Statistical Evaluation of Socio-economic Development of Different States in India

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SUMMARY

The level of development of different states was obtained with the help of composite index based on optimum combination of a number of socio-economic indicators. Seventeen major states and ten smaller states of the country were included in the analysis. The data on various indicators for the year 2001-02 were used in the study.

The level of development was examined separately for agricultural, infrastructural and overall socio-economic sectors. The state of Punjab was ranked first and Bihar was ranked last in overall socio-economic development. Wide disparities were observed in the level of development among different states. The overall socio-economic development was positively associated with the development in agricultural sector. The infrastructural facilities and literacy status were influencing the socio-economic development in the positive direction. For bringing out uniform regional development, potential target of developmental indicators was estimated for low developed states.

Key words: Composite index, Developmental indicators, Model states, Potential target.

1. INTRODUCTION

Socio-economic development is a process which improves the quality of life of people. Development of social sector along with technology absorption in agriculture and industry which are the principal sectors of our economy, could be considered as the primary objective of any economic developmental efforts. The developmental programmes have been taken up in the country in a planned way through various Five Years Plans with the main objective of enhancing the quality of life of people by providing basic necessities as well as effecting improvement in economic well being. Although resource transfers are being executed in the backward regions through a number of instruments like subsidies and Central assistance, it has been observed that the regional disparities in terms of socio-economic development are not declining over times. Even though the 'green revolution' in agriculture sector has increased the total crop production and commendable progress has been made in the industrial sector by implementing the modern improved techniques, but these activities also have not been able to reduce substantially the regional

disparities in the level of socio-economic development. In a large sized federal country like India, there is likely to exist wide disparities in the levels of development in different regions. It has been the continuous endeavour of scientists and planners to measure the levels of development in different regions of the country in order to identify where a given region stands in relation to others.

Socio-economic development is not a pre-determined state but it is a continuous process of improvement in the level of living. It implies the availability to the maximum number of people of goods and services in adequate measure concerning the growth and progress of agriculture, industry, education, medical, transport and other basic facilities. The impact of development can not be fully captured by a single indicator. Moreover, 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 of a composite index of development based on various socio-economic indicators. In the present study, an attempt has been made to quantify the socio-economic development

of different states of the country by constructing composite index of development. The levels of development for agricultural sector and infrastructural facilities have been calculated for different states. A total of 27 states have been included in this investigation. These states cover more than 99 per cent area and over 98.5 per cent population of the country. Seventeen major states have been compared together whereas 10 smaller and newly formed states have been compared with each other.

2. DEVELOPMENTAL INDICATORS

In this study, States have been taken up as the unit of analysis. Each State faces situational factors of development unique to it as well as common administrative and financial factors. The developmental indicators for the year 2001-02 are included in the analysis. The composite indices of development have been worked out for different states on the basis of the following indicators.

Developmental indicators for Major States:

1. Percentage of forest area to total area
2. *Percentage of net area sown to total area
3. *Per cultivator net area sown
4. *Percentage of net area irrigated
5. *Consumption of fertilizer per unit gross cropped area
6. *Yield rate of rice (Qt./ha)
7. *Yield rate of foodgrains (Qt./ha)
8. Per capita milk production (kg.)
9. *Yield rate of total pulses (kg./ha)
10. *Per capita foodgrains production (kg.)
11. *Number of fair price shops per lakh population
12. *Percentage of agricultural workers to total workers
13. *Percentage of total workers to total population
14. Percentage of villages electrified
15. *Per capita consumption of electricity
16. Percentage of factory workers to all India factory workers
17. Per capita gross output in industry (Rs.)
18. Per capita value added by manufacturer (Rs.)
19. *Percentage of urban population

20. *Population density (per sq. km. of area)
21. *Literacy rate
22. *Percentage of SC and ST population
23. *Population per bank (in '000)
24. Credit/Deposit ratio
25. *Annual birth rate
26. *Annual death rate
27. *Annual infant mortality rate
28. *Road length per 1000 sq. km. of area
29. *Number of motor vehicles per 1000 persons
30. Percentage of villages connected with all weather roads
31. Number of post office per lakh population
32. Per capita state Govt. expenditure on medical, public health and family welfare
33. Per capita state Govt. expenditure on education, sports, art and culture

In case of smaller states, values of all the indicators are not available because some of them are not important for the states. The indicators marked with asterisk (*) along with the following additional indicators are used for smaller states.

