



Pattern of Regional Disparities in Socio-economic Development in West Bengal

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SUMMARY

The level of development of different districts of West Bengal was obtained with the help of composite index based on optimum combination of forty five developmental indicators. Eighteen districts of the State have been included and the data on various indicators for the year 2001-02 were used in the study. The level of development was examined separately for agricultural sector, infrastructural facilities and socio-economic sector. Wide disparities in the level of development are observed among different districts. Infrastructural facilities and agricultural development are found to be positively associated with socio-economic development. For bringing out uniform regional development, potential targets of important indicators have been estimated.

Keywords: Composite index, Developmental indicators, Model districts, Potential target.

1. INTRODUCTION

Economic planning has been used in the country for bringing about uniform regional development. Developmental programmes were taken up in the country in a planned way through various Five Year Plans with the main objective of enhancing the quality of life of people by providing the basic necessities of life as well as effecting improvement in their social and economic well being. The 'green revolution' in agriculture and commendable progress in the industrial front have certainly increased the total production in the farm sector and the manufactured goods but there is no indication that these achievements have been able to reduce substantially the level of disparities in socio-economic development among different regions. For focusing the attention of administrators, scientists, planners and policy makers on the problems of estimation of disparities in the level of development, a seminar was organized jointly by the Planning Commission, Government of India and State Planning Institute, Government of Uttar Pradesh during April

1982. Realizing the importance and seriousness of the problem of estimation of level of development, the Indian Society of Agricultural Statistics conducted a series of research studies in this direction. Apart from evaluating the level of development at State level, the Society also estimated the status of socio-economic development at district level in respect of the states of Orissa (1992, 1993, 2005), Andhra Pradesh (1994, 2009), Kerala (1994, 2005), Uttar Pradesh (1995, 2001), Maharashtra (1996), Karnataka (1997, 2003), Tamil Nadu (2000), Madhya Pradesh (2002), Assam (2004) and Jammu & Kashmir (2005). It was found that entire part of the low developed districts is not low developed but some parts are also better developed. The present study is conducted for estimating the level of development at district level in the state of West Bengal by utilizing the values of developmental indicators for the year 2001-02. The study throws light on the association of development in different sectors of economy. The improvements needed in different indicators for enhancing the level of development are also suggested.

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The land frontiers of the state of West Bengal touch Assam and Bangladesh in the east and is separated from Nepal in the west. Bhutan lies in the north east, while Sikkim is on the north. On the west and south are the states of Bihar, Jharkhand and Orissa. Bay of Bengal is washing its southern frontiers. As per recommendations of State Reorganization Act 1956, some Bengali speaking areas of a neighbouring state were transferred to West Bengal. Agriculture plays a pivotal role in the State's income and nearly three out of four persons in the State is directly or indirectly involved in agriculture. About 50 per cent of gross cropped area of the State has also been brought under irrigation potential. The State occupies a leading position among the principal rice growing states of the country by contributing about 16 per cent of the total production of rice. The State accounted for about 75 per cent of the country's jute production including mesta in the year 2006-07. Important crops, among others include potatoes and oilseeds.

The level of development is estimated separately for agricultural sector, infrastructural facilities and overall socio-economic field. It will be of interest to estimate the level of development at district level since there has been a growing consensus about the need of district level planning in the country. Knowledge of level of development at district level will help in identifying where a given district stands in relation to others. There are 19 districts in the state of West Bengal. One district namely Kolkata having 185 square kilometer of area (about 0.2% of the State area) and 45.7 lakh population (about 5.7% of the State population) is not having any rural area. This district has not been included in this study.

2. DEVELOPMENTAL INDICATORS

Development is a multi-dimensional process and it 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. Hence there is a need of building up of a composite index of development based on optimum combination of various developmental indicators. Each district faces situational factors unique to it as well as administrative and financial factors common to all the districts. Indicators common to all the districts have been included in the analysis for evaluating the level of development.

Composite indices of development for different districts have been obtained by using the following developmental indicators.

