Pucca	14.62	41.61
Semi <i>Pucca</i>	15.16	30.96
<i>Kutcha</i>	70.22	27.44

Source: CMIE, February, 1996.

Table 6: Living Conditions in Some States of the North East India, 1998-99

State	<i>Percentage of households (except the last column)</i>					
	With Electricity	With Drinking Water that is piped or from a hand pump	With a toilet or latrine	Using biomass fuel for cooking	Living in a <i>pucca</i> house	Mean number of persons per room
India	60.1	77.9	35.9	71.7	32.0	2.7
Assam	26.4	60.1	63.0	87.1	10.9	2.1
Arunachal Pradesh	68.9	80.7	73.0	80.8	14.2	2.2
Manipur	75.3	48.9	92.0	69.2	7.1	2.1
Meghalaya	41.2	42.1	52.0	83.5	14.5	2.0
Mizoram	84.1	63.2	97.7	57.4	16.2	2.6
Nagaland	56.3	40.5	74.3	86.1	18.1	1.6
Sikkim	80.7	84.6	72.7	63.2	50.6	2.0

Source: NFHS-2, 1998-99. Table 2.12

Living conditions of a large section of the dwellings in the state is not satisfactory. Table 8 depicts that in several important indicators of the conditions of living Assam continues to remain in backward in comparison to the national average. District level data (1991 census) reveals that percentage of households with sanitation facilities is highest in Karimganj (73.17 per cent) and lowest in Kokrajhar (14.41). The percentage of household with access to safe drinking water is highest in Tinsukia district (73.96 per cent) and lowest in Kokrajhar district (8.93 per cent).

4.4. Crime and Social Unrest:

Effects of organized crime on regional socio-economic development needs no introduction. Plethora of studies (Daniele, 2009; Becker 1968; Ehrlich 1973; Stigler 1970) have been carried in this regard to study the effects of crime in social sector development. Crime imposes significant costs on society. Estimating such costs is a tough but not impossible. The impact of organized crime on labour productivity has been amply investigated in literature (Busetta and Sacco, 1992; Felli and Tria, 2000). Peri's study (2004), found that unemployment is an effect (a cost) of crime rather than one of its determinants. Organized crime also affects the localization of firms.

For studying the inter-district disparities in social sector development in Assam, district-wise crime reported under IPC have been taken not only to quantify the cognized crimes but also to have an idea of social unrest. Available data reveals that in 2006 crime reported under IPC was lowest in NC Hills district (221) and highest in Kamrup district (6312).

5. District-wise composite indices of social sector development

As there is not a singular parameter that expresses the excellence in social sector development, the rankings have been based on a number of parameters that focus the social parameters in a variety of perspectives. The main variables used in this analysis are X_1 : social unrest (taking proxy as incident of crime reported under IPC, 2006) (inverse thereof), X_2 : literacy rate (2001 census), X_3 : gross enrolment ratio at upper primary level (2007-08), X_4 : gender parity index at school level (2007-08), X_5 : pupil teacher ratio, 2007-08 (inverse thereof), X_6 : hospital beds per thousand population (2006), X_7 : infant mortality rate (1991 census) (inverse thereof), X_8 : percentage of households with sanitation (1991 census), X_9 : percentage of households with drinking water facilities (1991 census).

District wise ranking in the social sector development has been done with the help of composite scores. These scores have been calculated by taking first Principal Component from the Principal Component matrix derived from the inter-correlation matrix of 9 variables.

Table 7: Total Variance Explained

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.396	37.730	37.730	3.396	37.730	37.730	2.472	27.469	27.469
2	1.949	21.651	59.381	1.949	21.651	59.381	2.034	22.601	50.070
3	1.154	12.817	72.199	1.154	12.817	72.199	1.992	22.129	72.199
4	.927	10.299	82.498						
5	.661	7.344	89.842						
6	.486	5.403	95.245						
7	.216	2.399	97.644						
8	.128	1.425	99.069						
9	.084	.931	100.000						

Extraction Method: Principal Component Analysis.