1. Decennial growth rate of population
2. Sex ratio
3. Number of students in primary and secondary schools (per '000 population)

These indicators may not form an all inclusive list but these are the major interacting components of development.

3. METHOD OF ANALYSIS

There are several methods of estimation of level of development but most of these methods are having their own limitations. The major limitation arises from the assumptions made about the developmental indicators themselves and their weightage in aggregate index. Keeping in view the limitations of different methods of estimating the level of development, the following statistical procedures are used in the study.

Variables for different developmental indicators are taken from different population distributions and these are recorded in different units of measurement. The values

of the variables are not quite suitable for combined analysis. Hence, the variables are transformed for the combined analysis as given below.

Let $[X_{ij}]$ be data matrix giving the values of the variables of ith state, $i = 1, 2,.... n$ (number of states) and j^{th} indicator, $j = 1, 2,... k$ (number of indicators).

For combined analysis $[X_{ij}]$ is transformed to $[Z_{ij}]$ the matrix of standardized indicators as follows

$$[Z_{ij}] = \frac{X_{ij} - \bar{X}_j}{S_j}$$

where $\bar{X}_j$ = mean of the jth indicator

S_j = standard deviation of jth indicator

From $[Z_{ij}]$ identify the best value of each indicator. Let it be denoted as Z_{oj}. The best value will be either the maximum value or the minimum value of the indicator depending upon the direction of the impact of indicator on the level of development. For obtaining the pattern of development C_i of ith state, first calculate P_{ij} as follows

$$P_{ij} = (Z_{ij} - Z_{oj})^2$$

Pattern of Development is given by

$$C_i = \left[\sum_{j=1}^{k} P_{ij} /(CV)_j \right]^{1/2}$$

$(CV)_j$ = coefficient of variation in X_{ij} for j^{th} indicator

Composite index of development is given by

$$D_i = C_i / C$$

where $C = \bar{C} + 3S_{Di}$

$\bar{C}$ = Mean of C_i

S_{Di} = Standard Deviation of C_i

Smaller value of D_i will indicate high level of development and higher value of D_i will indicate low level of development.

For identifying the model states for less developed states, the distance between different pairs of states based on all the indicators is calculated.

The distance between two states i and p is given by d_{ip} where $i = 1, 2, ..., n$ and $p = 1, 2, ..., n$

Here $d_{ii} = 0$ and $d_{ip} = d_{pi}$

Now d_{ip} can be written as

$$d_{ip} = \begin{bmatrix} 0 & d_{12} & \cdots & d_{1n} \\ d_{21} & 0 & \cdots & d_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ d_{n1} & d_{n2} & \cdots & 0 \end{bmatrix}$$

From the above distance matrix, find out the minimum distance for each row. Let the minimum distance for row i is given by d_i.

Obtain the Critical Distance (CD) as follows

$$CD = \bar{d} + 2Sd$$

where $\bar{d}$ = mean of d_i

and Sd = standard deviation of d_i

Identification of Model States

Model states with respect to state A will be those states whose composite index of development is less than that of state A and the developmental distance of these states from state A is less than or equal to Critical Distance (CD). Thus, model states will be better developed in comparison to state A.

The best value of each developmental indicator of the model states will be taken up as the potential target of that indicator for state A.

