REGIONAL DISPARITIES IN ECONOMIC DEVELOPMENT: AN INTER-DISTRICT STUDY OF WEST BENGAL

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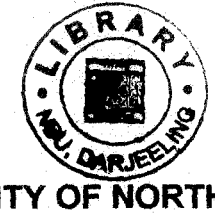

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ABBREVIATIONS USED IN THE THESIS

24 Parganas (N) – North 24 Parganas
24 Parganas (S) – South 24 Parganas
24 Pargs (N) – North 24 Parganas
24 Pargs (S) – South 24 Parganas
ASI – Annual Survey of Industries
BCCI – Bengal Chamber of Commerce
CID – Composite Index of Development
CSO – Central Statistical Organization
D. Dinajpur – Dakshin Dinajpur
DDP – District Domestic Product
FA – Factor Analysis
GDP – Gross Domestic Product
GoWB – Government of West Bengal
Ha. – Hectare
HYV – High Yielding Variety
HYV – High Yielding Variety
IMR – Infant Mortality Rate
NCAER – National Council for Applied Economic Research
PCA – Principal Component Analysis
PCSDP – Per Capita State Domestic Product
PQIL – Physical Quality of Life Index
PQLI - Physical Quality of Life Index
SDP – State Domestic Product
SSI – Small-Scale of Industries
U. Dinajpur – Uttar Dinajpur

CHAPTER 1

INTRODUCTION

1.1 Statement of the Problem

Problems related to economic development and undesirable regional disparities have attracted the attention of economists, planners, and regional scientists for several decades (Baer, 1964, pp.268-285; Rao and Sundarn, 1973, pp.793-800; Williamson, 1965, pp. 3-84). In developing countries the problem of economically retarded regions are somewhat different from that of developed countries. Regional disparities have turned into a political problem for many countries like Nigeria, Pakistan, Sudan, Malaysia, Yugoslavia and India (Dastidar and Dastidar, 1991, p.1). In recent years regional economic disparities in a national framework have attracted increasing attention, especially in developing countries. In spite of recent attention, little progress has been made in formulating and testing a general explanation for the occurrence of inequality in the spatial distribution of national income (Bernard, 1968, pp.297-311, Baster, 1970).

In affluent as well as in poor and backward countries there exist both developed and backward regions. But the more underdeveloped a country is, frequently the greater becomes the difference between its developed and backward areas (Bose, 1969, pp.177-188). There is often a tendency for the developed regions to develop even faster than the lagging regions (Singer, 1964; Higgins, 1968).

Reasons for underdevelopment of some areas may be due to improper utilization of resources, low savings, low output, high propensity to consume, high dependency ratio, large proportion of the population depending on primary economic activities and so on. In contrast, a developed region has a greater potential for better use of capital, labour, and available natural resources to support its present population at a higher level of living and higher per-capita income (Meir and Baldwin, 1966).

However, in programming economic development of developing countries, like India for example, regionalization seems to be a very much important task in view of the fact that whereas metropolitan growth has attracted

a huge inflow of the rural population in developing countries the pace of development in rural areas has failed to create any trickle down effect.

One of the reasons for regional disparity is the result of urban-rural disequilibrium. This disequilibrium occurs in economic activities, employment, educational opportunities, medical facilities, and other services. There is deep-seated polarization between metropolitan centers and surrounding villages. As a result almost all development tends to be concentrated in a few major cities while rural areas remain basically underdeveloped. In India, new economic centers are often developed with public investments, mainly in heavy industries, and in course of time these centers attract other activities (Chattopadhyay and Raza, 1975, pp.11-34).

If the patterns of urban development result in neglect of the city's hinterland, the organic development of a region will be fractional, fragile and unbalanced depending more on external demand rather than on the more regular vitality of a growing home market. This relationship needs to be changed into complementarities so that the interests of the metropolis as well as that of the countryside are satisfied simultaneously.

Regional disparities can be analyzed from different levels of industrialization, urbanization, and socio-economic distances between them. Differences in degree of development are attributable to the reflections of disparities in the degree of urbanization and industrialization among regions (Sovani, 1964, pp.113-122). There is an immense disparity in the level of income and standard of living among the people in developed and underdeveloped regions. The underdeveloped areas are used almost exclusively for the production of agricultural raw materials without sufficient concern for facilities to transform or diversify their economies. The inter-regional disparities occur not only due to differences in the natural resource endowments or availability of labour alone, but also due to differences in labour skills, irrigated land and industrial capital. The fact that the world's developed countries are highly urbanized and industrialized can safely justify the validity of the above deduction (Dastidar and Dastidar, 1991, p.4).

As far as the state economy of West Bengal is concerned, it can be seen that studies on regional disparity are very few in number. However, whatever studies are available (Bagchi and Sarkar, 2003; Bhattacharya, 1998, p. 3027;

Pal, 1995, pp. 276-296; GoWB, 1998; BCCI, 1971, pp. 44-51; Banerjee and Roy, 1998; pp. 3019-3026; Saha and Swaminathan, 1994, pp. A-2 – A-11 among others) these show implicitly and explicitly that there are inter-district and inter-regional disparities in various aspects of socio-economic development of West Bengal. These disparities not only do exist but are also perpetuating over a long period of time and probably gradually widening in some spheres.

In this context the findings of the Bengal Chamber of Commerce and Industry (BCCI, 1971), Calcutta is worth mentioning: "Regional disparities among the States of the Indian Union as well as among the districts or regions within the same State are quite marked and by itself would furnish no cause for comment. This indeed is a problem to all developing countries of the world, as also to many developed countries. But the extremely high degree of spatial imbalance that is manifested in West Bengal is something extra-ordinary."

It is probably the growing disparities in different socio-economic spheres and more probably with growing consciousness among the peoples of the backward regions and the consequent demand for more attention to the problems of underdevelopment of backward areas like northern and western parts of West Bengal has led to the constitution of Regional Development Councils for these areas very recently.

1.2 Objectives of the Study

The main objectives of this study are the following:

1. To identify inter-district disparities in socio-economic development with certain indicators
2. To determine the causes of regional disparities
3. To examine the extent of disparities among the districts of West Bengal.
4. To study and analyze the concept, classification and criteria of indicators and select suitable ones for assessing and analyzing the district-wise level and pattern of socio-economic development.
5. To rank the districts according to their levels of development on the basis of composite index of development both at sectoral and aggregate levels.
6. To identify various dimensions of development within each sector and those for all the sectors taken together.

7. To identify backward sectors / districts, this could be helpful in formulating regional policies for achieving the objective of balanced regional development.

We have made an attempt to build up the techniques of quantitative analysis of inter-relationships among demographic, social, and economic factors of development. It is expected that this study would enable us to determine the type and degree of regional disparities in West Bengal on the basis of quantitative analysis. Finally, recommendations will be made for formulating strategies of socio-economic development in order to minimize regional disparities.

The study as such will be limited to the state of West Bengal in India. Regional variations will be studied at the district level with a focus on the period 1980-81 to 2000-2001 in the background of disparities prevalent in the pre-eighties.

Prior to study regional inequality what is essential is to have an understanding about the concept of region. The dictionary meaning of the term *"region"* is a tract of country or an area characterized in some way (Chamber's Twentieth Century Dictionary) thereby implying that region is a spatial entity. To a geographer a region consists of contiguous or noncontiguous spatial units which are similar to each other in terms of one or more chosen criteria.

Political boundaries and administrative regions are mostly independent of the regional boundaries conceived on the basis of the various criteria chosen for planning purposes. One of the main reasons is that they are older than the conceptualization of the planning region boundaries and have evolved under various types of historical conditions. Moreover in the present day concept of "Nation States", frequent reorganization of administrative boundaries can lead to complications and difficulties. Though, at the lowest level of the hierarchy, rural-urban boundaries often change necessitating only local level adjustments in administration, higher level administrative boundaries like district, state or country boundaries need to be more stable to provide a reference framework for documentation and administration (Chaudhuri, 2001, p. 12, 26). In the present study, we have undertaken district as a region.

1.3 Research Hypotheses

We would like to test the following research hypotheses in the present study:

1. There exist inter-district disparities in economic development in West Bengal as far as the overall development as well as sector-wise i.e., agriculture, industry, economic infrastructure and social sector development is concerned.
2. Regional disparities are the result of higher levels of industrial, economic infrastructure and social sector activities whose relative importance increase constantly in the developed regions and as such the importance of agriculture activities constantly dwindles.
3. Less developed regions have predominantly primary economies of subsistence type with low per-capita income along with low levels of income in all other sectors.

1.4 Significance of the Study

The main purpose of this study is to find out whether and to what extent inter-district disparities are there in the agriculture, industrial, economic infrastructure and social sectors of the economy in West Bengal State and whether these disparities are increasing or decreasing over the period of time. It should also be found out as to what types of planning strategy is necessary to reduce regional disparity and to assess the effectiveness and performance of the existing disparity-reducing Government machinery in West Bengal.

1.5 Methodology

The study is based on existing literature and secondary data. For collecting secondary data and literature the Library of the University of North Bengal, Raja Rammohunpur; the National Library, Kolkata; Library of the Center for Studies in Social Sciences, Kolkata; Library of the State Assembly of West Bengal, Kolkata have been used. Some statistical methods like Mean, Standard Deviation, Coefficient of Variation, Principal Component Analysis / Factor Analysis for making Composite Index of Development for evaluating the performance of regional development have been applied. We have also used tables and diagrams where necessary to show inter-district disparities in socio-economic development.

The following major steps have been followed as parts of research methodology of this study.

1.5.1 Area of the study:

The area of the study is the state of West Bengal for an inter-district analysis.

1.5.2 Universe of the study:

The universe of the study is the state of West Bengal in India.

1.5.3 Tools and Techniques of Data Collection:

The present study is on the basis of secondary data. Data have been collected mainly from Census of India, Statistical Abstracts and Economic Reviews published by the Bureau of Applied Economics and Statistics, Government of West Bengal and Economic Survey published every year by Government of India. Moreover, various books, journals, bulletins, unpublished Ph.D. theses and research works have been consulted to collect relevant secondary data and information.

The most crucial task in the present study is to analyze the pattern of socio-economic development at the district level, where multi-area unit analysis is used. For this purpose construction of composite index of development was considered imperative for the analysis. The method of Principal Component Analysis/ Factor Analysis was used for construction of Composite Index of Development at district level. This method provides a better system of composite classificatory indices. Further, PCA or FA has been preferred as a statistical technique for determining weights of the selected indicators and identifying basic factors, which are crucial for development. In order to evaluate the dimensions of social and economic development at district level, method of Kaiser's Varimax Rotation (Kaiser, 1958, pp. 187-200) has been applied.

Further, in order to examine the inter-district disparities in the level of socio-economic development, statistical tools such as standard deviation and coefficient of variation etc. were also used.

In the subsequent paragraphs, conceptual framework of Principal Component Analysis and Factor Analysis has been discussed to justify the suitability of these methods in multivariate analysis like the present one.

1.5.4 Construction of Composite Indices in the Present Study

The present study is designed to be a district-wise study of Wes Bengal. It seeks to determine district-wise levels of agricultural development, industrial development, economic infrastructure development and social development. For

this purpose four sets of indicators have been identified. The first set includes 10 indicators reflecting the level of agriculture development in each district. Second set comprising 7 indicators has been taken for accessing the industrial development. Third set which includes 10 indicators, has been taken to evaluate economic infrastructural development. And finally, fourth set comprising 12 indicators has been taken to examine social sector development.

The methods which have been usually adopted for construction of composite index of development by pooling several indicators are those of indexing, ranking and Principal Component Analysis including Factor Analysis. In the first two methods i.e. indexing and ranking for construction of composite index of various physical variables, either subjective weights are assigned or they are left unweighted. Because the variables differ in terms of their relative importance, assignment of equal weights fails to impart accuracy to estimates; therefore some objective method of assigning appropriate weights has to be employed for constructing the composite index of development. This problem is taken care of by the method of 'Principal Component Analysis' or 'Factor Analysis' because this method provides a better system of composite classificatory indices. Further, PCA or FA has been preferred as a statistical technique for assigning weights to the selected indicators and identifying basic factors, which are crucial for development.

The *principal component analysis* is a branch of well-known multivariate technique of factor analysis. It is a relatively straightforward method of transferring a given set of variables or indicators into a new set of composite variables or principal components that are orthogonal to each other. Principal Component method of Factor Analysis, developed by Harold Hotelling (1933, pp. 417-441), seeks to maximize the sum of squared loadings of each factor extracted in turn. Accordingly, Principal Component factor explains more variance than would be loadings obtained from any other method of factoring. It is designed primarily to synthesize a large number of variables into a smaller number of general components, which retain the maximum amount of descriptive ability.

The method does not require any assumption about the underlying structure of the variables. One has simply to find out the best linear combinations of variables. In other wards, one tries to identify the particular combination of

variables, which could account for maximum of the variance in the data matrix than any other linear combination of variables. The first principal component may, therefore, be viewed as the single best summary of linear relationship demonstrated in the data. The second component is defined as the second best linear combination of variables, under the condition that the second component is orthogonal to the first. To be orthogonal to the first component, the second one must account for the proportion of the variance not accounted for by the first one. Similarly, the second component may be defined as the linear combination of variables that accounts for the most residual variance after the effect of the first component has been removed from the data. The subsequent components are defined in the same manner until all the variance in the data is completely exhausted. Unless at least one variable is perfectly determined by the rest of the variables in the data, the principal component solution requires as many components as there are variables (Tewari, 1984, p.36). The sum of the variance of all the principal components is equal to the sum of the variances of the original variables.

The full-fledged principal component model can be expressed as follows:

$$Z_j = a_{j1}P_1 + a_{j2}P_2 + ... a_{ji}P_i + ...a_{jm}P_n$$

Where,

Z_j = 1 to *n* is the standardized values of the observed variables;

$P_1, i = 1$ to *n*, are the new uncorrelated components; and

$a_{j1}, i = 1$ to *n*, and $i = 1$ to *n*, the coefficients are the *'factor loadings' or weights.*

Each of the n observed variables is described linearly in terms of n new uncorrelated components $P_1, P_2, ..., P_n$, each of which is, in turn, defined as a linear combination of the n original variables. Since each component is defined as the best linear summary of variance left in the data after the previous components are taken care of, the first n components usually much smaller than the number of variables in the set may explain most of the variance in the data.

In the model, the factor loadings, or co-efficients of principal components are the correlations of the variables with the principal components. Thus, a_{ji} is

correlated to variables Z_j with the principal component P_1. Principal components are linear combinations of standardized variables with weights in terms of factors loadings. Thus, principal component P_1 is determined as:

$$P_1 = a_{1i}.Z_1 + a_{2i}.Z_2 + ... + a_{ni}.Z_n.$$

Or,

$$P_1 = \sum_{i=1}^{n} a_{ji} \times Z_i,$$

Where P_1 = the first principal component;

a_{ji} = Factor loading of the first principal component vector relating to j^{th} indicator of the i^{th} districts;

Z_i = Standardized value of the observed variable.

Thus, the first principal component, which gives maximum correlation with variables and explains maximum of the total variance, is considered as composite index of development for a vector.

In the present study, the data of three benchmark years, i.e. the correlation matrices for the years 1980-81, 1990-91 and 2000-01 were analyzed separately for the derivation of factor matrix.

The sum of the squares of the factor loadings of the first principal component is the largest Eigen value, which measures the proportion of variance explained by the first principal component. On the other hand, the sum of squares of the factor loadings of all principal components retained corresponding to the variables is communality (h^2), which expresses the percentage of variance explained by the factor model (Kothari, 1991, pp.388-389).

In order to identify different dimensions of development unrotated as well as rotated, factor matrices were derived from correlation matrix using Principal Component Analysis, i.e. with unites in the diagonal of the correlation matrix. Since present study makes use of factor analysis technique for identifying various dimensions of socio-economic development, it is necessary to explain in brief the Factor Analysis.

Factor Analysis was originally propounded nearly 100 years ago by Charles Spearman (1904), a psychologist. Factor Analysis has been heavily employed over many years to relate the dimensions (factors) underlying human

abilities. It has been used in many other contexts. While principal component and factor analysis are related techniques, there are some important differences between the two. Principal Component analysis is oriented towards explaining the total variation in the original measures, while factor analysis is concerned only with explaining the co-variance among the original measures. Principal component analysis is merely a transformation of the original variables into principal components. It does not have an underlying model, as in factor analysis, where, for example, common and unique variance are distinguished. In line with this, note that the principal component model is formulated as maximizing the variance of a linear composite of the original variables, while factor analysis expresses the original variables as a linear combination of underlying factors plus residual term (Dunteman, 1984, pp. 181-183).

The common factor-analysis model may be expressed algebraically as:

$$y_i = l_{i1} f_1 + l_{i2} f_2 + \ldots + l_{im} f_m + U_i p_i$$

Or

$$y_i = \sum_{j=1}^{m} l_{ij} f_j + u_i p_i$$

Where y_i is the j^{th} variable, l_{ij} is the weight for variable i on the j^{th} factor, f_j is the score on the j^{th} common factor, U_i is the weight for the factor unique to variable i *and* p_i is the score on the factor unique to variable i.

It can be seen from the above model that common factor analysis assumes that each variable is a function of the same set of underlying common factors plus a factor unique to the variable. However, each variable has a different set of weight associated with the factors. The weights associated with the common factors are called "loadings". The common factor analysis, which is primarily concerned with identification of basic factors playing important role in development, has been considered in the present study to evaluate various dimensions of development.

For the extraction and rotation of the number of factors, the most popular method of varimax rotation, which was developed by Kaiser in 1958, has been applied in the present study. The varimax method in a sense attempts to specify simple structure in terms of the variances squared factor loadings. An Orthogonal

method such as principal component factor analysis can be combined with any type of orthogonal or oblique rotation (Dunteman, 1984, p. 199). The most common combination seems to be a principal components factor analysis with squared multiple correlations in the principal diagonal followed by a varimax rotation.

In the present study, on the basis of rotated factor matrix, various dimensions of agricultural, industrial, economic infrastructure and social development have been identified by taking into account the factor loadings greater than 0.576 (or nearer to this value) as significant for the purpose of construction of composite indices of various dimensions of development (Koutsoyiannis, 1977,p.432). Dimensional development within different sectors has been analyzed with the help of the method of *Cluster Analysis.* The basic object of cluster analysis is to determine how many mutually and exhaustive groups or clusters, based on the similarities of profiles among entities, really exist. Cluster analysis has been considered a useful technique in the context of market research studies and studies related to socio-economic development (Kothari, 1991, p.396).