1. Percentage of area under forest
2. Percentage of area not available for cultivation
3. Percentage of net area sown
4. Cultivable area per agricultural worker (ha.)
5. Percentage area under rice
6. Percentage area under wheat
7. Percentage area under pulses
8. Percentage area under oilseeds
9. Percentage area under jute
10. Percentage area under potato
11. Cropping intensity (%)
12. Yield rate of total cereals (kg/ha)
13. Production of total cereals per lakh population (000 tones)
14. Production of potato per lakh population (000 tones)
15. Area under mango (000 ha)
16. Consumption of fertilizer in kg/ha
17. Number of tubewells and river lift irrigation works (in '00)
18. Area irrigated by canals (in lakh ha.)
19. Production of milk (cow + buffalo +goat) (in '000 tones)
20. Production of egg (Hen + Duck) (in lakh)
21. Agricultural land distributed to weaker section (in '000 ha)
22. Number of cultivators (in '0000)
23. Number of agricultural workers (in '0000)
24. Non-workers as percentage of total population
25. Number of registered factories
26. Average daily employment in factories (in '000)
27. Number of commercial banks
28. Average population per bank (in '000)
29. Length of roads maintained by Zila Parishad and Gram Panchayats (in '000)
30. Number of fair price shops
31. Number of agricultural cooperative societies
32. Population density per square kilometer

33. Sex ratio
34. Percentage of urban population
35. Percentage of main workers to total population
36. Number of post offices per lakh population
37. Literacy rate for male
38. Literacy rate for female
39. Decadal growth rate of population (1991-2001)
40. Percentage of SC and ST population
41. Percentage of electrified villages
42. Percentage of villages having primary schools
43. Percentage of villages having health centres/ allopathic dispensaries
44. Per capita income at current prices
45. Per capita income at constant prices (1999-2000)

A total of forty five developmental indicators have been included in the analysis. These indicators are the major interacting components of development. Out of these forty five indicators, twenty four indicators are directly concerned with agricultural development and the rest twenty one indicators describe the availability of infrastructural facilities in the district.

3. METHOD OF ANALYSIS

The variables for different indicators are taken from different population distributions and they might be recorded in different units of measurement. The values of these indicators are not quite suitable for combined analysis. There are several statistical methods which are used for 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 combined analysis. Keeping in view the limitations of different methods, the following statistical procedures are used in the study.

Let $[X_{ij}]$ be the data matrix giving the values of the variables of i th district and the j th indicator.

$i = 1, 2, \dots, n$ (No. of districts) and

$j = 1, 2, \dots, k$ (No. of indicators)

For combined analysis $[X_{ij}]$ is transferred to $[Z_{ij}]$ as follows :

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

Where \bar{X}_j = mean of the j th indicator and

s_j = standard deviation of the j th indicator.

Now $[Z_{ij}]$ is the matrix of standardized indicators.

From $[Z_{ij}]$, identify the best value of each indicator. Let it be denoted by Z_{oj} . The best value will be either 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 i th district, first calculate the square of the deviation of the individual value of transformed variate from the best value. In other words, calculate P_{ij} as

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

For each i and j

Pattern of development is given by

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

where $(cv)_j$ = coefficient of variation of X_{ij} for j th indicator.

Composite index of development is given by

$$D_i = \bar{C} + 3s_i$$

Where \bar{C} = mean of C_i

s_i = 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 districts and fixing the potential targets of developmental indicators of low developed districts, the distance between pairs of districts will be calculated. The distance between districts i and p is given by d_{ip} as follows :

$$d_{ip} = \left[\sum_{j=1}^k (Z_{ij} - Z_{pj})^2 \right]^{1/2}$$

where $i = 1, 2, \dots, n$ and $p = 1, 2, \dots, n$

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

Now d_{ip} can be written as

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

From the above distance matrix, find out the minimum distance for each row. Denote the minimum distance for row i as 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

The critical distance (CD) will be used in identifying the model districts. Model districts for district 'A' will be those districts whose composite index of development is less than that of district 'A' and developmental distance of these districts from district 'A' is less than or equal to Critical Distance (CD). Thus model districts will be better developed districts in comparison to district 'A'.

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

The advantages and disadvantages of composite index of development are as follows :

Advantages

- It can summarize the complex or multidimensional issues.
- It is easier to interpret.
- It facilitates the task of ranking states/districts/regions etc. on complex issues.
- It can assess the progress of different regions over time.