For classificatory purposes, a simple ranking of the state on the basis of composite index of development is significant. However, a more meaningful characterization of different stages of development would be in terms of suitable fractile classification from the assumed distribution of the mean of composite indices. For relative comparison, it appears quite valid to assume that the states having the composite indices less than or equal to (Mean – S.D.) are in high developed category, the states having

the composite indices in between (Mean – S.D.) to (Mean) are in high middle level developed category, the states having composite indices between (Mean) to (Mean + S.D.) are in low middle level developed and the states having the composite indices greater than or equal to (Mean + S.D.) are in low level developed category.

4. RESULTS AND DISCUSSIONS

4.1 The Level of Development

The composite indices of development have been worked out for different states for agricultural sector, infrastructural facilities and overall socio-economic sector. The states have been ranked on the basis of developmental indices. The composite indices of development along with the rank are given in Table 1 for major states.

Table 1. Composite indices of development (C.I.) for major States

S.No.	States	Agricultural Development		Infrastructural Facilities		Socio-economic Development	
		C.I.	Rank	C.I.	Rank	C.I.	Rank
01	A.P.	0.56	2	0.61	10	0.62	5
02	Assam	0.77	14	0.68	11	0.78	12
03	Bihar	0.74	13	0.81	17	0.86	17
04	Gujarat	0.73	11	0.55	5	0.63	7
05	Haryana	0.58	3	0.59	9	0.61	4
06	H.P.	0.77	15	0.59	8	0.70	9
07	J & K	0.87	16	0.71	13	0.81	15
08	Karnataka	0.66	6	0.57	6	0.63	6
09	Kerala	0.90	17	0.42	1	0.68	8
10	M.P.	0.67	7	0.79	15	0.78	13
11	Maharashtra	0.70	8	0.45	2	0.57	3
12	Orissa	0.72	9	0.78	14	0.82	16
13	Punjab	0.54	1	0.51	4	0.54	1
14	Rajasthan	0.73	10	0.70	12	0.75	11
15	Tamil Nadu	0.64	5	0.47	3	0.56	2
16	U.P.	0.62	4	0.79	16	0.79	14
17	West Bengal	0.74	12	0.58	7	0.71	10

It may be seen from the table that the State of Punjab has been ranked first and the State of Kerala has been placed on the last position in agricultural development. The composite indices varied from 0.54 to 0.90. In case of infrastructural facilities, the State of Kerala is placed

on the first position and the State of Bihar is placed on the last position. The composite indices varied from 0.42 to 0.81. Regarding overall socio-economic development, the State of Punjab occupies the first place and the State of Bihar is placed on the last position. The composite indices varied from 0.54 to 0.86. Among major states in the country, five most developed states are Punjab, Tamil Nadu, Maharashtra, Haryana and Andhra Pradesh and five least developed states are Bihar, Orissa, Jammu & Kashmir, Uttar Pradesh and Madhya Pradesh. During 1981-82, five most developed states were found to be Haryana, Punjab, Kerala, Maharashtra and Tamil Nadu. During the period of 20 years from 1981-82 to 2001-02, the State of Kerala has gone down in overall socio-economic development and Andhra Pradesh has improved its position. The States of Bihar, Assam, Rajasthan, Orissa and Madhya Pradesh were found to occupy the last five positions during 1981-82. The states of Assam and Rajasthan have improved their positions during twenty years and the states of Uttar Pradesh and Jammu & Kashmir have gone down in the overall socio-economic development.

The composite indices of development along with the rank are presented in Table 2 for smaller states.

Table 2. Composite indices of development (CI) for smaller States

S.No	States	Agricultural Development		Infrastructural Facilities		Socio-economic Development	
		C.I.	Rank	C.I.	Rank	C.I.	Rank
1	Arunachal Pradesh	0.79	6	0.86	10	0.90	9
2	Jharkhand	0.97	10	0.83	7	0.95	10
3	Chhattisgarh	0.77	4	0.64	6	0.74	6
4	Manipur	0.90	9	0.46	1	0.70	3
5	Meghalaya	0.74	3	0.61	5	0.71	4
6	Mizoram	0.72	2	0.51	3	0.64	1
7	Nagaland	0.61	1	0.85	8	0.84	7
8	Sikkim	0.78	5	0.85	9	0.89	8
9	Tripura	0.88	8	0.53	4	0.73	5
10	Uttarakhand	0.80	7	0.47	2	0.65	2