Since the indicators selected for working out composite indices were measured in different units and as such they cannot be directly added, it was felt necessary to convert the variables into standard units so that the initial scale selected for measuring the variables did not bias the results.

The following method is applied in the present study in order to eliminate the bias of scale:

$$Z_{ij} = \frac{X_{ij} - \overline{X}_j}{\sigma_{xj}}$$

Where X_{ij} = value of X_i variable on i^{th} observation;

$\overline{X}_j$ = Mean value of X_j variable; and

σ_{xj} = Standard deviation on the X_j variable;

1.5.5 Determining Inter-District Disparities

In order to measure disparities in the levels of development the method of Coefficient of Variation has been used. This method was first suggested by Karl Pearson, as the most commonly used measure of relative variation. Coefficient of

Variation is the percentage of variation in the mean, the standard deviation being treated as the total variance in the mean (Elhance, 1971, p. 218). It is used in such problems where it is intended to compare the variability of two or more than two series. That series for which the coefficient of variance is greater is said to be more variable or conversely less consistent and vice-versa.

Coefficient of variation has been calculated by using the following formulae:

$$C.V. = \frac{\sigma_{xj}}{\overline{X}} \times 100$$

Where C.V. is coefficient of variation, σ_{xj} is standard deviation and $\overline{X}$ is mean. In the present study, districts have been ranked on the basis of value of composite indices of development. For ascertaining correlation between the levels development among different sectors or examining the relationship between patterns of development in the benchmark years, Spearman's Rank Difference Method has been applied, which is as below:

$$\rho = 1 - \frac{6\sum D^2}{N^3 - N}$$

Where ρ (rho) stands for the Rank Correlation Coefficient, $\sum D^2$ for the total of the squares of the difference of corresponding ranks, and N for the number of pairs of observations.

For the sake of meaningful analysis, a maximum minus value has been added to the composite index of each district so as to get a data set with all positive values.

1.5.6 Classification of Districts

On the basis of values of the indices of development the districts have been classified into two categories, viz. developed and developing (or less developed or backward). The developed districts are those, which have the composite index value above the state average, Districts having value of composite index below the state average are categorized as developing (or backward) districts.

1.6 Research Questions

In order to study the stated problems we have made an attempt to find out the answers to these questions by analyzing secondary data.

1. What is the pattern and degree of development of the primary, secondary, tertiary and social sectors of the economy of West Bengal? Are there any regional disparities?
2. If so, what are the causes of such regional disparities?
3. Have inter-district disparities in socio-economic development in West Bengal increased over the period 1980-81 to 2000-2001?
4. If so, what role socio-economic factors have played in sharpening inter-district disparity?
5. What are the causes of perpetuation of a backward region?
6. What type of policies should be taken for balanced regional development?

1.7 Importance of the Study

The present research investigation is an endeavour to evaluate various dimensions of socio-economic development at the district level. The study of this kind would largely help in identifying the districts suffering from overall backwardness and also those backward in respect of key sectors of the economy like agriculture, industry, and economic infrastructure and social sectors. This, in turn, would further help in making choice of operational areas for different kinds of programmes to be launched in order to overcome the problems of backwardness. In view of these considerations, it was felt imperative to study and analyze the district-wise pattern of socio-economic development at three points of time (i.e. 1980-81, 1990-91 and 2000-2001) both for the overall economy, as also for the key sectors of agriculture, industry, economic infrastructure and social sector at the district levels.

1.8 Limitations of the Study

Every investigation and study has certain limitations. Similarly, the present study faces a number of problems. This study could be made more meaningful and more representative if there is availability of desired data for some important indicators at district level. In particular, the level of social and economic development could not be adequately assessed due to non-availability of data pertaining to the following indicators at the district level for the reference years 1980-81 and 1990-91:

1. Infant Mortality Rate (IMR);
2. Percentage of net irrigated area to net sown area;
3. Percentage of area under high yielding varieties to gross cropped area;

4. Value added by manufacturing per workers;
5. Percentage of net irrigated area;
6. Number of multipurpose cooperative societies per lakh of population;

Nevertheless, this study has tried to overcome these limitations by rationally selecting the available data in a manner that the real picture of social and economic development could be delineated.

1.9 A Brief Review of Literature

The purpose of the review of literature on socio-economic development and regional disparities is to give a background on different approaches to the problem of variations in socio-economic development among regions. Such review would help us to clarify the present study relative to other theories and empirical findings. There exists a vast amount of literature on regional disparities in its different ramifications at international, national and sub-national levels. We have made a selective review below from these literatures on the basis of their availability and relevance to our study.

Baer (1964) examines the regional disparities in Brazil, especially between the industrialized region (Central-South) and the stagnant northeast region of the country. Baer observes that the relative poverty of the northeast region is due to a combination and low economic activity. To this, he adds lower education level, poor technical training, and relatively poor health conditions of the population in the northeast region. Baer suggests some policies, which include intensification of the humid coastal area, and progressive changes in the structure of the northeastern economy. He emphasizes social overhead capital (e.g., schools, colleges, medical institutions, etc.) as planning strategies.

Williamson (1965) identifies clearly the causes of regional inequalities and their effects in various countries of the world. He inquires into developing nations. An international cross-section analysis of twenty-four countries was used to portray inequalities. The author estimates the regional inequalities by using simple equations. He concludes that regional inequality is much more extensive in agricultural sectors than in industrial sectors. He concludes also that the labor force participation rates contribute to regional income per capita differentials. A description of the aggregate patterns is dealt with but disaggregating and identification of causation are left untouched.

Bose (1969) in his article deals with the extent of poverty in India and extent of differentials in the stages of economic development of West Bengal. He suggests maximization of savings by minimizing direct consumption. Bose recommends development of four or five big centers of growth in West Bengal every ten years to reduce regional disparities. The main target of his analysis was to initiate a discussion on policy tools for regional development. The author defines the development targets and suggests the means for achieving these targets.

Mukherjee (1969) deals with inter-sectoral disparity in India during the period of 1963-64 and establishes criteria for measuring disparities. His study deals with disparities, not only between different sectors, but also between rural and urban areas within the State. Inter-sectoral disparities are computed from distribution of industrial labor force and national income at both current and constant prices. Mukherjee observes that size distribution of income becomes progressively more unequal in the initial phases of development. However, another factor for income inequality among rural areas, he finds, is the localized nature of the agricultural development in the country. In the policy context the author suggests that reduction of intra-state urban-rural variation may be a more promising line of action rather than reducing inter-state variations.

Somasekhara (1970) in his article has tried to critically review the prevalent criteria for identification for less developed regions. Then he has suggested alternative criteria of identification. The Bureau of Economics and Statistics of the Government of Mysore had ranked the backward areas of that state according to the mean weighted rank, per capita income, and the aggregate score methods. The Bureau considered 13 indicators of the level of development or backwardness for the mean weighted rank. Somasekhara points out that the problem of the mean weighted rank is that the weights could be arbitrary; there is no scientific way of fixing the appropriate weights. There are commonly recognized difficulties in the use of the measurement of per capita income, which tends to make this a misleading indicator. The aggregate score method has the same limitation as the composite index.

The Bureau added two more indicators to the aggregate score method. The districts were ranked according to each individual indicator and rearranged in increasing order of the aggregate score. The Bureau also suggested that

standard of living can be an alternative indicator of the level of economic development. Per capita consumption expenditure is an important index of standard of living, but data on district per capita consumption expenditure is not easily available. The author selected a few items like radios, telephones and motor vehicles for consumption expenditure. Another set of alternative indicators is number of towns and villages electrified and the number of permanent movie houses. According to Somasekhara the number of first ranks, second ranks and so on, of different indicators of each district can be analyzed separately by ranking the districts according to the weighted mean rank.

Bose (1971) in his paper discusses the nature of the colonial relationship of India under the British regime and the effects of British colonial exploitation. He put emphasis on development of industries for economic development. Bose recommends three types of reforms, namely, reforms in the technological sphere, reforms in the sphere of spatial allocation of activities, and reforms in socio-economic institutional spheres. His policy recommendations can be accepted as policy guidelines for developing backward areas (Dastidar, pp. 14).

Goulet (1971) highlighted three basic components of development, viz., life sustenance, self-esteem and freedom. Life sustenance is concerned with the provision of basic needs of human beings. All people of the country should be provided with such basic needs as housing, clothing, food and minimal education. A major objective of development is to uplift people out of poverty and provide basic needs simultaneously.

Self-esteem is concerned with the feeling of self-respect and independence. No country can be regarded as fully developed if others exploit it and does not have the power and influence to conduct relations on equal terms. Developing countries seek development for self-esteem, to eradicate the feeling of dominance and dependence, which is associated with inferior economic status.

Freedom refers to freedom from 'want, ignorance and squalor' so that people are able to determine their own destiny. The advantage of material development is that it expands the range of human choice open to individuals and societies at large. Thus according to Goulet's concept, development takes place when there has been an improvement in basic needs, when economic progress has contributed to a greater sense of self-esteem for the countries and individuals within it and when material advancement has expanded the range of

choice for individuals. The condition of being developed is as much a state of mind as a physical condition measurable by economic indices.

Sarkar (1973) in his article tries to indicate certain problems in the way of achieving speedy rural development in Purulia and Bankura in this way, demographic situation 1961-1971, distribution of population, sex ratio, growth rate, density and rural population and growth rate of rural population-1971 and land use. According to the author as the development of agriculture is the precondition for development of other economic activities in rural areas; maximum attention should be placed on the planned development of infrastructural facilities that ensures agricultural prosperity in districts like Bankura and Purulia. For this purpose rural electrification development on an emergency basis, discriminatory power rates for installing tube wells for irrigation and establishment of cold storage and processing facilities, a percentage of capital cost as outright grant and liberal loan for purchasing tubewells and electric/diesel pumps, the scheme of advancing entire amount for purchasing tube wells and pumps as loan and subsequent conversion into subsidy or grant a part of the loan, special incentives for starting industries in rural areas that will produce agricultural implements, building up storage and cold-storage facilities by government, development of road communication and such other schemes should receive priorities in any planning for rural developments. Sarkar believes that identification of 'growth points' in the districts is important. These growth points if identified and developed, can make rural living little more attractive through certain modern services and facilities apart from generating income and employment opportunities. There is therefore urgent need for conducting detailed studies in regard to the selected growth points in the districts.

Sofranko and Bealer (1973) focused on political, economic, educational, and overall societal modernization for determining regional inequalities. They estimated the magnitudes of imbalance between actual and predicted levels of modernization. The main purpose of this study was an empirical examination of some relationships between patterns of institutional modernization and societal domestic instability. According to the authors, if the magnitude of imbalance is high, instability increases.

Jackman (1974) examines the validity of the propositions that the growth of political democracy has reduced social inequality. He uses statistical

techniques to derive conclusions about the effects of economic development, democratic performance, and social insurance programme experience intervening variables.

Chattopadhyay and Raza (1975) in their article distinguished between regional disparity and diversity and their horizontal and vertical dimension. They identified different economic, social and demographic indicators and regional accounts for measuring regional disparities. Their study is mainly a critique of techniques for analyzing regional inequalities. The authors raise the question of whether a composite index or multiple regressions should be applied for measuring regional disparities. There is a considerable degree of multi-co-linearity among physiographic and socio-economic factors. Any attempt at setting up composite indices of development must explicitly take into account of such multi-co-linearity among sets of variables.

Prakash (1977) attempted to analyze the regional inequalities in terms of infrastructure facilities in India during 1951-71 with the objective to determine the extent of the existing inequalities and identify the lagging regions. He selected important indicators like population size and density, literacy rates, urbanization, power, irrigation, banking, communication, transport, industrial and agriculture implements in his study. By the use of cumulative frequency technique developed by Gini and later on modified by Hirschman, he concluded that there is no region/state in India, which was equally developed or underdeveloped in all the fields of infrastructure. Relatively developed states like Panjab, Maharashtra, Tamil Nadu, Kerala and West Bengal were underdeveloped in one or more fields and opposite were the case of relatively backward states. Secondly, some regions came under the category of the developed regions on the basis of one indicator of given field, but fell in the category of underdeveloped regions, if some another indicator of the same field was used as key indicator for classification, e.g., Assam, Jammu and Kashmir, Himachal Pradesh and Tripura were among the least developed states in the field of per-capita credit and deposit, but they were highly developed regions on the basis of per-capita bank offices.

Rao (1977) in her article has made an attempt to identify backward regions and show the trends in regional disparities in India. In view of the continuing need to help economically backward States, it becomes essential to evolve some indicators for the purpose of measuring economic backwardness. Any plan or

policy towards regional disparities would call for an identification of backward regions. Such an attempt becomes imperative in a federal country not only for the purpose of transferring resources from the federal to the federating states but also to assess their competing claims for additional assistance and / or investments. Quite often, one finds, state persuasion and pressure for additional central assistance on the plea of lessening regional disparities. To support their claims, individual state, it is frequent to find, may try to project its own standard for identifying less developed regions. Sometimes these divergent standards may assume serious proportions. Naturally, it becomes imperative on the part of Central Government to set an objective standard, free from any kind of pressures, to identify states/ regions, which are lagging behind in socio-economic development. In this paper the author has tried to develop some measure of development in order to identify backward regions and subsequently to examine the trends in inter-regional and intersectoral disparities in India.

Das and Dalvi (1981) used the share and shift technique for projecting regional and sectoral growth rates. The study analyzed the data of State Domestic Product (SDP) at constant prices (1960-61) which were collected for 13 broad sectors and 14 major sector states of India for the period 1960-61 to 1974-75. The estimated growth rates for different sectors and for selected states for the period 1960-75 reveals that 14 states together attained on average growth rate of 3.56 percent per annum. Haryana had the highest growth rate (5.34%) and was followed by Punjab (4.85%), Karnataka (4.79%) and Jammu Kashmir (4.46%) whereas the Uttar Pradesh had the lowest growth rates of 1.92 percent.

Iyenger and Sudharshan (1982) examined the inter- state disparities adopting the method proposed by Morris and Liser (1970 and used by Mukherjee (1980) to measure the level of development. they analyzed inter-district variations in development in the district of Andhra Pradesh for the period 1978-79 and Karnataka for the period 1980-81 on the basis of 21 important indicators of development by constructing index of level of development. By using continuous Beta Distribution they classified districts of both states into five cluster according to their level of developments-Highly Developed, Developed, Developing, Backward and very backward regions.

Nair (1983) attempted to test the "concentration cycle hypothesis" which states that inner regional disparities increase initially but narrow down in later

stages of development. Thus inter-regional inequalities trace out an inverted U-shaped curve over the period. The analysis of inter-state income differentials was carried out for 17 major states of Indian Union during the period 1970-80 with the help of weighted and unweighted coefficients of variation, State Relatives and rank correlation. The states were ranked in terms of per- capita net domestic product. Punjab occupied the first rank during the whole decade while Behar remained at the bottom. State such as Punjab, Haryana, Maharashtra and Gujarat were at the top four positions, while Behar, Uttar Pradesh, Madhya Pradesh and Orissa occupied bottom places. There were hardly any noticeable change in the ranking order over the period 1971-81.The rank correlation coefficient were all positive and significant with none of them having value less than 0.90. The results of State Relatives also confirmed this argument. The unweighted and weighted coefficients of variation of per- capita net domestic product varied in the range of 25.87 to 37.04 percent and 23.73 to 33.34 percent respectively indicating that inter- state income differentials had been on the increase, though it was not a continuous year-to-year affair. On the whole, the study indicated that inter-state differentials in per capita income had widened during the period 1970-71 to 1979-80 and hence, the country was in divergent phase of the inverted U-shaped path.

Suar (1984) examined the regional disparities in economic development in Orissa for the year 1977, selecting twenty indicators of development. Principal Component Analysis, commonly called Factor Analysis (rotated and unrotated) was use the identify factors responsible for inter- district variations in economic development in Orissa. The results of the study showed that, "three factors" derived from twenty variables taken together explained 78.81 percent of total variations. First factor, termed as education and intra-structure, explained 44.64 percent while second factor (urbanization) and third factor (agriculture and rural development) explained 22.38 percent and 11.78 percent of variations respectively. The study reveled that development concentrated in certain pockets of the state. The regions (districts) having favorable agro-climate condition, fertile land and infrastructure were relatively developed.

Joshi (1987) made an attempt to examine the relationship between economic development and the level of infrastructure at the district level in Uttar Pradesh with the help of regression analysis for the period 1980-81. Ten core

infra-structural indicators pertaining to agriculture, industry and overall development were taken as independent variables for the analysis along with three dependent variables - net domestic output per capita, gross value of output per hectare of net sown area and value added per industrial worker. The study revealed positive correlation between the development indicators (dependent variables) and infra-structural indicators (independent Variables). However, in many cases, the association proved non significant as the value of regression coefficients were statistically non significant in most of the cases, though the sign of the coefficients were generally in the expected direction. One of the reasons for weak statistical association between the dependent and independent variables was that development of infra-structure did not cross the minimum threshold in most of the districts, most of the facilities were created in the recent past and their impact of the regional development could be felt only after some time. The study found that irrigation in case of agriculture and banking in case of industry turned out to be the most important factors affection the level of development.

Kannan (1987) has attempted to estimate the inter-regional disparities in banking development amongst the major 17 states in India for the period 1969-84.Index of banking development was constructed with the help of Factor analysis technique for selected 17 states. The study revealed that there was no significant variation in the ranking pattern of states. However, during 1975-84 substantial reduction in the regional disparities in banking development was noticed. The coefficient of variation of banking development index reduced from 56% in 1975 to 35% in 1984.The view was further supported in "Distance Analysis". The states were grouped into five clusters. The economic distance between least developed states and most developed states reduced from 7.97 to 6.48 over the period 1975-84.The distribution of credit among the different states indicated a greater degree of concentration than that noticed in deposits. Rural inter-state disparities considerably decreased during 1975-84.The-credit deposit ratio of rural branches improved by 11% during the period. This could be responsible for the decline in the variations of inter-state banking development index during this period.

Reddy (1988) attempted to examine the regional disparities in the development of small-scale industries (SSI) sector in Andhra Pradesh. The study

examined the inter and intra-regional disparities for the period 1971-85 in the development of industrial sector by computing Composite Index of Industrial Development on the basis of performance indicators viz., number of units, employment potential and investment levels. The state was divided into three regions- Andhra, Rayalseema and Telangana. The compounded growth for selected indicators for the period 1971-80 and 1980-85, indicating that growth of SSI in Andhra and Rayalseema regions was almost same, while Telengana region had higher growth rates of 551 during both the periods. The industrial development of 23 districts of Andhra Pradesh was also examined which were ranked on the basis of the Composite Index. The study reveled that the development of small-scale industries depended on resource potential, entrepreneurial abilities, financial capabilities and other and other infra-structural facilities. Infrastructure proved key factor industrial development. The study found that the districts having good infrastructural facilities recorded better performance.