- It reduces the size of a set of indicators or includes more information within the existing size limit.
- It places performance and progress of different regions at the centre of policy arena.
- It facilitates communication with general public (citizen, media etc.) and promotes accountability.

Disadvantages

- It may reveal misleading policy messages if it is poorly constructed.
- It may invite simplistic policy conclusions which may not be possible for adoption.
- It may be misused.
- The selection of indicators and weights for aggregating the composite index can change the final conclusions.
- It may lead to inappropriate conclusions if indicators those are difficult to measure are ignored.

4. RESULTS AND DISCUSSIONS

4.1 The Level of Development

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

It may be seen from the above table that in case of agricultural development, the district of Murshidabad is ranked first and the district of Darjeeling is ranked last. The composite indices vary from 0.64 to 0.94. As regards infrastructural facilities, the district of Hooghly is found to occupy the first position and the district of Howrah is on the last place. The composite indices vary from 0.40 to 0.99. For socio-economic development the district of Hooghly is placed on the first position and the district of Howrah is on the last position. The composite indices vary from 0.50 to 0.99. The districts of Murshidabad, Hooghly, Nadia, Birbhum and Malda are found to occupy the first five positions in the State in respect of agricultural development whereas the districts of Hooghly, Nadia, Cooch Behar, Murshidabad

Table 1. Composite Index of Development (CI) and Rank of the District

S.No.	District	Agriculture		Infrastructural Facilities		Socio-economic	
		C.I.	Rank	C.I.	Rank	C.I.	Rank
01.	Burdwan	0.69	8	0.74	17	0.75	16
02.	Birbhum	0.68	4	0.55	8	0.61	6
03.	Bankura	0.73	11	0.48	3	0.58	5
04.	Purba Medinipur	0.76	13	0.53	7	0.62	7
05.	Paschim Medinipur	0.69	7	0.59	11	0.64	10
06.	Hooghly	0.66	2	0.40	1	0.50	1
07.	Purulia	0.79	14	0.58	10	0.67	12
08.	North 24 Parganas	0.74	12	0.67	15	0.71	13
09.	South 24 Parganas	0.91	17	0.65	14	0.76	17
10.	Howrah	0.85	16	0.99	18	0.99	18
11.	Nadia	0.67	3	0.47	2	0.55	2
12.	Murshidabad	0.64	1	0.52	5	0.58	4
13.	Uttar Dinajpur	0.70	9	0.74	16	0.75	15
14.	Dakshin Dinajpur	0.71	10	0.56	9	0.63	8
15.	Malda	0.68	5	0.61	13	0.65	11
16.	Jalpaiguri	0.81	15	0.53	6	0.64	9
17.	Darjeeling	0.94	18	0.61	12	0.74	14
18.	Cooch Behar	0.69	6	0.50	4	0.58	3

and Bankura are found to be on the first five place in socio-economic development.

4.2 Different Stages of Development

For relative comparison among different districts regarding the level of development, it appears quite appropriate to assume that the districts having the composite indices less than or equal to (Mean – SD) are high level developed and the districts with composite indices greater than or equal to (Mean + SD) are low level developed. The districts having the composite index in between (Mean) and (Mean – SD) are high middle level developed and the districts having composite indices in between (Mean) and (Mean + SD) are low middle level developed. On the basis of this classification, districts are classified in four stages of development as high level, high middle level, low middle level and low level. The following table presents the number of districts lying in different stages of development in agricultural sector, infrastructural facilities and socio-economic field.

In case of agricultural development, out of 18 districts, eight districts are found to be in high level

Table 2. Number of Districts and Percentage Area and Population under different stage of Development

Stage of Development	Number of Districts	Area (%)	Population
Agricultural Development			
High	8	46	48
High Middle	4	18	21
Low Middle	2	12	9
Low	4	24	22
Infrastructural Facilities			
High	7	37	38
High Middle	6	34	23
Low Middle	2	16	21
Low	3	13	18
Socio-economic Development			
High	6	30	32
High Middle	6	37	27
Low Middle	4	20	26
Low	2	13	15

developed category. These districts cover about 46 per cent area and 48 per cent population of the State. Four districts covering about 18 per cent area and 21 per cent population of the State are observed to be in high middle level developed category. Two districts are found to be in low middle level developed category. These districts occupy about 12 per cent area and 9 per cent population. Four districts namely South 24 Parganas, Howrah, Jalpaiguri and Darjeeling are found to be in low developed category. These districts cover about 24 per cent area and 22 per cent population of the State. More than half population of the district of Howrah are from urban area and about 1/3rd population of district of Darjeeling are urban and the area of this district is mostly hilly. Action is required to be taken in the remaining districts of South 24 Parganas and Jalpaiguri for improving the level of development in agricultural sector.