Among smaller states, in agricultural development, the State of Nagaland was placed in the first position whereas the State of Jharkhand was on the last position. The composite indices varied from 0.69 to 0.97. In infrastructural facilities concerning availability of

transport, construction of road, bank and medical facilities, educational systems, literacy rate etc., the State of Manipur was on the first place and the State of Arunachal Pradesh was on the last position. The composite indices varied from 0.46 to 0.86. In overall socio-economic development, the State of Mizoram was found to occupy the first place among the smaller states whereas the State of Jharkhand was on the last place. The composite indices varied from 0.64 to 0.90. It was further observed that the relative variation of infrastructural facilities was of higher level among different smaller states.

4.2 Different Stages of Development

On the basis of system of classifications mentioned in Section 3, states are put in four stages of development as high, high middle, low middle and low. Table 3 presents the number of states along with the percentage area and population lying in different stages of development.

Table 3. Area and population lying under different stages of development

Stage of Development	Number of States	Area (%)	Population (%)
Agricultural Development			
High	7 (3)	37.8 (13.4)	45.2 (7.6)
High Middle	1 (4)	9.4 (61.8)	9.4 (45.1)
Low Middle	3 (1)	21.1 (2.2)	14.0 (4.7)
Low	6 (2)	17.7 (22.6)	23.2 (42.6)
Infrastructural Facilities			
High	3 (3)	14.6 (21.3)	19.6 (16.9)
High Middle	7 (3)	27.5 (37.0)	32.8 (38.5)
Low Middle	3 (1)	19.6 (17.7)	11.1 (39.4)
Low	4 (3)	24.3 (24.0)	28.3 (5.2)
Socio-economic Development			
High	3 (2)	15.9 (16.4)	17.9 (13.7)
High Middle	5 (4)	23.8 (41.9)	22.6 (41.7)
Low Middle	6 (3)	33.9 (24.0)	38.6 (5.2)
Low	3 (1)	12.4 (17.7)	12.7 (39.4)

Note :   Figures regarding number of states, area and population percentages are given in brackets for smaller states.

For major states, Table 3 reveals that in agricultural sector, seven states are found to be in high developed group having the area of about 38 per cent and population of 45 per cent. One state having the area of about 9 per cent and population also 9 per cent is high middle level developed. Three states are observed to be low middle level developed. The area and population of these states

are respectively about 21 per cent and 14 per cent. Six states having the area of about 18 per cent and population of about 23 per cent are low level developed. Steps should be taken to enhance the level of agricultural development in these states.

Infrastructural facilities are quite essential for enhancing the level of development of different sectors. In major states, three states having the area of about 15 per cent and population of about 20 per cent are found to be in high developed category. Seven states with area of about 27 per cent and population of about 33 per cent are in high middle category whereas three states with area of about 20 per cent and population of about 11 per cent are in low middle category. Four states with 24 per cent area and 28 per cent population are in low category. More effective infrastructural facilities should be created in these states for enhancing the level of development.

With regard to socio-economic development in major states, three states having the area of about 16 per cent and population about 18 per cent are found to be in high developed category. Five states with area of about 24 per cent and population of about 23 per cent are in high middle level developed category and six states having the area of about 34 per cent and population about 39 per cent are in low middle level developed category. Three states with area of 12 per cent and population about 13 per cent are in low developed category.

Tamil Nadu is the only State which is in high developed category in all the three sectors whereas Bihar is the only State in low developed category in all these sectors.