Shastri (1988) analyzed regional disparities in economic development of Rajasthan over a period of 23 year (1961-84) by applying techniques of Composite Index of Development (CID), coefficient of variation, range and ranking analysis. He selected 40 indicators for seven sectors of economy-Agriculture, Industry, Education, Banking, Transport, communication and Power, animal Husbandry and Medical services. On the basis of the Composite Index he proved that though some changes took place in the ranking of the districts, but their relative position in general did not change significantly. The coefficient of variation declined from 31.14%(1961) to 23.20%(1994), which implies that the districts in general have come nearer to the state average, but the range value increased marginally from14.117 to 15.199, implying that the gap among the districts has marginally widened.

Dabibhavi (1989) conducted a study on inter-state disparities in India based on the cross-section data for 16 major states for the years 1960-61 and 1980-81, by applying simple regional quantitative measures like coefficient of variation, correlation coefficients and shift and share analysis. The study confirmed that Uttar Pradesh, Madhya Pradesh, Orissa, Bihar and Kerala were not only suffering from low per-capita income but also from unfavourable industrial structure and productivity conditions whereas these factors were

favourable in Punjab, Maharashtra, Gujarat and west Bengal- the high income states. The factors explained most of the variations in inter-state per- capita income in India. The study reported that inequalities among states have been growing over the period. The study also showed that two factors viz., per worker productivity in agriculture and degree of industrialization have positive and significant association with economic development.

Sharma (1991) in her article 'Inter-State Disparities in the Levels of Development in India: With Particular Reference to the North- Eastern Region' makes an attempt to find out the extent of inter- state disparities in the India on the basis of the latest available statistics. The state per-capita income has not been included in her methodology because it has been pointed out by some scholars that this is not an appropriate criterion for measuring the levels of development of the North-Eastern Region, as quantity of resource transfer from center to these states are generally high, and this inflates the per-capita income figures.

Kantawala and Rao (1992) analysed the inter-state disparities in sectoral development in India during 1970-71 to 1985-86, selecting 8 agricultural indicators, 12 industrial indicators and 6 indicators of services sector. They used Composite Index tool to estimate the sectoral development and rank correlation analysis to show the change in positions or the states in their ranks. Examining the relative position of states with respect to all sectors, they concluded that in the case of industrial and services sectors the disparities among states declined marginally, while the inter- state disparities in the case of agricultural sector increased over time. The development was lagging in all sectors of the economy of the states like, Assam, Bihar, Madhya Pradesh, Orissa and Rajasthan. Moreover, the developed states have been growing at faster rate as compared to the backward regions. The study also proved that the relative position of states have not changed significantly considering the overall development.

Kantewala and Rao (1992) the importance of balanced regional development in a federal political structure needs no emphasis. It is, of course, true that perfect regional balancing is neither feasible nor economically desirable. Balance Regional Development does not mean equalization of all regions in every aspect of development. It means the maximum utilization of all the potentialities of an area and thereby giving its inhabitants the full benefit of

possible progress in relation to overall economic growth. Therefore, the solution of the problem of regional disparities and imbalances lies not in perfect balanced regional development but in regional development.

Mazumdar (1993) made an attempt to analyze inter-state disparities in per-capita state domestic product (PCSDP) for the period 1960-86 to check whether regional disparities were divergent or convergent during this period. The study also introduced price differentials in the per-capita state domestic products (PCSDP) series of fourteen major states of India. With the help of coefficients of variation of per-capita state domestic product of 14 selected states, the studies revealed that interstate income variation were on the increase with fluctuating trend during the period. Furthermore, the study revealed that the divergent was more with the introduction of inter-state price differential in PCSDP series of the selected states as the trend rates of the coefficients of variation were higher the trend rates of the coefficients of variation at all-India current as well as constant prices (1970-71=100).

Anuradha and Rao (1995) economic welfare does not merely depend upon the level of development but also on its distributive aspect. Unfortunately, the fruit of economic development is not equally distributed among different people and parts of the country, causing disparities and imbalances in economic development. Different areas of a country may not be evenly endowed with various resources-natural, human and others. Given the uniform circumstances to grow, these areas, therefore, advance at rates, which are quite different and have different pattern of economic development. The areas, which are rich in resources or are favourably placed, grow at comparatively faster rate than others. Thus, with every stage of development, gap between resourceful and less resourceful areas goes on widening.

Anuradha and Rao (1995), on the basis of ASI (Annual Survey of Industries) and CSO (Central Statistical Organization) data have studied the nature of inter-state disparities in the levels of industrial development during 1970-71 and 1985-86 and have concluded that though in absolute terms, the process of industrialization is characterized by an inequality in its spatial distribution, relatively speaking, the tendency is to decline. During the period 1971-85 industrial productions has increased by more than 6 times of value added, employment has increased by only 42 percent, and number of factories

by 56 percent. Industrially developed states continue to grow except West Bengal. Maharashtra and Gujarat continued to stay highly industrialized followed by Tamil Nadu. There has been relative decline in all aspects - value and output, value added, productive capital, factory employment and number of factories in West Bengal, (second highest industrial state) since 1970-71. The decline of West Bengal's industrial economy has reduced the regional inequality to a great extent in India. West Bengal's second rank in 1970-71 has slided down to 5^{th} to 6^{th} rank in 1985-86.

Subramanian (1995) examined the inter-state differences in the level of family health in all the states (except Tripura). The study was based on the data collected from National Family Health Survey 1992-93. A taxonomic approach was applied and Composite Index of family health for each state was constructed on the basis of ten important indicators pertaining to family health. The state was ranked on the basis of Composite Index of family health. Kerala State was placed at top and Bihar at bottom in the ranking. On the basis of Composite Index of family health, 23 states were classified into three categories -'higher ranked' states (Kerala, West Bengal and Tamil Nadu); 'low-ranked' states (Nagaland, Rajasthan, Madhya Pradesh and Bihar) and other states were included in the category of medium rank.

Joshi (1997) has observed that despite the adoption of a number of policy resolutions since 1956 for industrial development and its decentralization, regional disparities still persist. During 1969-70 to 1992-93 the pace of industrial development in the backward states was slow compared to that of the developed states. Industrial structure in the backward states is diversified than that of the developed states. The Government policy of industrial dispersal has not affected the industrially developed states of Maharashta, Gujarat, Tamil Nadu, Andhra Pradesh, Punjab and Uttar Pradesh. Industrially backward states of H.P., Jammu & Kashmir, Assam, Orissa, Rajasthan, Haryana, Kerala and M.P. and other northeastern states, even though eligible for subsidy in investment, incentive and concessional schemes, could not come up industrially. The industrial structure of the industrialized states like Maharashtra, Gujarat, Tamil Nadu, Karnataka and West Bengal is more diversified than that of the backward states. In other words, industrial diversification is closely associated with the higher level of industrial

development. In the backward states industrial structure is dominated by a few capital-intensive heavy industries.

Rana (1997) analyzed the inter-state disparities on the basis of large number of social, economic and infrastructural factors during the period 1971-95. Coefficient of Variation figures worked out for selected indicators revealed that inter-state disparities widened in terms of economic indicators and the disparities reduced in social and infrastructural sector over time. The study found that the pattern of development of Indian economy was not unison with respect to all the indicators rather it was of mixed nature. Some of the Indian states were found economically advanced and some were socially more developed. However, the states of Orissa, Bihar, Madhya Pradesh and Jammu & Kashmir were backward with respect to all indicators. The study proved that economic development does not necessarily lead to social development and vice-versa. The state of Panjab had real per-capita income much higher than that of Kerala but the standard of living in Kerala was far better than that of Punjab as revealed from the values of Physical Quality of Life Index (PQLI).

Banerjee and Roy (1998) in their paper have opined that though the Bureau of Applied Economics and Statistics, Government of West Bengal, furnishes data on district domestic products (DDP) in West Bengal, but the availability of statistics is not regular and up-to-date. Moreover, the basis of the calculation is never made explicit. So, one may be interested in qualifying the impact of major policy instruments on the state domestic product (SDP) and this estimated causal relation at the state- level may serve as a basis for projecting DDP figures. In this paper, they have tried to construct a district development index. They also showed that the construction of this index would involve two major steps. The primary step would be to settle the relative weights to be attached to each aspect. This paper intends to suggest a methodology towards that end.

Bhattacharya (1998) in her paper has made a study of inter-district variation in urbanization and human development in West Bengal and made a comparison with inter-state variation. This paper attempts to estimate disparities in human development levels in different district of West Bengal. It also attempts to examine whether the economy reflects any uni-nodal character and the nature of such centralization, if any. In an economy with a mono-nuclear set up, there is

usually a tendency of conglomeration of various facilities towards the urbanized regions thereby raising their human development levels. On the whole, this paper probes into the relationship between urbanization and human development in the economy of West Bengal.

Mahanty (1999a) in his study has considered seven variables to work out Agricultural Development Index. According to him, the main issue on agricultural front is how to increase agricultural production and productivity, which in turn depend on the inputs used. While the former is represented by agricultural output, the latter is proxied by a set of agricultural inputs like the extent of irrigated area, fertilizer use, available bank credit, mechanization and use of electricity. Seven indicators measure the industrial development index. Industrial production can be viewed in two ways e.g., the gross value of industrial product and value added in this sector. While the former considers the use of raw materials in the production process, the later excludes this and considers only the sectoral contribution to gross production. Our measurement of industrial index uses both. Apart from production the levels of industrial development required to be assessed by considering the employment provided by this sector. This aspect is proxied by the number of factory workers. Since the volume of production largely depends on the available infrastructure, indicators like electricity consumption and bank credit are chosen to represent this aspect. The social development index used 12 indicators. The indicators spread across education, health, electricity consumption, drinking water and other sanitary conditions that are generally identified as essential requirements for promoting human capabilities. As far as the nature of the indicator goes they are of percentage-type and have a strong distributional impact. The economic infrastructure sector that is precondition of development uses six indicators for working out its sectoral index. It covers some of the available important models of communication like road length, post offices, bank and telephone connections. Most of these indicators are of per-capita type and tend to be of economic in nature.

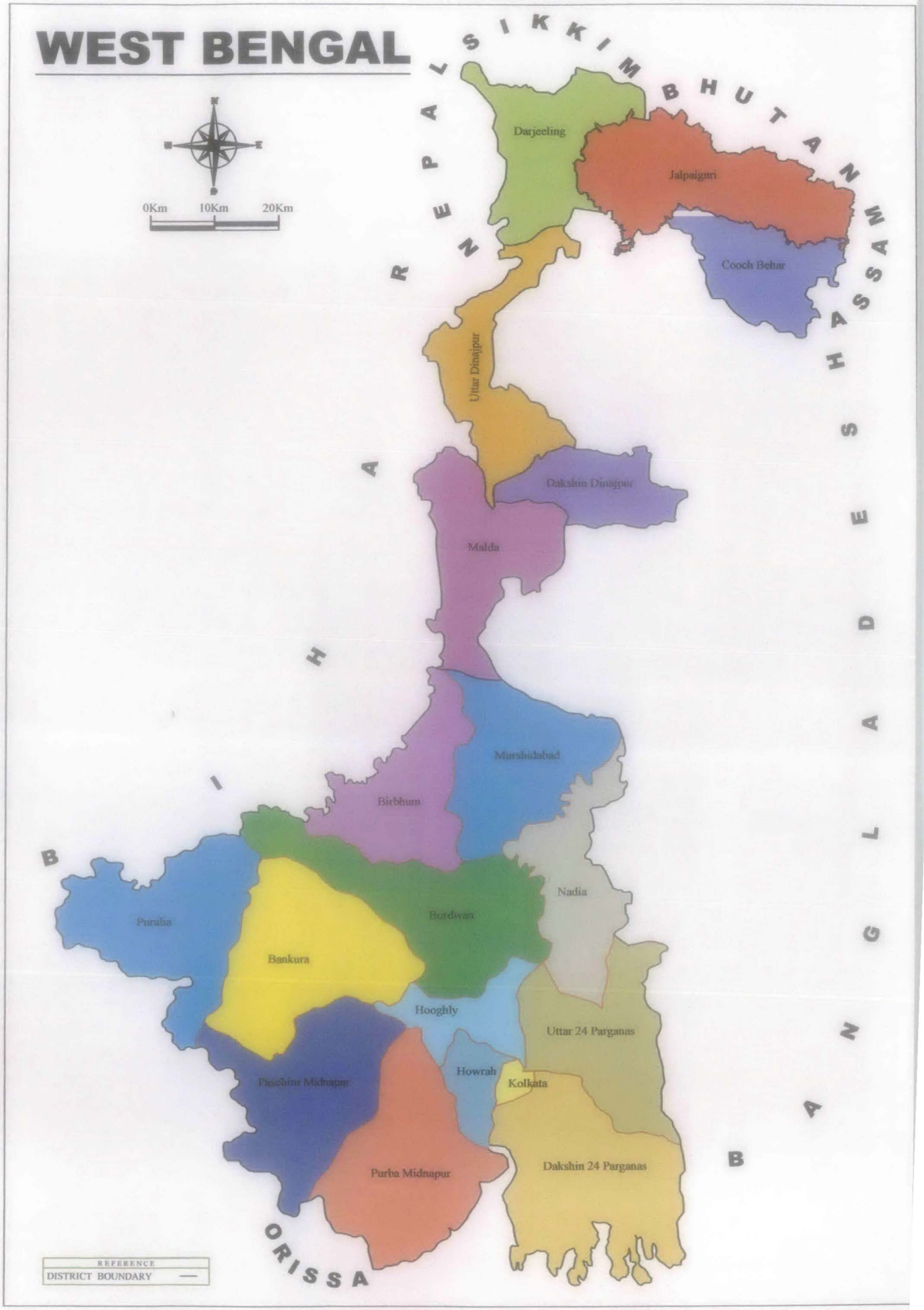
Mahanty (1999b) shows that to achieve national integration, elimination of roots of uneven growth and providing minimum entitlement to all sectors of production, removal of regional imbalance is not only made as a mandate in our constitution but also proclaimed goals of successive five-year plans. On the top of that to foster this process, periodically the National and Sub-National

Governments have set-up several commissions and committees to identify backward areas and formulate appropriate policies for reducing regional imbalances. After over-four and a half-decade of planning at center, state and local levels, the problems still persists. It will be not inappropriate to raise the same issue just a couple of years before the beginning of the next millennium. The issues of regional disparities in the process of development may be thought (Prabhu, 1991). The self-balance school, which has a neo-classical orientation, treats disparities, as a temporary phenomenon and the free play of market forces tend to reduce a regional imbalance. The imbalance school approach which is based on the classic work of Myrdal (1958) and Hirschman (1958) states that the strong backwash effect and favourable natural and geographical advantages pulls in more dynamic elements from the backward regions, intensifying the problem of regional imbalance.

Shaban and Bhole (2000) using seventeen indicators of development and principal component analysis cluster analysis, and other statistical methods have made an attempt to measures inter-state differentials in rural development in India. The study (using coefficient of variation) finds that inter-state disparities in rural development are very high and rural development in India is regionally imbalanced one.

Mallikarjun (2002) measures the intra-regional disparities in economic development. This paper makes an attempt to measure regional disparities at sub-regional levels in Andhra Pradesh. He had seen that, their alternative methods for the construction of composite index of development were used considering 50 development indicators divided into nine sectors. Discriminant analysis was used for measuring significant differences across the districts in each sub- region as well as across the sub-regions in the state.

Pathak (2002) has observed that there is no sign of declining regional disparity in industrial development in India except that the second ranking state of West Bengal in 1969 has gone down to 11^{th} position out of 17 states. There has been continuous decline in number of factories in West Bengal since 1969 to 1992-93 (from 10.7 percent to 5.09 percent), so is the case in respect of productive capital, number of industrial workers, etc.


WEST BENGAL
0Km
10Km
20Km
NEPAL
SIKKIM
BHUTAN
ASSAM
BANGLADESH
BIHAR
ORISSA
Darjeeling
Jalpaiguri
Cooch Behar
Uttar Dinajpur
Dakshin Dinajpur
Malda
Murshidabad
Birbhum
Nadia
Purulia
Bardwan
Bankura
Hooghly
Uttar 24 Parganas
Howrah
Kolkata
Paschim Midnapur
Purba Midnapur
Dakshin 24 Parganas
REFERENCE
DISTRICT BOUNDARY

CHAPTER 2

OVERVIEW OF ECONOMIC DEVELOPMENT IN WEST BENGAL SINCE THE BRITISH PERIOD TO THE LATE 1970s

2.1 Regional Setting and History of Economic Development:

West Bengal is located in Eastern India. It is bounded on the north by the Indian states of Sikkim and the country Bhutan, on the east by Bangladesh and the Indian state of Assam. It is bounded on the west by Nepal and the state of Bihar, and on the south by the state of Orissa and the Bay of Bengal. It is well situated from the point of view of commerce both within the sub-continent and with the outside world. Bengal took full advantage of her geographical position to become an entrepot for a large part of India. Waterways were the main and cheapest highways of commerce. A number of roads radiate from Bengal to different parts of the subcontinent.

The state of West Bengal is comprised of 19 districts *(See in Appendix to chapter-2)* with a total area of now in 88,752 square kilometers. These nineteen districts are Darjeeling, Jalpaiguri, Cooch Behar, Uttar Dinajpur, Dakshin Dinajpur, Malda, Murshidabad, Nadia, 24 Parganas (N), 24 Parganas (S), Howrah, Kolkata, Hooghly, Burdwan, Birbhum, Bankura, Purba Midnapore, Paschim Midnapore and Purulia the first six districts comprise the Jalpaiguri administrative division, the next six districts are under the Presidency division, and the remaining seven districts comprise the Burdwan division.

A complete knowledge of economic history of the region is essential before explaining the disparities of the region. In this section a short history of economic development of West Bengal is discussed.

According to Roy "Bengal was the wealthiest province in the subcontinent when the British arrived in India. In ancient and medieval ages foreign travelers were impressed by the province's flourishing agriculture, industry and trade. When they came, the British were attracted to Bengal by the wealth and industries of the province and her strategic position in international trade. Their industries could not compete with Indian industries at that time. They systematically ruined India's flourishing industries of that time as a matter of state

policy. They ultimately reduced the country into an agricultural hinterland of Britain".