Infrastructural facilities are very important and these are required to make improvement in the development of different sectors of economy. Out of 18 districts of the State which have been included in the study, seven districts are found to have high level of these facilities. These districts are having 37 per cent area and 38 per cent population of the State. Six districts are observed to have high middle level facilities. About 34 per cent area and 23 per cent population of the State are covered by these districts. Two districts with 16 per cent area and 21 per cent population of the State are having low middle level of these facilities. Three districts namely Burdwan, Howrah and Uttar Dinajpur are found in the low developed category. More than 50 per cent population of district Howrah belongs to urban area and these facilities are recorded for the rural area. Immediate action is required to be taken for making improvement in these facilities in respect of districts of Burdwan and Uttar Dinajpur.

With respect to socio-economic development, six districts having 30 per cent area and 32 per cent population of the State are observed to have high level category. Six districts are having high middle level development. These districts cover about 37 per cent area and 27 per cent population of the State. Four districts with 20 per cent area and 26 per cent population of the State are found in low middle level developed group. Two districts namely South 24 Parganas and Howrah are having 13 per cent area and 15 per cent population of the State are in low developed category.

The district of Howrah is having mostly urban population. The improvement in the level of development can be made by the urban area. The districts of South 24 Parganas, Jalpaiguri, Burdwan and Uttar Dinajpur are found to be low developed either in agricultural development or in infrastructural facilities or in socio-economic development. Infrastructural facilities in Burdwan is slightly less but the developments in agriculture and socio-economic fields are quite satisfactory. Special action should be taken to enhance the level of development of these districts.

4.3 Inter-relationship Among Development of Different Sectors of Economy

It is quite essential and important that the impact of development of different sectors of economy should be in proper directions. The development in various sectors should flourish together and this will enhance the level of living of people in the State. The level of education envisages all round development of manpower and human resources required for various social and economic activities. The correlation coefficients between the development of agricultural sector, infrastructural facilities, socio-economic development, literacy rate for male and literacy rate for female are given in Table 3.

Table 3. Correlation Coefficients

Factors	Agricultural Development	Infrastructural Facilities	Socio-economic Development	Literacy Rate (M)	Literacy Rate (F)
Agricultural Development	1	0.39	0.60**	0.38	0.34
Infrastructural Facilities		1	0.97**	0.06	0.13
Socio-economic Development			1	0.15	0.21
Literacy Rate (M)				1	0.89
Literacy Rate (F)					1

** Significant at 0.01 level. M : Male, F : Female

Infrastructural facilities in respect of education, health, medical and banking etc. do not significantly influence the agricultural development but these facilities are very highly associated with over all socio-economic development. Literacy rates both for male and female do not influence the agricultural development. These rates are also not associated with socio-economic development. Infrastructural facilities are not found to influence the literacy rates among male and female. Agricultural development is very highly associated with socio-economic development. Literacy rates for male and female are very highly associated with each other.

4.4 Potential Targets of Developmental Indicators for Low Developed Districts

It is quite useful and important to examine the extent of improvement needed in developmental indicators for improving the level of development of low developed districts. This information is essential for readjusting resources for enhancement of status of development in backward areas. For estimation of potential targets of developmental indicators, model districts for low developed districts have been identified and given in the following table. South 24 Parganas, Jalpaiguri and Uttar Dinajpur are found to be low developed either in agricultural development or infrastructural facilities or socio-economic development.

Table 4. Model Districts

Low Developed Districts	Model District
South 24 Parganas	Birbhum, Paschim Medinipur, North 24 Parganas, Nadia
Jalpaiguri	Cooch Behar, Murshidabad. Nadia, Bankura
Uttar Dinajpur	Cooch Behar, Murshidabad. Nadia, Hooghly

It may be seen that the districts of Nadia, Birbhum and Bankura are found to be model districts for most of the low developed districts. In comparison to low developed districts, model districts are better developed.