In case of smaller states in agricultural sector, three states are better developed. These states are having about 13 per cent area and more than 7 per cent population. Four states are high middle level developed with about 62 per cent area and 45 per cent population. One state is in low middle level developed category with only 2 per cent area and about 5 per cent population whereas two states are low developed with about 23 per cent area and *43 per cent population.*

As regards, infrastructural facilities, three states are having high level facilities with about 21 per cent area and 17 per cent population. Three states are found to have high middle level of facilities with 37 per cent area and 38 per cent population. One state is having low middle

level facilities with about 18 per cent area and 49 per cent population. Three states enjoy low infrastructural facilities with about 24 per cent area and 5 per cent population.

With respect to socio-economic development, two states are highly developed with about 16 per cent area and 14 per cent population. Four states are in high middle level developed category. These states are having about 42 per cent area and 42 per cent population. Three states are in low middle level category with about 24 per cent area and 5 per cent population. One state is in low developed category with about 18 per cent area and 39 per cent population.

4.3 Inter-relationship among Different Sectors of Economy

For proper development and better level of living, it is essential that all the sectors of economy should flourish together. Similarly, system of education envisages all round development of manpower and human resources required for socio-economic activities. A large population below an acceptable economic level poses serious problems. Massive poverty in the country characterizes its economy. The correlation coefficients between the developments of different sectors of economy and literacy level are given in Table 4.

For major states, literacy level does not influence the level of development in agricultural sector. However, agricultural development is influencing the overall socio-

economic development in the positive direction. Infrastructural facilities are highly associated with overall socio-economic development. Literacy level influences significantly the overall socio-economic development in positive direction.

For smaller states, development in agricultural sector is not influencing socio-economic development. It is also not affected by infrastructural facilities and literacy status. Infrastructural facilities are influencing socio-economic development in the positive direction. It is also positively associated with the literacy level. Socio-economic development has a positive relationship with the literacy status.

4.4 Potential Targets for Low Developed States

It is quite essential and useful to examine the extent of improvement in different developmental indicators for the low developed states. This will help the administrators and planners to re-adjust the resources for bringing about uniform regional development. For estimation of potential targets of developmental indicators of low developed states, model states have been identified on the basis of composite index of development and the developmental distances between different states. In case of major states, Bihar, Jammu & Kashmir and Orissa are observed to be low developed in overall socio-economic development. These states cover about 12.4 per cent area and 12.7 per cent population of the country. List of model states for these low developed states is given in Table 5.

Table 4. Correlation Coefficient for smaller States

Factors	Agricultural Development	Infrastructural Facilities	Socio-economic Development	Literacy Level
Agricultural Development	1 (1)	-0.004 (-0.176)	0.492* (0.189)	0.191 (-0.292)
Infrastructural Facilities		1 (1)	0.856** (0.931**)	-0.823** (-0.645*)
Socio-economic Development			1(1)	-0.597* (-0.746*)
Literacy Level				1 (1)

Note : Correlation Coefficient for smaller states are given in brackets.
　　　* Significant at 0.05 probability level,　　　** Significant at 0.01 probability level

Table 5. Model states for low developed states

S.No.	Low Developed States	Model States
1	Bihar	Haryana, West Bengal, Madhya Pradesh, Andhra Pradesh
2	Jammu & Kashmir	Himachal Pradesh, Assam, Haryana
3	Orissa	West Bengal, Madhya Pradesh, Haryana

Model states are better developed in comparison with low developed states. The states of Haryana, West Bengal and Madhya Pradesh are found to be model states for most of the low developed states. The best value of the developmental indicators of model states are taken as potential targets of the low developed states. The present value of the developmental indicators along with the potential target for the low developed states is presented in Table 6.

It may be seen that the values of the potential targets are quite high for some of the indicators. Suitable action should be taken to achieve the potential target and to enhance the level of development of low developed state.

1. **Bihar**: This state is low developed in agriculture and overall socio-economic fields. Infrastructural facilities are also poor in the state. Steps should be taken to enhance the productivities of different crops by creating more irrigation facilities and using fertilizers. Only 71 per cent villages in the state are electrified. Suitable action is needed to electrify all the villages of the state. Literacy rate is extremely poor in the state. Immediate action is required to enhance the literacy rate and also to improve medical and transport facilities in the state.