The fertile soil and the monsoon made agriculture thrive. Cottage industries of a varied kind were run on an extensive scale. A perfect balance between agriculture and industries was in existence for centuries. Cotton textiles and silk fabrics were the most famous industries and these had markets in different parts of India and in many other countries as well. Bengal's other major industries were sugar and salt.

Much of the primary capital for British industries was drained out of Bengal. Immediately after the war of Palasi (1857), the East India Company embarked on a determined policy to monopolize manufacturing, particularly of silk and cotton fabrics. In the course of five decades from the war of Palasi all industries in Bengal declined. The destruction of the diversified basis of the traditional rural economy by the heavy competition of British industry intensified the pressure on land. As a result the village handicrafts declined and the cultivation of non-food crops decreased. Thus the socio-economic disintegration and sectoral distortion of the economy of Bengal set in motion a process of static expansion. The rural economy and the rural society became less progressive in the nineteenth century in response to the new colonial conditions.

The British government constrained the growth of per capita consumption, especially food and the size of the domestic market for agricultural products by its monetary policies. Consequently Bengal gradually became a producer of raw materials for British industries and a market for finished goods produced by British industries.

Independence of India from Britain (1947) was a severe blow to Bengal, since the province was partitioned by the Imperial government. Industries and their raw materials fell under different national jurisdictions. In addition, West Bengal had to face a huge influx of refugees numbering anywhere from five to eight million due to partition of India. Although taxes were centrally collected, the tax redistribution was utilized as an instrument to pump money out of one or two prosperous states. West Bengal has suffered the most from this policy. However, even then the state was producing much more than any other state in the nation. It had the highest per capita income, and was second in terms of education. She

had access to industrial raw materials and an infrastructure to make progress faster than any other state.

In 1965 a seminar was organized by the National Chamber of Commerce on West Bengal's economic problems. They found that the state was discriminated against through a quota for raw materials and steel supplies. In the 1960's the industrial situation in West Bengal had been altogether dismal. The crisis in agriculture was no less deep. In the early 1970's Roy remarked, "if economically, culturally, socially and politically West Bengal is collapsing, the unresolved refugee problem is one of the most serious causes of this"

2.2 Demographic and Socio-economic Structure of West Bengal

2.2.1 Demographic Features

Over the years, population concentration has brought about increased density in human settlements resulting in considerable regional disparity in the distribution of the state's population. India, the second most populous country of the world, has been increasing in terms of population at the rate of 2.5 per cent a year. In 1971 West Bengal comprised only 2.67 per cent of India's land area (12^{th} among the states and territories), however, it ranked fourth in population size.

Within West Bengal the percentage share of population is lowest in the Darjeeling district (1.76 %), while the percentage share of land area is lowest in Kolkata (0.12%) but its density is the highest (30,276 persons per square kilometer; Table 2.1). Apart from the above mentioned districts, the density of population is less than the state average in Jalpaiguri, Cooch Behar, West-Dinajpur, Malda, Birbhum, Bankura, Midnapore, and Purulia. In contrast, the concentration of population is high in all the districts of the Presidency division because of urban agglomerations in Kolkata, Howrah and Hooghly.

The highest concentration of working population is in Kolkata (11,207 persons per sq. km.) Other districts having higher than the state average in density of working population are Murshidabad, 24 Parganas, Howrah, Hooghly and Burdwan. The density of working population is below average mainly in the northern hill districts and south-western districts (Table 2.1). There is a high concentration of nonworking population in the districts of Kolkata and Howrah reflecting the over all population densities in these regions. People come to cities for educational, medical and recreational facilities as well as for job.

In 1971, the population of India was 548 million, and West Bengal's population was 44 million with a 27 per cent growth rate over the past decade. There has been a tendency of growth of population since 1901, except during the decade 1911-1921 when almost all the districts declined because of disease and famine both natural and man-made. The aggregate growth of population was high in the districts of 24 - Parganas and Kolkata as well as in Jalpaiguri, Darjeeling, Nadia and Howrah districts *(Appendix A 2.2)*. Although there was a trend of positive growth, the percentage increase for the decade 1961-71 was lower than that of 1951-61. This was due to a lower birth rate and improvement in family planning, as well as the decreasing influx of refugees.

Table 2.1: Distribution of Area and Density of Population of West Bengal, 1971

Sl. No.	District	Area		Population		Density (Persons Per Sq. Km.)				
		Sq. Km.	(%)	Total	(%)	Rural	Urban	Working	Non Working	Total
1	Burdwan	7,028	8.00	3,716,174	8.84	430	127	158	401	557
2	Birbhum	4,550	5.18	1,775,909	4.01	363	27	104	286	390
3	Bankura	6,881	7.83	2,031,039	4.58	273	22	84	211	295
4	Midnapore	13,724	15.62	5,509,247	12.43	370	31	107	294	401
5	Howrah	1,474	1.68	2,417,286	5.54	952	688	496	1204	1640
6	Hooghly	2,145	3.58	2,872,116	6.48	671	242	246	667	913
7	24 Parganas	13,796	15.70	8,449,482	19.07	397	215	158	454	612
8	Nadia	3,926	4.47	2,230,270	5.03	462	106	141	427	568
9	Murshidabad	5,341	6.08	2,940,204	6.64	504	46	143	408	550
10	Malda	3,713	4.23	1,612,657	3.64	416	18	118	316	434
11	West Dinajpur	5,206	5.93	1,859,887	4.20	324	33	100	257	357
12	Jalpaiguri	6,245	7.11	1,750,159	3.95	253	27	87	193	280
13	Darjeeling	3,075	3.50	781,777	1.76	196	59	92	162	254
14	Cooch Behar	3,386	3.85	1,414,183	3.19	389	29	115	302	418
15	Purulia	6,259	7.12	1,602,875	3.62	235	21	80	176	256
16	Kolkata	104	0.12	3,148,746	7.11	-	30276	11207	19069	30276
State		87,853	100.00	44,112,011	8.09	379	125	141	363	504

Source: Census of India, 1971, series 22, West Bengal, General population Tables, part-II-A.

Kolkata unlike all other million plus cities in the world has been experiencing a decrease in absolute as well as in relative growth. Population increase in the southern and southeastern districts of West Bengal were mostly due to immigration induced by expansion of industrial complexes. The high growth rate of population of West Bengal can also be explained in terms of a persistently high birth rate and a fast declining death rate. A major part of the increase in population takes place in rural areas. Large additions to the work

force caused by a high rate of population growth leads to higher rates of unemployment and underemployment. The labor force of the country can make a positive contribution if it can be truly utilized; otherwise a rapidly growing population retards the process of development.

2.2.2 Socio-Cultural Features

Economic development is closely associated with the growth of urbanization. As urbanization progresses new opportunities for gainful employment arise and a new horizon of a richer and more varied existence opens up. People are likely to be pulled out of their traditional occupations and living environments to towns and cities. The rate of urbanization for West Bengal was only 28.4 per cent in 1971 (Table 2.2), whereas the national rate was 37.83 per cent. In 1961 and 1971 the proportion of urban population was above average only in the districts

Table 2.2: Distribution of Villages, Towns and Urban Population of West Bengal in 1971

Sl. No.	District	Villages (% of total)	Towns (% of total)	Urban Population		Rate of Urbanization 1971
				1961	1971	(1961 = 100 Base)
1	Burdwan	6.59	9.86	18.2	22.8	59.0
2	Birbhum	5.97	2.69	7.0	7.0	23.5
3	Bankura	9.24	2.2	7.4	7.5	23.4
4	Midnapore	28.53	7.17	7.7	7.6	25.8
5	Howrah	1.88	12.11	40.5	41.9	22.8
6	Hooghly	4.68	7.62	26.0	26.5	31.3
7	24 Parganas	9.36	31.39	31.8	34.2	48.7
8	Nadia	3.34	5.83	18.4	18.7	32.7
9	Murshidabad	5.38	4.93	8.5	8.5	27.4
10	Malda	4.33	0.89	4.2	4.2	33.4
11	West Dinajpur	8.13	3.14	7.5	9.3	75.4
12	Jalpaiguri	1.8	3.59	9.1	9.6	35.5
13	Darjeeling	1.4	1.79	23.2	23.1	24.3
14	Cooch Behar	2.82	3.14	77.0	6.8	36.1
15	Purulia	6.49	3.14	6.8	8.3	42.3
16	Kolkata	–	0.45	100.0	100.0	7.6
West Bengal		6.58	7.13	12.7	24.8	28.4

Source: Census of India: 1971, Series I, General Population Tables, Pt. II- A (1)

of 24 Parganas, Howrah, Kolkata and Hooghly. The percentage of urban population was high in the Kolkata industrial region, as many manufacturing industries as well as service industries was established here. There was a decline of urbanization in the districts of Darjeeling, Cooch Behar, Midnapore and Murshidabad during the decade of 1961-71.

It is expected that in the districts in which there has been substantial urbanization, the pressure of population of rural areas is likely to be comparatively small. But Chatterjee (1973) has shown that urbanization in West Bengal has contributed little in reducing the pressure of population in rural areas. Some districts enjoy congenial locations, those that are rich in natural endowments and have favorable economies and political antecedents. Both urban and rural areas of such regions may, therefore, be densely populated, as for example, Howrah, Hooghly and Burdwan. People in rural areas of such districts have also facilities for commuting daily to the industrial and commercial areas of the regions and to the city of Kolkata. A high degree of urbanization in the districts of Kolkata, Howrah, Hooghly, 24 Parganas, Darjeeling and Burdwan is explained by the fact that these districts are the major recipients of public sector projects and industrial projects. Another factor of great significance is the development of overseas trade.

The pattern of urbanization can be understood by the study of the proportional distribution of towns and villages. In 1971 Midnapore district had the largest proportion of villages (28.53%), while in the whole districts the concentration of villages was low. Out of the total 223 towns, 70 (31.39%) of them were located in 24 Parganas. A high concentration of towns also existed in the districts of Howrah and Burdwan (Table 2.2).

2.2.3 Economic Features

The importance of population as a primary determinant of crude labor force participation is well recognized. Age composition has been found to be an important factor in determining unemployment. In this study age structure is grouped into four major classes.

The regional distribution of population shows that the percentage of population was highest (more than 40 per cent) in the 0-14 age group in almost all the district. Out of the total of 40 per cent infants and younger children, more than 30 per cent were rural in all the districts (Table 2.3). A high proportion of elderly people are found in rural areas because most of them go back to their villages after retirement. Therefore, there is a great disequilibrium between rural and urban population.

The level of literacy in India has increased from 24 per cent in 1961 to 29.31 per cent in 1971. The level of literacy achieved in Australia, Canada, the

United Kingdom and the United States is about 95 per cent. The proportion of literates in West Bengal decreased from 34.65 per cent in 1961 to 33.00 per cent in 1971. The percentage of literate people was more than average only in the districts of Kolkata, Howrah, Hooghly, 24 Parganas and Burdwan. Kolkata's literacy rate was over 60 per cent while the others ranged from 33% to 40% (Table 2.4). The dominance of male literates over females is common in every district. The difference is minimal in Kolkata but the disparity between male and female literates is gradually narrowing. A higher dependency ratio is one of the retarding factors to economic development. Populations below the age of 15 and above 60 are considered as non-earning members. The higher proportion of infants and young children in all the districts reveal the potential dependent group of population. Darjeeling, Howrah, Purulia, Jalpaiguri, Burdwan, Hooghly and 24 Parganas comprise more than the average of the state dependency ratio. High fertility and to a lesser extent improvements in medical facilities and pubic health programme cause a higher dependency ratio.

Table 2.3: Age Structure of Rural and Urban Population of West Bengal, 1971

Sl. No.	District	0-14		15-39		40-59		60+		Total	
		Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
1	Burdwan	34.30	9.02	27.79	9.79	11.36	3.10	3.78	0.86	77.22	22.73
2	Birbhum	42.07	2.87	31.84	2.79	14.08	1.05	4.99	0.32	92.97	7.03
3	Bankura	40.46	3.09	32.76	2.89	13.87	1.12	5.44	0.37	92.53	7.47
4	Midnapore	41.62	3.15	31.99	3.05	13.25	1.14	5.32	0.36	92.29	7.71
5	Howrah	25.40	14.79	20.57	18.86	5.50	6.54	3.60	1.74	58.07	41.93
6	Hooghly	33.76	9.41	25.79	11.45	9.99	4.22	4.00	1.38	73.54	26.46
7	24 Parganas	29.56	12.99	22.72	1.51	8.82	5.29	3.74	1.80	64.85	35.15
8	Nadia	38.46	7.42	26.90	7.25	11.21	2.81	4.68	1.26	81.26	18.74
9	Murshidabad	44.39	3.54	30.47	3.23	12.16	1.20	4.53	0.47	91.55	8.45
10	Malda	45.42	1.74	33.08	1.66	12.29	0.58	4.99	0.24	95.78	4.22
11	West Dinajpur	42.31	4.05	31.37	3.54	12.73	1.27	4.24	0.48	90.66	9.34
12	Jalpaiguri	39.38	3.87	33.09	3.85	13.73	1.39	4.20	0.49	90.40	9.60
13	Darjeeling	32.18	8.73	30.58	10.12	10.85	3.19	3.34	0.99	76.96	23.04
14	Cooch Behar	44.90	2.73	30.74	2.76	12.49	0.98	5.04	0.37	93.17	6.23
15	Purulia	37.56	3.40	34.35	3.23	14.93	1.26	4.91	0.38	91.74	8.26
16	Kolkata	-	29.30	-	46.85	-	18.62	-	5.24	-	100
State		34.17	8.79	26.30	10.80	10.68	3.96	4.07	1.24	75.22	24.78

Source: Census of India: 1971, series 32, West Bengal, General population Tables, Pt. II-A.

Labor force participation rates can be explained by the level of employment opportunities. In 1971 the potential labor force in West Bengal was

51.65 per cent of the population. This proportion was high in the districts of Kolkata, Darjeeling and Howrah. Apart form these districts, Jalpaiguri, 24 Parganas and Burdwan also had above average potential labor force (Table 2.4). In contrast to the 51.65 per cent potential labor force in West Bengal the actual labor force participation was 24.91 per cent. In almost all the districts the labor force participation was below the state average except for Kolkata, Darjeeling, Purulia, Burdwan and Bankura. This indicates that all the districts had more manpower than was being used. The relation between labor force participation is income, occupational levels, health, education, other cultural and institutional factors. The proportion of labor force was higher than that of the potential productive labor force in almost all the districts (Table 2.4).

Table 2.4: Level of Literacy, Dependency Ratio and Labour force Participation of West Bengal in 1971

Sl. No.	District	Literates			Dependency Ratio (%)	Potential Labour Force (%)	Potential Productive Labour Force (%)	Labour Force Participation (%)	Surplus Labour Supply (%)
		Male (%)	Female (%)	Total (%)					
1	Burdwan	43.2	24.5	34.4	92.2	52.02	48.75	25.36	26.66
2	Birbhum	35.7	16.8	26.4	100.9	49.75	46.89	23.33	26.42
3	Bankura	38.1	13.9	26.2	97.5	5063	49.35	24.99	25.64
4	Midnapore	45.6	19.4	32.9	101.9	49.01	47.99	23.52	25.49
5	Howrah	49.4	28.0	39.7	83.6	54.47	45.17	24.60	29.87
6	Hooghly	47.9	28.3	38.6	94.3	51.44	47.32	24.34	27.10
7	24 Parganas	48.2	26.4	38.0	92.7	51.89	44.87	23.29	28.60
8	Nadia	26.8	12.1	19.6	112.4	47.06	47.40	22.31	24.75
9	Murshidabad	39.3	22.9	31.3	107.6	48.16	44.80	21.58	26.58
10	Malda	25.1	9.0	17.2	110.0	47.59	48.55	23.10	24.49
11	West Dinajpur	31.2	11.9	22.0	104.4	48.91	48.37	23.66	25.25
12	Jalpaiguri	32.4	15.0	24.2	92.1	52.05	46.89	24.41	27.64
13	Darjeeling	42.0	22.5	32.90	82.7	54.73	59.50	32.56	22.17
14	Cooch Behar	31.4	11.7	22.0	112.9	46.93	50.22	23.57	23.36
15	Purulia	35.1	8.2	21.9	86.0	53.75	51.35	27.60	26.15
16	Kolkata	64.2	54.4	60.4	52.8	65.45	53.13	34.78	30.67
State		42.8	22.1	33.0	93.3	51.65	48.22	24.91	26.74

Source: Census of India: 1971, series 22, West Bengal, General population Tables, Pt. 2-A.

There is a great disparity in the supply of surplus labor. In West Bengal 26.74 per cent of the entire labor force comprise surplus labor. In the districts of Hooghly, Jalpaiguri, 24 Parganas, Howrah, and Kolkata the surplus labor supply was above average. Kolkata and its surroundings are the centers of many industries, and other multifarious activities. Since a higher proportion of the population remain underutilized. The rapid growth of population and consequent

increase in the supply of labor force are leading the problems of labor absorption in the economy.

In India the ratio of productive consumers (working population) to non-productive consumers (non-working population) deteriorated during 1961-71. In India the proportion went up from 57.3 per cent in 1961 to 67.1 per cent in 1971. In West Bengal, the proportion increased from 66.8 per cent in 1961 to 72.1 per cent in 1971. The proportion of male productive consumers was higher (25.80%) than that of female (2.05%) in the entire economy. Therefore, this indicates the backward nature of the economy. In all the districts the ratio of productive consumers to non-productive consumers is higher in the rural areas than in the urban areas. In the rural areas family employment is dominant and there is a higher child labor participation in unorganized sectors. In the urban areas the income among educated people is not a serious problem for the family. Although the ratio of productive consumers is high in the rural areas, the wages in the rural sector is very low, and as a result their contribution in the economy is low.

In terms of occupational structure, 72 per cent of the working population was engaged in the primary sector, 11.1 per cent in the secondary sector and 16.7 per cent in the tertiary sector in 1971 in India. In West Bengal 62.5 per cent of the working population was engaged in the primary sector, 15.0 per cent in the secondary sector and 22.5 per cent in the tertiary sector during the same period, thus the economy of West Bengal is more diversified than the national average.

The proportion of male working population in West Bengal is high while that of female is very low. Distribution of male workers was above average in the northern (except Darjeeling and Jalpaiguri), central and southeastern districts. On the other hand, the distribution of female workers was above average in Darjeeling and Jalpaiguri and all of the south western districts (Table 2.5).