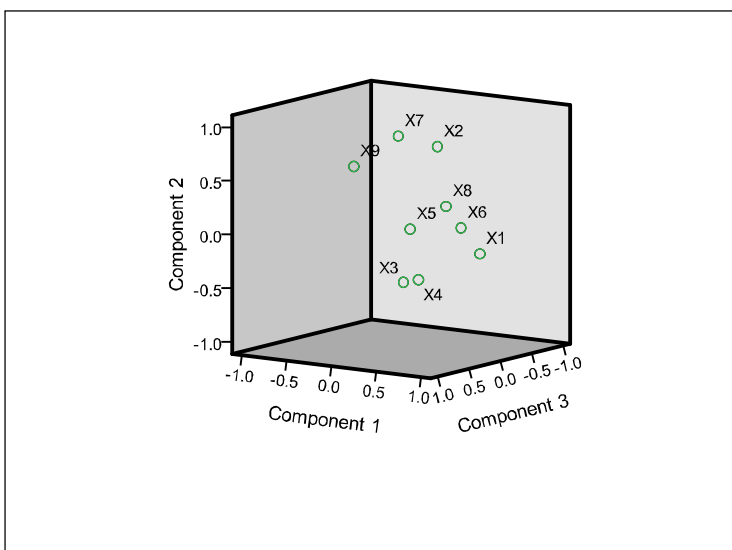
From table 1 it can be seen that Principal Component 1 explains about 37 per cent of the data variance, Component 2 explains about 21 per cent and Component 3 explains about 12 per cent data variance. The initial eigen values of the three components are fairly large.

Table 8: Component Score Coefficient Matrix

Variable	Component		
	1	2	3
X_1	0.919	-0.128	0.051
X_2	0.257	0.765	-0.214
X_3	0.369	-0.385	0.490
X_4	0.486	-0.360	0.416
X_5	0.587	0.162	0.691
X_6	0.870	0.142	0.286
X_7	-0.077	0.850	-0.066
X_8	-0.127	0.071	-0.903
X_9	-0.254	0.617	0.389

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Figure 1: Component plot in rotated space



Ranking of 23 districts of Assam in social sector development as per the first principal component has been constructed by using the following formula:

$$CS_i = (0.919)Z_1 + (0.257)Z_2 + (0.369)Z_3 + (0.486)Z_4 + (0.587)Z_5 + (0.870)Z_6 + (-0.077)Z_7 + (-0.127)Z_8 + (-0.254)Z_9$$

Where, CS_i is the composite score for the i^{th} district and Z_i are the values of the variables in standardized form and figures in the parenthesis are factor loadings or weights.

Table 9: District-wise rankings

District	Score based on PCA	Rank
Dhubri	-2.03	19
Kokrajhar	1.34	5
Bongaigaon	0.67	7
Goalpara	0.61	9
Barpeta	-0.49	13
Nalbari	0.59	10
Kamrup	-1.47	18
Darrang	-0.29	12
Sonitpur	-1.19	16
Lakhimpur	1.73	4
Dhemaji	3.08	2
Morigaon	-0.25	11
Nagaon	-1.38	17
Golaghat	0.65	8
Jorhat	1.12	6
Sivasagar	-0.93	14
Dibrugarh	-3.33	23
Tinsukia	-3.31	22
Karbi Anglong	2.34	3
NC Hills	9.65	1
Karimganj	-2.21	20
Hailakandi	-1.10	15
Cachar	-2.72	21

From table 9 it is found that NC Hills district ranked first followed by Dhemaji district. A striking observation is that both the hill districts fared well in social sector development.

6. Conclusion

The rankings of the districts of Assam on the basis of social sector development are grossly different from their HDI rankings¹. Development on these fronts is also important for overall development of a region. This poses a great challenge to the planners and policy makers not only to plan for even dispersal of social infrastructures all through the state but also prepare specific strategy for the backward districts so as to enable them to come into the mainstream. Expenditure decentralization with strict accountability and transparency can increase the efficiency of use of funds through greater involvement of stakeholders.

Note:

¹ for details see *Assam Human Development Report (2003)*, Planning Commission.

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