2. **Jammu & Kashmir**: The state is low developed in agricultural and overall socio-economic sectors. Suitable action is required for enhancement of crop productivities by creating more irrigation facilities and proper application of chemical fertilizers. Literacy rate should be enhanced. Transport system and medical facilities should be increased. Developmental programmes suitable for hilly states should be encouraged in the state.

Table 6. Value of developmental indicators along with potential target

S. No.	Developmental Indicators	Low Developed States		
		Bihar	Jammu & Kashmir	Orissa
01	Net area sown (%)	43(63)	16(63)	39(63)
02	Net area irrigated (%)	50(78)	42(78)	35(78)
03	Fertilizer consumption (kg./ha)	97(147)	60(147)	40(147)
04	Yield rate of rice (Qt./ha)	15(26)	17(26)	10(26)
05	Yield rate of foodgrains (Qt./ha)	17(31)	12(31)	10(31)
06	Per capita milk production (kg.)	36(225)	100(225)	20(225)
07	Per capita foodgrains production (kg.)	133(224)	56(140)	188(224)
08	Percentage of total workers to total population	34(43)	37(40)	39(43)
09	Villages electrified (%)	71(100)	98(100)	73(100)
10	Factory workers (%)	1.5(4.3)	0.3(4.3)	1.5(4.3)
11	Per capita gross output in industry	11(175)	15(175)	31(175)
12	Literacy rate (%)	47(69)	54(69)	64(69)
13	Annual birth rate	31(27)	24(24)	24(24)
14	Annual death rate	9(8)	10(8)	11(8)
15	Infant mortality rate	63(52)	70(68)	97(52)
16	Road length in 1000 sq. km. area	51(89)	11(53)	169(169)
17	Per capita expenditure of State Govt. on medical and public health	120(654)	415(654)	140(654)
18	Per capita expenditure of State Govt. on education etc.	484(654)	937(937)	478(654)

Note : Potential targets of different indicators are given in brackets.

3. **Orissa** : The state is low developed in overall socio-economic field. Only 73 per cent villages are electrified in the state. Steps should be taken to electrify more villages. Establishment of small scale industries should be encouraged. The level of literacy has improved in the state but steps are required to make further improvement in it. Medical facilities should be enhanced and communication system should be improved.

4. **Jharkhand :** The state is found to be low developed in agricultural sector and socio-economic fields. Major improvements are required in the state for enhancing crop productivity. Irrigation facilities might be created and utilization of fertilizers should be enhanced. Improved technique of dryland farming might also be adopted in the area where irrigation facilities are not sufficient. Transport and medical facilities should be enhanced.

5. CONCLUSIONS

The broad conclusions emerging from the study are as follows

(i) With respect to socio-economic development, the states of Punjab, Tamil Nadu and Maharashtra are found to be better developed as compared to other states. The states of Bihar, Orissa and Jammu & Kashmir are low developed.

(ii) As regards agricultural development, seven states namely Andhra Pradesh, Haryana, Karnataka, Madhya Pradesh, Punjab, Tamil Nadu and Uttar Pradesh are better developed in comparison to other states. Six states namely Assam, Bihar, Himachal Pradesh, Jammu & Kashmir, Kerala and West Bengal are found to be low developed.

(iii) Infrastructural facilities are better in the states of Kerala, Maharashtra and Tamil Nadu. These facilities are found to be poor in the states of Bihar, Madhya Pradesh, Orissa and Uttar Pradesh.

(iv) Overall socio-economic development is found to be positively associated with the developments in agricultural and industrial sectors. Infrastructural facilities are also influencing the socio-economic development in the positive direction. Literacy rate is also positively related to socio-economic development.

(v) Wide disparities in the level of development among different states have been observed.

(vi) For enhancing the level of development of low developed states, model states have been identified and potential targets of important developmental indicators have been estimated.

(vii) It would be useful to examine and evaluate the level of development at smaller level for making location specific recommendations.

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