In each case, the proportion of female workers was high in the rural economy only. Other than Kolkata the districts which comprise a comparatively higher proportion of urban workers are mostly the neighboring districts of Kolkata, as well as Burdwan. The reason in obvious, the Kolkata industrial region attracts the urban workers from the neighboring districts and also from the neighboring states. The distribution of urban male workers was below average in almost all the districts except Hooghly, 24 Parganas, Howrah, and Kolkata. Rural workers dominate West Bengal's work force (73.30%). The proportion of rural

workers was very high (more than 90%) in the north (except Darjeeling) and south – western districts of Birbhum, Bankura, Midnapore, and Purulia. The proportion of male workers was less than average in the districts of Darjeeling, 24 Parganas, Howrah, Kolkata, and Hooghly. Cooch Behar and Malda had more than 90 per cent rural male workers.

Out of the total 16 districts of West Bengal only five districts (24 Parganas, Howrah, Kolkata, Hooghly and Burdwan) have less than the average number of workers in the primary sector of the economy. More than 80 per cent of workers were engaged in the primary sector in Cooch Behar, West Dinajpur and Malda in the north and Birbhum, Bankura, Midnapore and Purulia on the south-west. The proportion of workers in the secondary sector was very low in almost all the districts except the five mentioned above. People are employed mostly in manufacturing other than household industry in those areas. The highest percentage of workers (69.31) in Kolkata was engaged in the tertiary sector. The root cause of this concentration in tertiary activities is the location of educational institutions, administrative offices, courts, transport offices and cultural institutions. Other districts which had a higher than average concentration of workers in the tertiary sector were Howrah, Darjeeling, and 24 Parganas where transport as well as services are dominant.

A higher than average proportion of workers in the primary sector existed in Midnapore, 24 Parganas, Burdwan and Murshidabad, while the districts of 24 Parganas, Burdwan, Kolkata, Howrah and Hooghly showed a higher than average proportion of workers in secondary sector of economy. Other than Kolkata, areas having higher proportion of workers in the tertiary sector are 24 Parganas, Burdwan, Midnapore and Howrah. Northern hill districts had a higher proportion of workers in the primary sector compared to other two sectors.

In rural areas, due to the absence of diversification of the economy, intensification of the pressure on land is likely to reduce the size of land holdings. This increases the ratio of landless laborers in agriculture. The rural economy is least diversified in Cooch Behar and West Dinajpur because of location and their industrial base. On the other hand Hooghly, Kolkata and Burdwan have diversified economies in response to economic opportunities and pressure on land. Substantial diversification of the rural economy in Howrah can be explained

by a developed network of transportation and communication, a high degree of industrialization, nearness to Kolkata and population pressure.

Total agriculture area has more than doubled in almost all the districts from 1957 to 1971. One of the reasons of higher agricultural production is more irrigated area. This is true in Murshidabad, Nadia, Burdwan, Birbhum, 24 Parganas and Hooghly.

The average daily wages of male agricultural workers ranged from Rs. 1.50 to 3.50. Therefore, their monthly earning is small (approximately Rs 100.00) it is lower in the case of women and young persons.

In 1971 per capita income of West Bengal was Rs. 524.00 in West Bengal out of the 16 districts, 6 districts had per capita income greater than the average of the state where as in 2001 per capita income of West Bengal is Rs.9764.75 (1993-94, constant prices) out of 18 districts, 8 districts have per capita income greater than the state average *(see appendix A 2.3)*. These are Kolkata, Burdwan, Hooghly, Jalpaiguri and Cooch Behar. Per capita income was highest (Rs. 1,011.00) in Kolkata. The hill districts and the south – eastern districts are next to Kolkata in per capita income. The reason of their higher per capita income is that the south-eastern districts are located in the industrialized belt, and the northern hill districts have tea estates. A high concentration of small scale industries and their employment denote a higher per capital income.

In Kolkata there is a high concentration of small scale industries (32.07%) and a high proportion of industrial employment (26.82%). In fact this concentration is highest in the state in 24 Parganas and Howrah. Darjeeling also shows a high concentration of small scale industries in Table 2.6.

Replacement of the relatively backward jute industry by the relatively modern engineering industries, e.g., machine tools, machinery, manufacture of cotton and textiles, electrical equipment, and diesel engines is an important aspect of the structural change in the state economy. The majority of large industries are concentrated in Kolkata and in a close cluster of towns around it, barring Asansol-Durgapur region. The Kolkata industrial region has built up a strong industrial base and the Damodar Valley Corporation has helped to develop the area in to one of India's major industrial concentration.

Table 2.5: Distribution of Workers of West Bengal, 1971

Sl. No.	Districts	Urban Workers (%)			Rural Workers (%)			Total Workers (%)		Distribution of Workers by Sector (%)			Distribution of Workers by Districts (%)		
		Male	Female	Total	Male	Female	Total	Male	Female	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary
1	Burdwan	21.54	1.15	22.69	69.85	7.46	77.31	91.39	8.61	56.27	23.79	19.94	8.11	13.17	7.80
2	Birbhum	6.28	0.59	6.87	85.59	7.54	93.13	91.87	8.13	80.20	5.95	13.85	5.00	1.43	2.43
3	Bankura	6.00	0.48	6.48	80.39	13.13	93.52	86.39	13.61	82.16	6.97	10.87	6.23	2.03	2.23
4	Midnapore	6.63	0.47	7.10	84.21	8.69	92.90	90.84	9.16	81.20	5.86	12.94	15.69	4.15	6.74
5	Howrah	47.27	1.39	48.66	50.40	0.94	51.34	97.67	2.33	33.42	37.29	29.29	2.83	12.13	6.73
6	Hooghly	27.18	1.57	28.75	64.46	6.79	71.25	91.64	8.36	55.93	22.00	22.07	5.71	8.64	6.11
7	24 Parganas	34.81	1.08	36.61	61.87	1.52	63.39	96.68	3.32	53.06	23.08	23.86	15.28	25.54	18.64
8	Nadia	16.72	1.35	18.07	79.41	2.52	81.93	96.13	3.87	68.21	12.55	19.24	4.97	3.51	3.80
9	Murshidabad	7.37	0.79	8.16	87.65	4.19	91.84	95.02	4.98	77.69	10.90	11.41	7.80	4.20	3.10
10	Malda	3.55	0.31	3.86	90.31	5.83	96.14	93.86	6.14	82.03	6.33	11.64	4.72	1.40	1.82
11	West Dinajpur	7.42	0.45	7.87	87.84	4.29	92.13	95.26	4.73	85.86	3.35	10.79	5.90	0.88	2.00
12	Jalpaiguri	8.04	0.57	8.61	76.79	14.60	91.39	84.38	15.17	78.18	4.97	16.85	5.61	1.37	3.29
13	Darjeeling	17.04	1.76	18.80	54.94	26.26	81.20	71.98	28.02	66.57	6.08	27.35	2.48	0.87	2.76
14	Cooch Behar	6.18	0.52	6.70	90.89	2.41	93.90	97.07	2.93	84.32	4.08	11.60	4.34	0.81	1.62
15	Purulia	6.26	0.54	6.80	78.93	14.27	93.20	85.15	14.81	80.03	7.99	11.98	5.26	2.01	2.13
16	Kolkata	94.05	5.95	100.00	..	..	..	94.05	5.95	0.44	30.25	69.31	0.07	17.86	28.89
West Bengal		25.21	1.49	26.70	67.31	5.99	73.30	92.52	7.48	62.50	15.00	22.50	100.00	100.00	100.00

Source: Census of India, 1971, Series 22, West Bengal, General Economic Tables, Pt. II-B (i)

Table 2.6: Agricultural production, industrial employments and per capita income of West Bengal

Sl. No.	District	Agri-cultural Area (1971) 1956-57 =100	Total Agri-cultural Pro-duction (1971) 1956-57 =100	Average daily Wages of male Agri-cultural workers (Rs.) (1971)	Per-capita Income at current prices (Rs.) (1971)	Small-scale Indus trial units (%) (1971)	Em-ployment in small-scale Indus-tries (1971)	Regis-tered factory units (1972)	Em-ployment (daily) in registered factories (1972)
1	Burdwan	223.5	326.6	3.00-3.80	685	5.32	3.73	4.85	9.95
2	Birbhum	249.7	380.7	2.50-3.00	515	0.97	1.89	1.53	0.54
3	Bankura	225.5	282.5	3.00-3.50	482	5.30	5.24	1.21	0.27
4	Midnapore	208.0	245.5	3.00-3.35	416	4.57	4.33	1.48	1.93
5	Howrah	187.0	293.1	3.20-3.50	617	14.67	23.08	21.81	19.00
6	Hooghly	215.1	304.8	3.00-3.50	552	2.91	4.00	2.4	10.94
7	24-Parganas	186.1	328.3	2.44-3.25	479	15.42	17.68	45.32	49.92
8	Nadia	251.6	399.7	3.00-3.25	347	4.81	2.63	0.82	0.72
9	Murshidabad	258.9	461.4	2.75-3.00	343	1.26	0.26	0.27	0.24
10	Malda	232.6	304.9	....	304	....	....	0.12	0.04
11	West Dinajpur	276.8	365.9	3.00-3.25	468	1.15	0.69	0.61	0.26
12	Jalpaiguri	268.4	278.2	....	569	1.26	3.07	4.24	2.42
13	Darjeeling	239.4	307.4	3.25-3.50	407	7.51	2.86	2.80	0.95
14	Cooch Behar	252.6	321.6	3.00-3.50	525	1.97	1.43	0.23	0.07
15	Purulia	232.1	309.0	1.50-2.50	394	0.81	1.43	0.80	0.27
16	Kolkata	—	—	....	1011	32.07	26.82	11.46	2.47
West Bengal		116.6	146.2		524	100.00	100.00	100.00	100.00

Source: Economic Review, 1974-75, Bureau of Applied Economics and Statistics, Government of West Bengal.
Note: ... Data not available.

2.3 Industrial Decline of West Bengal

Just at the time of independence West Bengal was the most industrially developed State in India. Kolkata was, so to say, the industrial capital of the country. But today, West Bengal is said to be one of the backward States in India. Now everywhere the declining trend of West Bengal is a matter of discussion. Numerous seminars, debates, symposia, workshop have been held on the declining trend of the State's economy since independence and various causes of the continuous falling trend have been pointed out by different persons. The Bengal Chambers of Commerce have also pinpointed some causes for the present situation of the economy of West Bengal.

In 1950-51, Net Domestic Product (at 1960-61 prices) of West Bengal was Rs. 1239.82 crores, i.e., 11.6 per cent of the total Net Domestic Product of the country, and at the same time the NDP of Maharashtra was Rs. 1194.83 crores,

i.e., Maharashtra shared 11.2 per cent of the all India figure. The economic picture of some of the States in 1950-51 will be clear from the Table 2.7.

In 1951, West Bengal had the highest number of registered factories—1493. She was followed by the composite state of Madras (roughly Tamil Nadu and Andhra) with 1473 factories and Bombay (Maharashtra and Gujarat) with 1426 factories. The number of persons employed in factories in that year was 475084 in West Bengal, 537969 in Bombay and 180629 in Madras. Bombay factories had a total fixed capital of about Rs. 79 crores, West Bengal Rs. 73 crores and Madras Rs. 31 crores at that time.

Table 2.7: Net Domestic Product of Selected States

States	NDP in 1950-51 (at ' 60-' 61 prices) (Rs. in crores)	Percentage share
West Bengal	1239.82	11.60
Maharashtra	1194.83	11.20
Tamil Nadu	737.13	6.90
Gujarat	619.64	5.80
Bihar	700.41	6.60
Uttar Pradesh	1710.22	16.10
INDIA	10657.64	100.00

Source: 'Agony of West Bengal' by Ranajit Roy, second Edition, Chapter-IV. 1971

In the year 1950-51, the industrial production of the State was about 25 per cent of the total industrial production of the country.

The location advantages helped grow industries in and around Kolkata, the biggest city in India. The infrastructural facilities, wide market, availability of skilled personnel etc. were some of the reasons for rapid industrialization, especially in the Eastern Region. But from the later part of 50's the position of West Bengal began to change. Other states, especially Maharashtra, Gujarat, Karnataka, Punjab and Tamil Nadu began to grow more rapidly in industrialization than West Bengal. From the middle of 1950's Maharashtra replaced West Bengal from the top position in the industrial map of the country.

The contribution of West Bengal to National Product came down to 10 per cent in 1960-61, 8.76 per cent in 1976-77, 10.2 per cent in 1978-79, and 9 per cent in 1985-86.

The per capita income in West Bengal fell from Rs. 390 in 1960-61 (at 60-61 prices) to Rs. 385 in 1978-79. But the national average increased from Rs.

353 to Rs. 365 during that period. The index number of per capita net output (1970-71 base = 100) in West Bengal increased to 118 whereas all India figure was 126 in 1985-86.

West Bengal dominated the country in engineering industry. The percentage share of West Bengal in the producing of engineering goods was 40 per cent in 1950-51 and the number of total registered factories was about 30 per cent. But rapid decline in engineering industry was noticed from the second half of 60's. In 1966-67, West Bengal had 23.4 per cent of the total registered engineering factories in the country; a decade later in 1975-76, this percentage came down to 2.7. During the same period, the percentage share of productive capital deployed in the engineering industry declined from 28.5 (1966-67) to 13.2 (1975-76). Similarly, employment percentage in the same period became almost half from 30.5 to 16.5.

In pharmaceutical industry also West Bengal had a pioneering position. The total production of drugs in the country was Rs. 10 crores only in 1948, but 70 per cent of it (i.e. Rs. 7 crores) was produced in West Bengal. The value of total production of drugs in the country was Rs. 1150 crores in 1979-80, but West Bengal's share declined to 10 per cent from 70 per cent. The percentage share was only 8 per cent in 1985-86. In 1996, the paid up capital of all companies in West Bengal was 18.2 per cent of the all India total, it came down to 14 per cent by 1979, and 12 per cent in 1986.

Even the production of jute goods was lower in 1985 in West Bengal than that in 1960. In 1960 total production of jute goods was 1058 thousand tons and it was 1077 thousand tons even after 25 years.

In the second half of 1970s the position of West Bengal in the industrial map of the country will be to a large extent clear from the table below:

Table 2.8: Industrial Indicators: 1976-77

States	Factories		Output		Number of employees
	Number	Percentage to all India	Rs. in Lakh	Percentage to all India	
Maharashtra	13981	17.2	827037	24.3	1210028
Gujarat	9722	12	353143	10.3	594688
Tamil Nadu	8247	10.2	341817	10	668182
Andhra Pradesh	8450	10.4	188463	5.5	561658
Uttar Pradesh	6034	7.4	238426	7	592093
West Bengal	6173	7.6	272134	10.9	882100

Source: Basic Statistics of State Economies – Commerce Research Bureau, Chapter-II

The Table 2.8 shows that in number of industries and value of output West Bengal is relegated to the fifth and fourth position respectively. The number of industries in West Bengal is 6173 and the value of output is Rs. 2721.34 crores (converted to crores). Though West Bengal's position is second to Maharashtra in terms of the value of output; the difference between the two State is wide — Maharashtra 24.3 per cent and West Bengal 10.9 per cent.

Again, in Net Domestic Product West Bengal lost its predominant position in one decade from 1950-51 to 1960-61 (Table 2.9).

From 1950-51 to 1960-61 West Bengal's NDP increased by 30.3 per cent only compared to 58.7 per cent in Maharashtra, 57.1 per cent in Tamil Nadu and 34.1 per cent in Gujarat.

Table 2.9: Net Domestic Product at Current Prices

States	N.D.P. in 1960-61 at current prices (Rs. in lakh)	Percentage increase in 1960-61 over 1950-51
Maharashtra	189612	58.7
West Bengal	161308	30.3
Tamil Nadu	115812	57.1
Bihar	103137	47.3
Punjab-Haryana	89616	37.3
Gujarat	83108	34.1
INDIA	1474378	38.3

Source: NCAER- annual report 1960-61

Thus, we find that there if a gloomy picture in West Bengal's economy, especially in the industrial sector. Nobody denies that West Bengal has been losing ground in the industrial field let alone other sectors. It is now an accepted fact that West Bengal which was once the most industrially advanced State has lost position. She is now considered to be one of the backward states in the country. A few years ago, 12 districts of West Bengal, out of 16, were declared backward (Basu, 1989). No new major industry had been set up in this State during last two decades. New entrepreneurs are not coming up in West Bengal.

The major existing industries in West Bengal are jute, tea, paper, iron and steel, engineering (general), cotton, silk, mining, aluminium, chemicals, leather and footwear, electrical goods, automobiles, bi-cycle etc. In every field growth and expansion is practically absent.

2.4 CAUSES OF DECLINING TREND

Now the question is why West Bengal is limping behind other states in industrial development. Reasons for slow growth rate in West Bengal are many. We shall try to explain the main causes of the present state of affairs of the state in industrial field.

2.4.1 Partition: the main cause

The partition of Bengal (1947) is the main cause of the declining trend of West Bengal Economy. Just after the partition, lakh of East Pakistan refugees crossed the border and about 70 per cent of these refugees concentrated in and around Kolkata. Despite repeated assurances from the leaders, the East Bengal refugees were not properly rehabilitated. As there was no economic rehabilitation of these refugees social, economic and political problems were created in West Bengal with them. Kolkata was overpopulated and lost its charm as the ideal place of living for the industrialists. The city could hardly bear the huge burden of refugee influx. The political parties began to make political capital out of the helpless condition of the up-rooted East Pakistan people. No parties were interested in their economic settlement. The refugees were their political tools. They became desperate when they realized that there was none to help them. As a result, law and order began to deteriorate in West Bengal. Besides, after the partition there was continuous tension in the border. Kolkata and its suburban areas were not far away from the border. Kolkata, which was once a paradise for the industrialists, became a nightmare to them. Many of them left Kolkata and preferred to live in Bombay, Delhi and other cities. The industrialists made no major investment in West Bengal since partition. That does not mean that they had no interest in Kolkata. With the growth of population, the importance of Kolkata as a market began to increase. What ultimately happened was that Kolkata lost importance as a producing centre, but retained its position as an important trading centre.

Besides, the jute industry, the main industry of Bengal, was the victim of partition. Scarcity of raw jute halted the growth and expansion of this industry. Jute goods cannot compete with synthetic goods. Modernization of jute industry has not yet been possible.

The airport and seaport of Kolkata also lost significance due to partition of Bengal. The Government of West Bengal was busy in tackling the refugee

problem and development work suffered initially, but other states had a good start.