Potential targets of various indicators have been estimated for low developed districts. Actual achievements and potential targets (in brackets) of various indicators are presented in Table 5.

The values of potential targets are higher than the present achievements in almost all the indicators. In low developed districts, suitable action is needed to achieve the potential targets and enhance the level of development. It is found that all parts of low developed districts are not low developed but some parts are high or middle level developed. Location specific recommendations for enhancing the level of development should be made after conducting the studies for evaluating the developmental status at a smaller level say tehsil or block level.

5. CONCLUSIONS

The broad conclusions emerging from the study are as follows :

1. With respect to overall socio-economic development, the districts of Birbhum, Bankura, Hooghly, Nadia, Murshidabad and Cooch Behar are found to be better developed as compared to other districts of the State.
2. In case of agricultural sector, the districts of Burdwan, Birbhum, Paschim Dinajpur, Hooghly, Nadia, Murshidabad, Malda and Cooch Behar are found to be better developed. Infrastructural facilities are comparatively better in the districts of Bankura, Purbi Medinipur, Hooghly, Nadia, Murshidabad, Jalpaiguri and Cooch Behar.
3. Infrastructural facilities are highly associated with over all socio-economic development. These facilities are not found to be associated with agricultural development. The development in agricultural sector is observed to influence the socio-economic development. Literacy rates for male and female do not significantly influence the agricultural and socio-economic developments. These rates are found to be significantly associated among them.
4. Wide disparities have been observed in the level of development among different districts.
5. For enhancing the level of development of low developed districts, model districts have been identified and potential targets of various developmental indicators have been obtained. The low developed districts require improvement of

Table 5. Actual Achievements and Potential Targets

S.No.	Developmental Indicators	Low Developed Districts		
		South 24 Parganas	Jalpaiguri	Uttar Dinajpur
01.	Percentage net area sown	40.0 (76)	56.0 (76)	89.00 (89)
02.	Cultivable area per agricultural worker	0.4 (0.48)	0.7 (0.70)	0.43 (0.43)
03.	Cropping intensity (%)	143.0 (246)	169.0 (246)	178.00 (246)
04.	Yield rate of total cereals (00 kg/ha)	20.0 (27)	16.0 (27)	25.00 (27)
05.	Production of total cereals per lakh population (000' tones)	12.0 (17)	13.0 (17)	35.00 (44)
06.	Consumption of fertilizer (kg/ha)	140.0 (164)	119.0 (164)	80.00 (164)
07.	Milk production (000' tones)	174.0 (307)	127.0 (307)	94.00 (307)
08.	production of egg (in lakh no.)	33.0 (332)	93.0 (238)	100.00 (238)
09.	No. of registered factories (00' no.)	32.4 (32.4)	5.3 (32.4)	0.50 (32.4)
10.	No. of commercial banks (00 no.)	2.5 (3.0)	1.4 (3.0)	0.80 (3.0)
11.	No. of ration shops (00' no.)	14.0 (14)	8.0 (14)	5.00 (14)
12.	No. of agricultural cooperative societies (00' no.)	4.7 (4.7)	1.6 (4.7)	2.10 (4.7)
13.	Percentage of main worker to total population	24.3 (36.9)	30.1 (36.9)	29.30 (36.9)
14.	Literacy rate (Male)	79.0 (100)	73.0 (100)	58.00 (100)
15.	Literacy rate (Female)	59.0 (100)	52.0 (100)	37.00 (100)
16.	Percentage of electrified villages	96.0 (100)	100.0 (100)	98.00 (100)
17.	Percentage of villages having primary schools	62.0 (100)	100.0 (100)	97.00 (100)
18.	Percentage of villages having health centres & allopathic dispensaries	16.2 (30)	29.8 (30)	3.20 (30)
19.	Per capita income at constant prices (2005-06) (000' Rs.)	21.0 (28.6)	21.2 (28.6)	15.20 (28.6)
20.	Per capita income at current prices (1999-2000) (000' Rs.)	17.0 (23.4)	18.5 (23.4)	12.80 (23.4)

various dimensions in the developmental indicators. The level of development at smaller level say tehsil or block level should be evaluated and location specific recommendations for improving the developmental status may be given.

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