2.4.2 Discrimination

It is alleged by many that the Central Government is discriminating against West Bengal in respect of issuing of industrial license, sanctioning of credit, public investment, expansion of development of infrastructural facilities etc. The Communist Party of India (Marxist) i.e. CPI (M), especially of West Bengal, charged the Union Government for colonial treatment towards this State. Though CPI (M) openly criticizes the Union Government for step-motherly treatment towards West Bengal, it is not true, as said by others, that CPI (M) alone has brought such allegation. In 1949, Shri Sarat Chandra Bose said, "The very existence of West Bengal is at stake, her economy is in a perilous condition" (Basu, 1989). He drew the attention of Central Government, but the Centre cared little. Even the Congress Chief Minister, Sri Siddhartha Sankar Roy made similar allegation against the Centre. In a meeting with the business community, particularly Chambers of Commerce in Kolkata on June 18, 1974, Mr. Roy said that the whole of Eastern Region was neglected and the Centre was discriminating against this region, particularly West Bengal (Basu, 1989).

Without trying to judge whether the Central Government is actually neglecting West Bengal, it can be established with facts and findings that the Central Government's apathy towards West Bengal is to a large extent responsible for the present condition of the state. First, applications for the establishment of industries in West Bengal are, without reasons, delayed by the Central Government. Licenses and letters of the Intents are not easily issued to prospective entrepreneurs who are willing to set up industrial units in this state. In 1985-86 West Bengal was granted 21 industrial licenses, but in the same year Maharashtra was granted 96 licenses, Gujarat 86, Tamil Nadu 61 and Karnataka 52. In 1975-76, the number of licenses to West Bengal was 71 against 243 to Maharashtra, 142 to Tamil Nadu, 103 to Gujarat.

A comparative statement indicating how the Letters of Intent and Industrial Licenses were issued in favour of several States of India including West Bengal is furnished in Table 2.10 with a view to giving a clear idea on the subject.

There are cases when the application for the establishment of an industry in West Bengal was rejected, but if the entrepreneur applied afresh for the setting up of

the same industry in any other state, the application was sympathetically considered and license issued. The case of Phillips India Ltd. is an example. Phillips India wanted to expand its radio manufacturing unit in Kolkata and applied for permission; but that application was rejected by the centre. But when the company applied to expand its radio manufacturing unit in Pune that application was entertained and license issued. The same case was with Dunlop India Ltd. Dunlop India's application for expansion of the factory in West Bengal was turned down, but the company was permitted to set up a new factory in Tamil Nadu (Basu, 1989).

New entrepreneurs and the existing industrial units in West Bengal were not provided credit as liberally as were done in other States by the financial institutions and scheduled commercial banks. Though Kolkata is the biggest city in India its claim for having the head offices for financial institutions like LIC, IDB, ICIC, IFC, IRBI, SBI, UTI were denied. Most of the head offices of financial institutions are located in Bombay alone. The head office of the newly constituted EXIM Bank has also been set up in Bombay. The vocational advantages of the head quarters were absolutely enjoyed by Maharashtra, Gujarat and other Western States. The whole of Eastern Region is deprived of the type of credit facilities which are enjoyed by industrialists, traders, artisans in the States of the Western Region. The allegation that the all India financial institutions have not done justice to West Bengal can be established by concrete examples.

Table 2.10: State-wise Distribution of Letters (LI) and Industrial Licences (IL)

States	1975-76		1976-77		1977-78		1986	
	LI	IL	LI	IL	LI	IL	LI	IL
Maharashtra	163	243	125	148	127	127	173	96
Tamil Nadu	69	142	37	54	20	23	104	61
Gujarat	65	103	73	85	79	46	105	86
Karnataka	60	56	41	48	36	39	76	42
West Bengal	61	71	37	56	44	29	42	21

Source: Quarterly Bulletin of Statistics, Ministry of Industry, Government of India

Table 2.11: Credit Disbursements (Rs. in crores)

States	Disbursements		Per capita disbursements from 1969-70 to 1977-78	Upto March 1983
	1977-78	1969-70 to 1977-78		
Maharashtra	116.55	574.50	99	2442 (21)
Gujarat	89.05	322.38	103	1555 (12)
Tamil Nadu	55.59	299.38	66	1162 (10)
West Bengal	43.47	219.25	41	895 (8)

Figure in the bracket is the percentage of the total

In per capita disbursement of credit West Bengal's position is seventh after Gujarat, Maharashtra, Tamil Nadu, Haryana, Karnataka and Meghalaya.

Commercial banks' credit policy is also important to all states. For instance, from June, 1969 to December 1977, the scheduled commercial banks sanctioned credit to West Bengal to the tune of Rs. 1748 crores compared with Rs. 3359 crores to Maharashtra, Rs. 1380 crores to Tamil Nadu. Maharashtra got 22 per cent of the total credit and West Bengal 11.4 per cent. Relative credit position in 1984 was also dismal. Upto December 1984 commercial banks sanctioned Rs. 4332 crores to West Bengal against Rs. 12224 crores to Maharashtra.

Thus, it is proved that West Bengal has not got fair treatment from commercial banks also. West Bengal is always compared with Maharashtra, Gujarat, Tamil Nadu, Karnataka because these states are industrially developed. In population also West Bengal is far ahead of Tamil Nadu, Gujarat and Karnataka, inspite of that West Bengal has got less credit.

New entrepreneurs and industrialists face a lot of difficulties in securing raw materials in West Bengal. The distribution of the basic industrial inputs and raw materials are under the control of the Centre. Here also the Centre follows a different policy in the case of West Bengal.

Many of the cotton textile mills in West Bengal have been closed and the rest are sick. Many of the sick units have already been taken over by the National Textile Corporation. Cotton textile mills in West Bengal do not get cotton at reasonable price. West Bengal is deprived of the locational advantages of coal and steel. The prices of coal and steel are equalized throughout the country. But West Bengal's cotton mills are required to buy cotton at higher price. Cotton is mainly produced in Maharashtra and Gujarat, and the mills in these two States get cotton at cheaper price than those in Eastern Region, Particularly in West Bengal. Numerous examples can be given to prove that the Union Government does nothing for the industrial development of this State. The benefits of foreign collaborations and aids are hardly enjoyed by the people of this State.

The importance of Kolkata Port and Dum Dum Air Port has been deliberately reduced by shifting or withdrawing many of the international services from Kolkata. Even freight charges are higher from Kolkata Port and Dum Dum Air Port.

Since independence, there was practically no expansion of railways in West Bengal. Moreover, some railways had been abolished. Rail link is an important infrastructure for industrial development. Many of the districts of West Bengal are still inaccessible. Road links are not also much expanded. In other states, every district is well connected with State capital either by rails or roads. But roads in West Bengal are in a deplorable condition. Industrial development depends to a large extent on the infrastructural facilities. But West Bengal, excepting Kolkata, is backward in this respect.

2.4.3 MRTP Act and West Bengal Economy

The monopolies and Restrictive Trade Practices Act, 1969 identified 75 industrial houses in the country whose capital exceeded Rs. 20 crores. These large industrial houses were termed as Monopolists. The Government of India decided not to allow them to expand further. For historical reasons these monopoly houses dominated in West Bengal. The Central Government did not permit these big industries to invest further in this State. As a result of this policy industrial development in West Bengal halted. New entrepreneurs could not fill up the vacuum. What is astonishing is that the Union Government allowed these big industrial houses to expand their units or to establish new units in other States. But the provisions of MRTP Act were strictly translated into action in West Bengal. Shri Siddhartha Sankar Roy, the then Chief Minister of West Bengal, exercised his influence to relax some of the provisions of the MRTP Act in West Bengal in consideration of the near-stagnant economic situation in this State. Shri Roy placed that the purpose of MRTP ACT had not been served, new industries were not coming up. Hence, he requested the Union Government to relax a few provisions of the Act on merit. But the central Government did not pay heed to his words. To speak the truth, MRTP ACT is a curse to West Bengal. Halting of industrial growth to avoid concentration of economic power is a policy which is debatable. (Basu, 1989)

2.4.4 Harmful Trade Union

In West Bengal from the 1960's the trade Unions led by left parties began to dominate over others. All Trade Union movements in this State was politically motivated. Strike, go-slow, cease work, work to rule, gherao were very common. Labourers were made conscious of their rights, but they were ignorant of the senses of duty. 'Right implies duties' – without duty right became meaningless.

Trade Union did not perform their real functions. To speak the truth, the trade union did much harm to the labour community. Union leaders are generally outsiders. Hence, the interests of the trade union leaders do not coincide with that of the workers. So the trouble. Labourers are misinformed and misguided Union leaders are only interested in political gains. They do not bother for the welfare of the workers. In many cases trade union movements have been destructive. Strikes, lock-out, indiscipline have retarded growth. Owing to this labour unrest and militant role of the trade unions, many of the industrialists decided not to insert in West Bengal. They preferred other states where trade unions were not so turbulent.

In 1986 man days lost was 14835 thousand and men involved were 146 thousand. Man days lost for industrial dispute in West Bengal were the highest in the country.

In this atmosphere of mutual distrust among trade unions and their weakening bargaining power, the capitalist class is able to push through its agenda of economic reforms, knowing fully well the hard reality that unions will only bark and not bite. It is high time that the unions realize the prevailing social and economic scenario affected by the forces of globalization so as to bring about a change in their strategy, rather than getting sidelined by the state and capitalist class.

2.4.5 Naxalite Movement

Naxalite movement in West Bengal was another set back in the economic development especially in the industrial field. Indiscriminate killing of individual persons in the name of Maoism created a terror particularly among the business community and industrialists. There was serious law and order problem in the State. The investors were shaky. Inflow of capital was stopped and outflow started afresh. The administration was busy in curbing the activities of extremists and they could hardly think of economic development. This condition prevailed from 1969 to 1975. Sociologists and political thinkers believed that Naxalite movement was a corollary of regressive economic situation, unemployment and frustration among the youths. The movement subsided due to brutal police action on the Naxalites. But the state suffered in the economic front and it took several years to regain the confidence for safe investment (Basu, 1989).

2.4.6 Lack of Good Governance

The State Government has a bigger role in the industrial development of the State. But the Government of West Bengal is to a great extent responsible for the slow industrial growth rate (Basu, 1989). The state administration is very weak and government employees in concerned departments are passive. They do not take any initiative to accelerate the growth rate. The State Government blames the Centre for not clearing the applications from West Bengal for licence, but here in West Bengal also large number of applications lie with the Directorate of Small Scale Industries for registration and permit. Schemes for a small unit submitted with the Directorate for approval are delayed for months. The incentive schemes are paper policy only. In the practical field, none from the Government side comes forward for help. The State Government adopts dilly-dally tactics in the sanction and payment of 'Margin Money'. The SICOM in Maharashtra has been doing yeoman's service to the economy of the State by providing various types of incentives to medium and small sectors. The SICOM deals from ideas to implementations. It provides both 'financial' and 'result-oriented' services to the entrepreneurs. SICOM acts as a co-ordinating agent. On the initiative of the Chambers of Commerce of Kolkata a SICOM type organization i.e. SILPA was formed in West Bengal by the State Government but nobody is aware of its activities.

A few years ago, West Bengal Government planned to set up several industrial estates in some selected growth centres. The growth centres are in Asansol, Durgapur, Farakka, Kalyani, Haldia, Kharagpur, Santaldiha and Siliguri. But the government had done little for the development either of the growth centres or the industrial estates. In West Bengal the policy of setting up industrial estates is still a paper policy, nothing tangible has been done for the implementation of the policy (Basu, 1989). Thus, it is clear that there are severe disparities as measured by the various socio-economic variables among the districts of West Bengal. The most backward regions are those with the least urbanization.

CHAPTER 3

REGIONAL DISPARITIES IN AGRICULTURAL DEVELOPMENT

3.1 Introduction

Agriculture is a very important sector and backbone of the Indian economy and despite concerted industrialization in the last six decades, agriculture still occupies a place of pride. It contributes a sizable percentage to the domestic product as also to exports. More than two-thirds of the work-force is engaged in agriculture and large many depend upon it being engaged in trade in agricultural products, agro-based industries etc. Being the largest industry in the country, agriculture provides employment to around 60 per cent of the total work-force in the country. The significance of agriculture in the national economy can best explained by considering the role of agriculture under different heads as follows.

3.1.1 Share of Agriculture in the National Income

According to the Economic Survey 2003-04, between 1950-51 to 1960-61, the share of agriculture in GDP has been in the range of 55 to 52 per cent, though it was declining, but as the process of industrialization and economic growth gathered momentum, the share of agriculture indicated a sharp decline and reached a level of 22 per cent in 2003-04 and 20 per cent in 2006-07.

Comparison can be made between the positions of agriculture in India with that in the other countries as regards the share of agriculture in national income. In the United Kingdom and United States, only 2 to 3 per cent of the working population is engaged in agriculture; in France, the proportion is about 7 per cent; and in Australia, this is about 6 per cent.

It is only in backward and less developed countries that the working population engaged in agriculture is quite high. For instance, it is 35 per cent in Egypt, 59 per cent in Bangladesh, 50 per cent in Indonesia and 68 per cent in China. The more developed a country, the smaller is the share of agriculture in national output. India, having not yet reached the stage of an advanced economy, has an agricultural sector which is still the dominated one in the country.

3.1.2 Indian Agriculture and Pattern of Employment in the Country

Agriculture dominates the economy to such an extent that a very high proportion of working population in India is engaged in agriculture. Agriculture

provided employment to 98 million people in 1951; the number of people working on land (cultivators and agricultural labourers) increased to 235 million in 2001. In terms of percentage, however, people working on land came down from 70 to 59 during the five decades between 1951 and 2001.

The Tenth Plan (2002-07) estimates that the agricultural sector still provides employment to 57 per cent of India's work force and is the single largest private sector occupation. It is, however, really disturbing that the proportion of agricultural labourers has increased from 20 to 27 per cent between 1951 and 2001 but that of cultivators registered a decline from 50 per cent to 32 per cent. This shows clearly the growing pauperization of the rural peasantry.

3.1.3 Importance of Agriculture for Industrial Development

Indian agriculture has been the source of supply of raw materials to our leading industries. Cotton and jute textile industries, sugar, flour mills, vanaspati and plantations, all these depend on agriculture directly. There are many other industries which depend on agriculture in a direct manner. Many of our small-scale and cottage industries like handloom weaving, oil crushing, rice husking etc., depend upon agriculture for their raw materials, together they account for 50 per cent income generated in the manufacturing sector in India.

But then, in recent years, the significance of agriculture to industries is going down as many new industries have come up which are not dependent on agriculture. Under the Five Year Plans, iron and steel industry, chemicals, machine tools and other engineering industries, automobiles, information technology etc., have come up in big way.

However, in recent years, the importance of food processing industries is being increasingly recognized both for generation of income and for generation of employment.

3.1.4 Role of Agriculture in the Field of International Trade

Importance of Indian agriculture also arises from the role it plays in India's trade. Agricultural products—tea, sugar, oilseeds, tobacco, spices, etc. constituted the main items of exports of India. Broadly speaking, the proportion of agricultural goods which were exported came to 50 per cent of our exports, and manufactures with agricultural content (such goods as manufactured jute, cloth and sugar) contribute another 20 per cent or so; and the total comes to 70 per cent of India's exports in 1950-51. But with diversification of exports, especially

after the introduction of agricultural exports which were 18.5% in 1990-91 rose to 20.3% in 1996-97 and thereafter indicated a continuous decline and were of the order of only 10.8% in 2005-06.

3.1.5 Role of Agriculture Sector in Economic Planning

Importance of agriculture in the national economy is indicated by many facts. For example, agriculture is the main support for India's transport systems, secure bulk of their business from the movement of agricultural good. Internal trade is mostly in agricultural products.

Further, good crops implying large purchasing power with the farmers lead to greater demand for manufactures and, therefore, better prices. In other words, prosperity of the farmers is also the prosperity of industries. Likewise, bad crops lead to a depression in business. Generally, it is the failure in the agricultural front that has led to failure of economic planning in particular periods.

Agricultural growth has direct impact on poverty eradication. It is also an important factor in containing inflation, raising agricultural wages and for employment generation.

Besides, the allied sectors like horticulture, animal husbandry, dairy and fisheries have an important role in improving the overall economic conditions and health and nutrition of the rural masses. To maintain the ecological balance, there is need for sustainable and balanced development of both agriculture and the allied sector. The Tenth Plan—in fact, every one of the Five Year Plans—brought out the crucial role of the agricultural sector in enabling the widest dispersal of economic benefits and emphasized that "agricultural development is central to economic development of the country".

3.2 Importance of the Agriculture Sector in West Bengal Economy

Total employment in the state increased at compound annual rate of 3.34%. Employment in rural areas increased at a compound annual rate of 3.33% and in urban areas by 3.55%.

In the agriculture sector (agriculture includes animal husbandry, fishery, forestry and allied activities), the growth in employment in the rural areas was an impressive 3.05% per annum. Although agriculture in the urban areas is not significant, growth of employment in the sector was 2.13% per annum. The annual growth rate of total employment (rural + urban) in the agriculture sector was 3.03% (Economic Review, 2006-2007, p.205)

3.2.1 Present Agrarian Scenario in West Bengal

West Bengal has projected population of 8.92 crore on 01.01.2005 of which 6.33 crore (71%) reside in rural areas. The availability of land per person in West Bengal has been abysmally low and declining very fast over the years. The gross cropped area per rural person in West Bengal in 2002-2003 has been only 0.39 acre as against 0.62 acre in all-India. Further, according to the NSSO 59th Round landholdings survey, the average size of operational holdings in West Bengal in 2002-03 has been only 1.10 acres as against 2.63 acres in all-India. All these figures clearly indicate that rural West Bengal has to withstand a very high pressure of population.

3.2.2 Recent Performance of Agriculture in West Bengal

A great deal of discussion has taken place in recent years on the issue of production performance of agriculture in West Bengal. In a pioneering study, Boyce (1987) observed that the exponential growth rate of total agricultural output in West Bengal was 1.74 per cent per annum during the period 1949 to 1980 which was lower than population growth rate. However, since early 1980s, the situation changed dramatically so much so that the rate of growth of agricultural output far exceeded the growth rate of population in West Bengal. As reported by the CMIE (1993), the rate of growth of agricultural production in the states of eastern India increased rapidly during 1980s and the fastest growth has been recorded in West Bengal, particularly with regard to the foodgrains production (growing by 6.5 per cent per annum during 1981-82 to 1991-92, while the all-India average was only 2.7 per cent per annum). Saha and Swaminathan (1994) further reported that for the period 1981-82 to 1990-91, the exponential growth rate of all-crop production for West Bengal was 6.4 per cent per annum. Sanyal, Biswas and Bardhan (1998) maintained that the period of stagnation in West Bengal agriculture has come to an end under the Left Front Government rule. They observed that annual exponential growth rate of all crops production in West Bengal during 1977-78 to 1995-96 was 4.1 per cent, which exceeded the growth rate of production.

To understand the current scenarios, let us have a look at the performance of agriculture in West Bengal vis-à-vis all-India covering a wider period, from 1980-81 to 2004-05. The following three points are worth mentioning in this context.

1. During 1980-81 to 1992-93, the annual growth rate of foodgrains production in West Bengal was 4.99 per cent, which was far greater than the growth rate observed for all-India (2.88 per cent). During the same period, the annual growth rate of rice production was as high as 5.53 per cent in West Bengal as against 3.58 per cent for all-India. Even for commercial crops such as Jute and Potatoes, West Bengal recorded high growth rate of production during this period.
2. Both in West Bengal and all-India, the growth rate of foodgrains production decelerated significantly during 1993-94 to 1999-2000. During this period, annual growth rates of foodgrains production in West Bengal and all-India have been 2.45 and 2.06 per cent respectively. It is important to note that not only the annual growth tare of foodgrains production in West Bengal has been higher than the same for all-India in the early years of economic reforms, but also the growth rate of foodgrains production exceeded the growth rate of population during this period.
3. The situation changed drastically after 1999-2000 as far as agricultural performance in all-India is concerned. During 1999-2000 to 2004-2005 (more matured phase of economic reforms), the growth rate of foodgrains production at the all-India level became negative (-0.23 per cent per annum) while population grew at the rate of 1.96 per cent per annum. This is where the country got trapped in an 'agrarian crisis'. On the other hand, in West Bengal, foodgrains production grew at the rate of 2.06 per cent per annum even during this phase of agrarian crisis which was again higher than population growth rate. The overall picture obtaining in West Bengal during 1999-2000 to 2004-05 appear to be quite satisfactory, particularly with regards to growth rate of foodgrains production, when agriculture in many states as well as all-India suffered a set back.

Nevertheless, one might ask to what extent good agricultural performance in West Bengal could be sustained in future. It is also important to identify the areas for important so that the current growth momentum could be sustained and bettered. To this end, let us concentrate on a few indicators relating to the pattern of adoption of agricultural technology in West Bengal. The important points are as follows.

1. There is indeed scope for raising cropping intensity in West Bengal through increase in irrigation. In 2002-03, about 52% of gross cropped areas were irrigated and the cropping intensity stood at 1.78, which was lower than Punjab, the highest performing state in this respect.
2. There also exists a yield-gap for rice / foodgrains, which becomes apparent through a comparison with the best performing state, namely Punjab. The yield of foodgrains in West Bengal is about 2374 kgs / ha. this is 61% less than the same in Punjab. Similarly, the yield of rice (2463 kgs / ha.) fell short by 43% compared with Punjab. It seems that with appropriate interventions, the state could enhance the yield levels for rice / foodgrains further. However, it also needs to be emphasized that as 85% of Aman rice area and 100% of Boro rice area are already under HYVs, for yield enhancement, it would perhaps be necessary to develop new and improved seed varieties of rice which would be suitable to the local agro-climatic conditions.
3. To enhance the pace of agricultural diversification in West Bengal, it would be necessary to improve, among others, the storage and marketing infrastructures. Another very important intervention needed is that of expanding the flow of institutional credit. Accordingly, West Bengal lagged far behind all-India as well as the highest performing state with regard to institutional banking support provided to agriculture. Even in the mater of co-operative credit, West Bengal stands way behind Maharashtra where credit flow per hectare from co-operatives has been the highest in India (Bhaumik, 2007).

It clearly emerges that agriculture still has something to contribute in the process of future economic development in West Bengal, particularly in terms of employment generation and poverty reduction in rural areas. Therefore, following the objective set for the Eleventh Five Year Plan, the state should devise its region-specific policies to accelerate the pace of agricultural development. As more than 60 per cent of rural workers are still dependent on agriculture and it continued to absorb a good majority of incremental workers even during recent years of economic reforms, its importance in the economy of West Bengal could not be dismissed at least in the short to medium term.

As is evident from above the agricultural sector is a prime sector of the economy of West Bengal where expansion of industrial sector is limited due to many constraints. The study of the relationship between value of agricultural produce per hectare of net area sown and agricultural values are relevant and significant to find out the roots to pace of agricultural development. There is the coexistence of developed and developing districts in West Bengal. The changing pattern of association of agricultural development indicators for the decadal year of 1980-81, 1990-91 and 2000-2001 has been analyzed in this chapter. Some ten (10) variables have been identified at district level in West Bengal to analyze the level of agricultural development. The Principal Component Analysis (PCA) and Factor Analysis (FA) (Rotated Factor Matrix / Kaiser Varimax Method) techniques have been used for the analysis.

The relative importance of the agriculture sector in the economy of different districts of West Bengal can be understood from the Table 3.1 below. We have presented the percentage share of agriculture in DDP over the period 1980-81, 1990-91 and 2000-2001 is calculated district-wise and presented in Table 3.1.

Table 3.1: Share of Agriculture Sector (percentage) in DDP

Districts	1980-1981	1990-1991	2000-2001
Burdwan	31.36	27.61	20.68
Birbhum	53.78	42.28	35.10
Bankura	55.14	42.97	36.15
Midnapore	47.14	30.70	30.79
Howrah	8.06	8.96	10.61
Hooghly	30.04	29.00	22.90
24 Parganas (N)	15.73	19.64	16.87
24 Parganas (S)	17.78	23.96	18.61
Nadia	40.35	41.04	35.59
Murshidabad	46.86	37.39	32.36
Malda	49.34	41.32	41.60
Uttar Dinajpur	63.06	26.63	41.29
Dakshin Dinajpur	63.05	18.51	44.20
Jalpaiguri	36.52	40.49	33.96
Darjeeling	9.98	32.66	29.71
Cooch Behar	54.20	44.41	44.27
Purulia	38.70	28.28	24.90
Kolkata	0.00	0.34	0.32
West Bengal	27.84	27.18	24.182

Source: Statistical Abstract, the Bureau of Applied Economics and Statistics, GoWB (various years)

Kolkata's position in respect of other districts is more or less the lowest because of its metropolitan character. The contribution of agriculture to DDP was the maximum in Uttar Dinajpur district in the year 1980-81; where as its contribution to DDP of Cooch Behar district (44.41 and 44.27) was more consistent than the other districts in the year 1990-91 and 2000-01. Dakshin Dinajpur consistently occupies the second position in the year 1980-81 and 2000-01 and in the lower echelon the position of the Howrah district remains unchanged among the benchmark years. In West Bengal, percentage share of agriculture in DDP is 27.84, 27.18, and 24.18 in the three points of time.

3.3 Indicators of Agriculture Development

As a matter of fact, determination of the validity of the indicators is one of the crucial problems in social science research because of its selection being quite difficult. In spite of knowing very well the importance of this major problem, efforts have been made to provide rationale for selecting the indicators and giving empirical content to various concepts used to measure and analyze the level of development of different districts.

We have used the following indicators *(see in Appendix to chapter-3)* of agricultural development in order to make a comparative study of agricultural development in the 18 districts of West Bengal.

A-1: Gross value of agricultural produce per hectare of net area sown;

A-2: Gross value of agricultural produce per capita of rural population;

A-3: Gross value of agricultural produce per agricultural worker;

A-4: Percentage of area under commercial crops to gross cropped area;

A-5: Percentage of net area sown to total geographical area;

A-6: Cropping intensity;

A-7: Percentage of agricultural workers to total (main) workers;

A-8: Credit to agriculture (Rs. Per Capita);

A-9: Consumption of fertilizer per hectare of gross cropped area;

A-10: Average size of holding.

3.3.1 Rationale for the Choice of Indicators of Agricultural Development

The first three indicators A-1, A-2 and A-3 have been selected to exhibit the overall performance of agriculture in terms of agriculture productivity, labour productivity and availability of agricultural produce for consumption of the

population, besides showing the effects of all technological inputs on land. West Bengal has enough potential for horticulture development; as such A-4 has been selected to assess the horticultural development. It reveals the level of diversification within agricultural sector from foodgrain production to commercial crops in terms of percentage of area under commercial crops. Net area under agricultural use has been evaluated with the help of A-5 and the intensity of cropping A-6, is measured through the ratio of gross to net cropped area, which shows the rate of utilization of net area under cultivation in different districts and enlightens on the scope of bringing additional area under multiple cropping. Indicator A-7 has been selected to assess the labour absorption situation in agriculture. Indicator A-8 includes credit to agriculture which obviously lead to increase in the productivity of the farm sector. Modernization and commercialization of agriculture sector have been examined with the help of A-9 and A-10, which indicates consumption of fertilizers for increasing the productivity of land. With the help of this indicator, modernization of agriculture sector can be evaluated at the district level.

3.3.2 District-wise Agricultural Development: Indicator-wise Assessment

Inter-District Disparities in terms of the Indicator of Agricultural Development

West Bengal agriculture has occupied around 3 per cent of India's productive land. More than 8 percent of India's foods are being generated by the agricultural sector of West Bengal. Small and marginal farmers rule over the West Bengal agriculture and cultivate more than 68 per cent of the total area. The agriculture in West Bengal is one of the most significant means to earn livelihood especially in the rural sectors. This has been enabled by various schemes of the Green Revolution and the land reforms. West Bengal comprises of 8 per cent of India's population and the majority of them are engaged in farming and others agricultural activities (*http://business.mapsofindia.com*).

Therefore, agriculture, being the main occupation of the people of West Bengal, has an important role to play in the economy of the state. In order to study indicator-wise level of agricultural development, districts have been classified into two categories, viz. developed and developing (or less developed), according to the level of development in relation to state average with reference to different indicators of agricultural development for the years 1980-81, 1990-91 and 2000-01.

The classification of districts according to their respective level of development with respect to different indicators of agricultural development is shown in Tables 3.2, 3.3 and 3.4 for the benchmark years 1980-81, 1990-91 and 2000-01 respectively.

Table 3.2: Distribution of Districts by Relative Levels of Socio-economic Development in West Bengal 1980- 81

Sl. No.	*Indicators*	*State Average*	*Developed Districts*	*Developing Districts*
			Agriculture Sector	
1	Gross value of agricultural produce per hectare of net area sown	4454.46 (Rs.)	Hooghly, Burdwan 24 Parganas (N), Howrah, Darjeeling, Birbhum, Bankura, Nadia, Midnapore, Murshidabad, Dakshin Dinajpur	Cooch Behar, Malda, Purulia, Uttar Dinajpur, 24 Parganas (S), Jalpaiguri, Kolkata
2	Gross value of agricultural produce per capita of rural population	617.34 (Rs.)	Burdwan, Dakshin Dinajpur, Birbhum, Hooghly Bankura, Uttar Dinajpur, 24 Parganas (N), Cooch Behar	Purulia, Nadia, Midnapore, Malda, Jalpaiguri, Murshidabad, Howrah, 24 Parganas (S), Darjeeling, Kolkata
3	Gross value of agricultural produce per agricultural workers	6155.55 (Rs.)	Jalpaiguri, Dakshin Dinajpur, Burdwan, Hooghly, Birbhum, Bankura, Darjeeling, Cooch Behar, Purulia, 24 Parganas (N), Midnapore	Nadia, Uttar Dinajpur, Malda, Murshidabad, Howrah, 24 Parganas (S), Kolkata
4	Percentage of area under commercial crops to gross cropped area	14.971 (in hectare)	Jalpaiguri, Nadia, Darjeeling, Cooch Behar, Uttar Dinajpur, Hooghly, Murshidabad, Dakshin Dinajpur	Malda, Burdwan, Howrah, Bankura, Birbhum, Midnapore, 24 Parganas (N), Purulia, 24 Parganas (S), Kolkata
5	Percentage of Net Area Sown to Total Geographical Area	62.380 (in hectare)	Uttar Dinajpur, Dakshin Dinajpur, Nadia, Murshidabad, Cooch Behar, Malda, Birbhum, Hooghly, 24 Parganas (N), Burdwan, Howrah	Midnapore, Jalpaiguri, Bankura, Purulia, 24 Parganas (S), Darjeeling, Kolkata
6	Cropping Intensity	140.237	Darjeeling, Nadia, Uttar Dinajpur, Murshidabad, Hooghly, Cooch Behar, 24 Parganas (N), Burdwan	Malda, Dakshin Dinajpur, Howrah, Birbhum, Midnapore, Bankura, Jalpaiguri, 24 Parganas (S), Purulia, Kolkata
7	Percentage of Agricultural workers	25.866	Birbhum, Uttar Dinajpur, Bankura, Malda,	Purulia, 24 Parganas (N), Jalpaiguri, Howrah,

	to total (main) workers		Murshidabad, Dakshin Dinajpur, Midnapore, Burdwan, 24 Parganas (S), Nadia, Hooghly, Cooch Behar	Darjeeling, Kolkata
8	Credit to Agriculture (Rs. Per Capita)	25.914	Darjeeling, Jalpaiguri, Hooghly, Nadia	Malda, Murshidabad, Burdwan, Birbhum, Cooch Behar, 24 Parganas (N), 24 Parganas (S), Bankura, Uttar Dinajpur, Midnapore, Dakshin Dinajpur, Purulia, Howrah, Kolkata
9	Consumption of fertilizer per hectare of gross cropped area	35.67 (Kg.)	Howrah, Hooghly, Burdwan, Nadia, Birbhum, 24 Parganas (N)	Murshidabad, Malda, Midnapore, Uttar Dinajpur, 24 Parganas (S), Darjeeling, Purulia, Dakshin Dinajpur, Cooch Behar, Jalpaiguri, Bankura, Kolkata
10	Average size of holdings (in hectare)	0.947	Darjeeling, Jalpaiguri, Burdwan, Birbhum Purulia, Bankura, Cooch Behar, Nadia	Murshidabad, Malda, Midnapore, Hooghly, 24 Parganas (N), 24 Parganas (S), Uttar Dinajpur, Howrah Dakshin Dinajpur, Kolkata

It may be observed from the Table 3.2 above that majority of the districts fall in the developed category in the matter of value of agricultural produce per hectare of net area sown. The seven districts, namely, Cooch Behar, Malda, Purulia, Uttar Dinajpur, 24 Parganas (S), Jalpaiguri and Kolkata, however, lagged in this respect during the year 1980-81 due to metropolitan characteristics. After one decade, minor reshuffle took place in the placement of districts. For example, Cooch Behar district emerged as developed district in 1990-91 in this respect. In the matter of another indicator, i.e., value of agricultural produce per capita of rural population, Darjeeling, Jalpaiguri and Nadia districts emerged as reasonably developed, during the period of 1990-91. Again, in the matter of another indicator— gross value of agricultural produce per agricultural workers, majority of the districts fall in the developed category but minor reshuffle took place in the placement of districts, viz., Kolkata and Nadia emerged as developed category. But in the indicator of credit to agriculture, positions of some districts have drastically changed, i.e., emerged from developing to developed districts, viz., Uttar Dinajpur, Dakshin Dinajpur, Midnapore, Birbhum and Burdwan.

As revealed by Table 3.3 and Table 3.4, Darjeeling, Jalpaiguri, Cooch Behar, and Nadia are fairly developed in respect of first three indicators, which represent overall performance of agriculture in the year 1990-91. In the indicator of percentage of area under commercial crops to gross cropped area, Nadia, Murshidabad, Cooch Behar, Uttar Dinajpur, Darjeeling, 24 Parganas (N) and Burdwan districts fall in category of developed districts, which stand for diversification within agriculture from food grain to commercial crops area and also show efficiency of farm management. In the aspect of two indicators, viz., percentage of net area sown to total geographical area and cropping intensity, Uttar Dinajpur, Nadia, Murshidabad, Cooch Behar, 24 Parganas (N), and Burdwan districts are placed above the state average in respect of these indicators, which indicates that the rate of utilization of net area under cultivation in these districts is reasonably high. Eleven districts, viz., Uttar Dinajpur, Birbhum, Dakshin Dinajpur, Purulia, Bankura, Midnapore, Malda, Burdwan, Cooch Behar, Murshidabad and 24 Parganas (S) are placed in the developed category in respect of the indicator percentage of agricultural workers to total (main) workers which indicates that degree of concentration of agricultural activities was rather high in the year 1990-91 and 2000-01, in these districts.

Table 3.3: Distribution of Districts by Relative Levels of Socio-economic Development in West Bengal 1990-91

Sl. No.	*Indicators*	*State Average*	*Developed Districts*	*Developing Districts*
			Agriculture Sector	
1	Gross value of agricultural produce per hectare of net area sown	7192.69 (Rs.)	Hooghly, 24 Parganas (N), Nadia, Burdwan, Howrah, Murshidabad, Darjeeling, Cooch Behar	Malda, Jalpaiguri, Bankura, Dakshin Dinajpur, Midnapore, Birbhum, Uttar Dinajpur, 24 Parganas (S), Purulia, Kolkata
2	Gross value of agricultural produce per capita of rural population	782.95 (Rs.)	Darjeeling, Burdwan, Hooghly, Dakshin Dinajpur, Jalpaiguri, Bankura, Nadia, Cooch Behar, Birbhum	24 Parganas (N),Uttar Dinajpur, Murshidabad, Malda, Midnapore, Purulia, Howrah, 24 Parganas (S), Kolkata
3	Gross value of agricultural produce per agricultural workers	9150.00 (Rs.)	Darjeeling, Kolkata, Jalpaiguri, Cooch Behar, Nadia	Hooghly, Bankura, 24 Parganas (N), Midnapore, Dakshin Dinajpur, Murshidabad, Burdwan, Birbhum, Malda, Uttar Dinajpur, Purulia, Howrah, 24 Parganas (S)

4	Percentage of area under commercial crops to gross cropped area	15.152 (In hectare)	Jalpaiguri, Hooghly, Nadia, Murshidabad, Cooch Behar, Uttar Dinajpur, Darjeeling, 24 Parganas (N), Burdwan	Malda, Dakshin Dinajpur, Birbhum, Bankura, Midnapore, Howrah, 24 Parganas (S), Purulia, Kolkata
5	Percentage of Net Area Sown to Total Geographical Area	60.891 (In hectare)	Uttar Dinajpur, Dakshin Dinajpur, Murshidabad, Birbhum, Nadia, Cooch Behar, Hooghly, 24 Parganas (N), Malda, Burdwan,	Midnapore, Howrah, , Bankura, Jalpaiguri, Purulia, Darjeeling, 24 Parganas (S), Kolkata
6	Cropping Intensity	153.540	Darjeeling, Nadia, Uttar Dinajpur, Murshidabad, Hooghly, Cooch Behar, 24 Parganas (N), Burdwan	Malda, Dakshin Dinajpur, Howrah, Birbhum, Midnapore, Bankura, Jalpaiguri, 24 Parganas (S), Purulia, Kolkata
7	Percentage of Agricultural workers to total (main) workers	25.406	Birbhum, Uttar Dinajpur, Malda, Bankura, Dakshin Dinajpur, Burdwan, 24 Parganas (S), Murshidabad, Nadia, Hooghly, Cooch Behar, Purulia, Midnapore	24 Parganas (N), Jalpaiguri, Howrah, Darjeeling, Kolkata
8	Credit to Agriculture (Rs. Per Capita)	83.000	Uttar Dinajpur, Dakshin Dinajpur, Midnapore, Darjeeling, Birbhum, Hooghly, Nadia, Burdwan,	Malda, Bankura, Murshidabad, Jalpaiguri, Cooch Behar, Howrah, Purulia, 24 Parganas (N), 24 Parganas (S), Kolkata
9	Consumption of fertilizer per hectare of gross cropped area	84.56 (Kg)	Howrah, Hooghly, Birbhum, 24 Parganas (N), Malda, Darjeeling,	Nadia, Purulia, Murshidabad, Cooch Behar, Midnapore, Uttar Dinajpur, Bankura, 24 Parganas (S), Jalpaiguri, Burdwan, Dakshin Dinajpur, Kolkata
10	Average size of holdings (in hectare)	0.893	Darjeeling, Jalpaiguri, Burdwan, Birbhum Bankura, Purulia, Cooch Behar, Nadia	Malda, Murshidabad, Midnapore, Hooghly, 24 Parganas (S), 24Pargana(N), Uttar Dinajpur, Dakshin Dinajpur, Howrah, Kolkata

Table 3.4: Distribution of Districts by Relative Levels of Socio-economic Development in West Bengal 2000-01

Sl. No.	*Indicators*	*State Average*	*Developed Districts*	*Developing Districts*
			Agriculture Sector	
1	Gross value of agricultural produce per	34523.73 (Rs.)	Howrah, Hooghly, Nadia, Malda, 24 Parganas (N), Murshidabad,	Midnapore, Cooch Behar, Bankura, Dakshin Dinajpur, Jalpaiguri, 24 Parganas (S),

	hectare of net area sown		Darjeeling, Burdwan,	Uttar Dinajpur, Birbhum, Purulia, Kolkata
2	Gross value of agricultural produce per capita of rural population	3199.49 (Rs.)	Darjeeling, Dakshin Dinajpur, Nadia, Burdwan, Hooghly, Jalpaiguri, Cooch Behar, Bankura, Malda, Midnapore, Uttar Dinajpur	24 Parganas (N),Murshidabad, Birbhum, Howrah, Purulia, 24 Parganas (S), Kolkata
3	Gross value of agricultural produce per agricultural workers	32100.00 (Rs.)	Darjeeling, Kolkata, Jalpaiguri, Nadia, Howrah	24 Parganas (N), Cooch Behar, Hooghly, Murshidabad, Malda, Dakshin Dinajpur, Midnapore, Burdwan, Bankura, Birbhum, Uttar Dinajpur, 24 Parganas (S), Purulia,
4	Percentage of area under commercial crops to gross cropped area	17.349 (in hectare)	Hooghly, Nadia, Murshidabad, Jalpaiguri, Cooch Behar, Uttar Dinajpur, 24 Parganas (N)	Darjeeling, Malda, Dakshin Dinajpur, Burdwan, Howrah, Birbhum, Midnapore, 24 Parganas (S), Bankura, Purulia, Kolkata
5	Percentage of Net Area Sown to Total Geographical Area	60.906 (in hectare)	Uttar Dinajpur, Dakshin Dinajpur, Cooch Behar, Nadia, Birbhum, Murshidabad, Hooghly, Burdwan, 24 Parganas (N), Midnapore,	Malda, Howrah, Jalpaiguri, Bankura, Purulia, Darjeeling, 24 Parganas (S), Kolkata
6	Cropping Intensity	160.673	Darjeeling, Nadia, 24 Parganas (N), Murshidabad, Cooch Behar, Howrah, Uttar Dinajpur, Hooghly, Jalpaiguri, Burdwan, Midnapore	Dakshin Dinajpur, Bankura, 24 Parganas (S), Darjeeling, Birbhum, Purulia, Kolkata
7	Percentage of Agricultural workers to total (main) workers	25.538	Uttar Dinajpur, Birbhum, Dakshin Dinajpur, Purulia, Bankura, Midnapore, Malda, Burdwan, Cooch Behar, Murshidabad, 24 Parganas (S)	Hooghly, Nadia, Jalpaiguri, 24 Parganas (N), Darjeeling, Howrah, Kolkata
8	Credit to Agriculture (Rs. Per Capita)	97.000	Darjeeling, Birbhum, Hooghly, Midnapore, Burdwan, Nadia, Bankura, Malda, Cooch Behar	Murshidabad, 24 Parganas (N), 24 Parganas (S), Jalpaiguri, Purulia, Howrah, Uttar Dinajpur, Dakshin Dinajpur, Kolkata
9	Consumption of fertilizer per hectare of gross cropped area	127.91 (Kg)	Howrah, Hooghly, Darjeeling, Burdwan, Purulia, Birbhum	24 Parganas (N), 24 Parganas (S), Cooch Behar, Midnapore, Bankura, Jalpaiguri, Malda, Uttar Dinajpur, Nadia, Murshidabad, Dakshin Dinajpur,

				Kolkata
10	Average size of holdings (in hectare)	0.785	Darjeeling, Jalpaiguri, Birbhum, Bankura, Burdwan, Cooch Behar, Nadia, Purulia, Malda	Murshidabad, 24 Parganas (N), Hooghly, Midnapore, 24 Parganas (S), Uttar Dinajpur, Howrah, Dakshin Dinajpur, Kolkata

Indicator 8, in the year 1990-91 and 2000-01 although some districts are reshuffled, viz. Uttar Dinajpur, Dakshin Dinajpur, Malda, Bankura and other districts remain the same positioned in respect of credit to agriculture (Rs. Per capita) these districts are Darjeeling, Birbhum, Hooghly, Midnapore, Burdwan, Nadia, which improve is an outcome of utilization of several inputs like improved seeds, fertilizer and this shows the extent of modernization of agriculture in these districts. Being an agricultural state, average size of holdings is an important indicator in the aspect of agricultural development, viz. Darjeeling, Jalpaiguri, Birbhum, Bankura, Burdwan, Cooch Behar, Nadia, Purulia and Malda districts are above in the state average which indicates that, capability of land holding are high in comparison of other districts in the year 1990-91 and 2000-01.

Table 3.5: Indicator-wise Coefficient of Variation (%)

Sl. No.	Indicators	1980-81	1990-91	2000-01
1	Gross value of agricultural produce per hectare of net area sown	43.05	41.00	40.15
2	Gross value of agricultural produce per capita of rural population	40.50	36.38	34.05
3	Gross value of agricultural produce per agricultural worker	31.57	48.02	56.88
4	Percentage of area under commercial crops to gross cropped area	70.21	57.08	64.19
5	Percentage of net area sown to total geographical area	37.16	30.44	32.89
6	Cropping intensity	39.15	31.62	30.89
7	Percentage of agricultural workers to total (main) workers	38.96	37.40	42.05
8	Credit to Agriculture (Rs. Per Capita)	121.49	64.68	47.16
9	Consumption of fertilizer per hectare of gross cropped area	80.56	61.02	59.77
10	Average size of holdings	48.82	49.86	44.76
Source: Authors Calculation				

Inter-districts variations have been examined with the help of the co-efficient of variation at three points of time as depicted in Table 3.5. The analysis of trends in the inter-district variation presents a mixed picture as the value of the

co-efficient of variation suggests. Disparities in most of the indicators remain wide in spite of the planned efforts to reduce them. Disparities as per the gross value of agricultural produce per hectare of net area sown, agricultural produce per capita of rural population, cropping intensity, credit to agriculture and consumption of fertilizer per hectare of gross cropped area have shown declining trend.

On the other hand, the disparities with respect to the indicator like, gross value of agricultural produce per agricultural workers shown a rising trend between 1980-81 and 2000-01. In the case of indicator average size of holding has increased slightly between1980-81and 1990-91 but declined in 2000-01.

3.3.3 District-wise Composite Indices of Agriculture Development:

District-wise Analysis of the Level of Agricultural Development

District-wise level of agricultural development has been analyzed with the help of composite indices of agricultural development. These indices have been calculated by taking first principal component from the principal component matrix derived from the inter-correlation matrix of 10 (ten) variables.

The inter-correlation matrices of the selected 10 variables of agricultural development separately for the years 1980-81, 1990-91 and 2000-01 are given in Tables 3.6, 3.7 and 3.8 respectively.

It may be observed from Table 3.6 that the value of agricultural produce per hectare of net area sown is positively and significantly correlated with value of agricultural produce per capita of rural population, cropping intensity and consumption of fertilizer per hectare of gross cropped area.

Correspondingly, Table 3.7 reveals that value of agricultural produce per hectare of net area sown is significantly and positively correlated with value of agricultural produce per capita of rural population, percentage of area under commercial crops to gross cropped area, percentage of net area sown to total geographical area, cropping intensity and consumption of fertilizer per hectare of gross cropped area.

Inter-correlation matrix of 2000-01, Table 3.8 depicts that value of agricultural produce per hectare of net area sown is significantly and positively associated with gross value of agricultural produce per capita of rural population, percentage of area under commercial crops to gross cropped area, percentage of net area sown to total geographical area, cropping intensity and consumption of

fertilizer per hectare of gross cropped area. Obviously, this correlation matrix does not represent a clear-cut picture.

Table 3.6: Inter-Correlation Matrix of Agriculture Development (1980-81)

Variable Number	A - 1	A - 2	A - 3	A - 4	A – 5	A – 6	A - 7	A - 8	A - 9	A -10
A - 1	1.000									
A - 2	0.613	1.000								
A - 3	0.242	0.627	1.000							
A - 4	0.168	0.134	0.279	1.000						
A - 5	0.401	0.712	0.033	0.328	1.000					
A - 6	0.489	0.201	0.111	0.616	0.166	1.000				
A - 7	0.254	0.725	-0.100	0.057	0.749	0.098	1.000			
A - 8	0.096	-0.138	0.386	0.667	-0.259	0.607	-0.350	1.000		
A - 9	0.744	0.200	-0.200	0.102	0.331	0.209	0.044	-0.068	1.000	
A - 10	0.210	0.128	0.423	0.476	-0.143	0.703	-0.027	0.816	-0.124	1.000

Note: Critical value of r at 10 percent level = 0.497
Critical value of r at 5 percent level = 0.576
Critical value of r at 1 percent level = 0.714

Table 3.7: Inter-Correlation Matrix of Agriculture Development (1990-91)

Variable number	A - 1	A - 2	A - 3	A - 4	A – 5	A – 6	A - 7	A - 8	A - 9	A -10
A - 1	1.000									
A - 2	0.615	1.000								
A - 3	-0.223	0.014	1.000							
A - 4	0.672	0.719	0.171	1.000						
A - 5	0.598	0.673	-0.588	0.548	1.000					
A - 6	0.804	0.527	-0.538	0.590	0.828	1.000				
A - 7	0.204	0.466	-0.723	0.168	0.751	0.522	1.000			
A - 8	0.114	0.546	-0.087	0.347	0.536	0.311	0.491	1.000		
A - 9	0.600	0.031	-0.371	0.097	0.313	0.578	-0.006	-0.049	1.000	
A - 10	0.213	0.654	0.318	0.437	0.140	0.134	0.063	0.194	-0.038	1.000

Note: Critical value of r at 10 percent level = 0.497
Critical value of r at 5 percent level = 0.576
Critical value of r at 1 percent level = 0.714

Table 3.8: Inter-Correlation Matrix of Agriculture Development (2000-01)

Variable number	A - 1	A - 2	A - 3	A - 4	A – 5	A – 6	A - 7	A - 8	A - 9	A -10
A - 1	1.000									
A - 2	0.570	1.000								
A - 3	-0.033	0.070	1.000							
A - 4	0.617	0.540	0.054	1.000						
A - 5	0.498	0.679	-0.484	0.615	1.000					
A - 6	0.829	0.679	-0.297	0.683	0.777	1.000				
A - 7	-0.060	0.356	-0.761	-0.005	0.644	0.316	1.000			
A - 8	0.421	0.585	0.093	0.254	0.293	0.343	0.209	1.000		
A - 9	0.559	0.109	-0.066	0.110	0.162	0.256	-0.149	0.328	1.000	
A - 10	0.207	0.637	0.258	0.179	0.161	0.275	0.140	0.726	0.148	1.000

Note: Critical value of r at 10 percent level = 0.497
Critical value of r at 5 percent level = 0.576
Critical value of r at 1 percent level = 0.714

Hence, from this inter-correlation matrix (Table 3.6), a matrix of Principal Components (PCs) has been derived as per the procedure explained in *Methodology* for the year 1980-81 which is presented in Table 3.9. In the same way, Principal Component matrices for the years 1990-91 and 2000-01 have also been derived and presented in Tables 3.10 and 3.11 respectively.

It may be observed from Table 3.9 that the principal component matrix has retain four principal components, which taken together, explains 88.85 per cent of the total variance. Four principal indicators are significantly correlated with the first principal component (*a'; s> or* =0.576 is significant for 10 degrees of freedom at 5 per cent level of significance). It explained 38.53 per cent of the total variance.

As is obvious from the last column of Table 3.9, all the communalities (h^2) are very high ranging from +0.69 to +0.98, which indicates that each variable taken for analysis is significantly correlated with all other variables.

Table 3.9: Principal Component Matrix of Agricultural Development (1980-81)

Variable	P_1	P_2	P_3	P_4	h^2
1	-0.044	0.716	-0.615	-0.234	0.947
2	-0.489	0.760	0.339	-0.216	0.979
3	0.255	0.735	0.473	-0.287	0.911
4	0.535	0.358	0.163	0.724	0.965
5	-0.702	0.359	0.139	0.540	0.932
6	0.758	0.200	-0.169	0.217	0.691
7	-0.735	0.072	0.424	0.132	0.743
8	0.930	0.162	0.107	0.095	0.912
9	-0.163	0.363	-0.864	0.117	0.919
10	0.873	0.099	0.261	-0.215	0.886
Eigenvalue	*3.853*	*2.099*	*1.799*	*1.134*	
Percentage Variance	*38.530*	*20.991*	*17.985*	*11.339*	
Cumulative Variance (%)	*38.530*	*59.522*	*77.507*	*88.846*	

The selected indicators were, by and large, correlated with each other in the reference years, i.e. 1980-81, 1990-91 and 2000-01, and in most of the cases the correlation was significant as well. The first principal component explained 38.53 percent of the total variance in 1980-81, 46.39 percent in 1990-91 and 43.55 percent in 2000-01.

The composite index of agricultural development for each district at three selected points of time was computed. Such an index of Agricultural Development (AD_1) for 1980-81 was computed by using the following equation:

$AD_1 = (-0.04399)\ Z_1 + (-0.48874)\ Z_2 + (0.25493)\ Z_3 + (0.53487)\ Z_4 + (-0.70163)\ Z_5 + (0.75832)\ Z_6 + (-0.73493)\ Z_7 + (0.93016)\ Z_8 + (-0.16285)\ Z_9 + (0.87291)\ Z_{10}$ ....(I)

Where, AD_1 is composite index of agricultural development of a district, $Z_1, Z_2, Z_3, Z_4, \ldots, Z_{10}$ are the values of variables in standardized form and the figures in parentheses are factor *loadings or weights.*

The above Equation (I) shows that the coefficient of correlation of agricultural development ranges between -0.04 and +0.93.

Table 3.10: Principal Component Matrix of Agricultural Development (1990-91)

Variable	*P_1*	*P_2*	*P_3*	*h^2*
1	0.785	0.043	0.538	0.908
2	0.801	0.503	-0.146	0.916
3	-0.452	0.828	0.176	0.921
4	0.701	0.518	0.185	0.794
5	0.926	-0.187	-0.177	0.923
6	0.900	-0.224	0.242	0.919
7	0.667	-0.347	-0.587	0.909
8	0.538	0.184	-0.548	0.623
9	0.412	-0.392	0.678	0.783
10	0.339	0.717	-0.010	0.629
Eigenvalue	*4.640*	*2.116*	*1.571*	
Percentage Variance	*46.397*	*21.163*	*15.705*	
Cumulative Variance (%)	*46.397*	*67.560*	*83.265*	

Table 3.11: Principal Component Matrix of Agricultural Development (2000-01)

Variable	*P_1*	*P_2*	*P_3*	*P_4*	*h^2*
1	0.785	0.254	-0.465	0.129	0.913
2	0.855	0.146	0.277	-0.224	0.881
3	-0.223	0.883	0.059	-0.328	0.940
4	0.700	0.134	-0.353	-0.453	0.838
5	0.835	-0.435	-0.064	-0.124	0.906
6	0.896	-0.111	-0.265	-0.107	0.898
7	0.415	-0.776	0.438	0.092	0.975
8	0.632	0.363	0.468	0.292	0.835
9	0.361	0.287	-0.365	0.761	0.925
10	0.515	0.448	0.647	0.071	0.890
Eigenvalue	*4.355*	*2.102*	*1.458*	*1.085*	
Percentage Variance	*43.552*	*21.023*	*14.584*	*10.847*	
Cumulative Variance (%)	*43.552*	*64.575*	*79.159*	*90.006*	

The composite index of agricultural development of a district for 1990-91 was constructed by using the following formula:

$AD_2 = (0.78539)\ Z_1 + (0.80120)\ Z_2 + (-0.45224)\ Z_3 + (0.70100)\ Z_4$

$$+ (0.92578)\ Z_5 + (0.89996)\ Z_6 + (0.66660)\ Z_7 + (0.53776)\ Z_8$$
$$+ (0.41155)\ Z_9 + (0.33926)\ Z_{10} \quad \text{..... (II)}$$

Where, AD_2 is composite index of agricultural development of a district, $Z_1, Z_2, Z_3, Z_4, \ldots, Z_{10}$ are the values of variables in standardized form and the figures in parentheses are factor *loadings or weights.*

The above equation (II) shows that the coefficient of correlation of agricultural development ranges between +0.33 and +0.92.

Similarly, the composite index of agricultural development of a district for the year 2000-01 was constructed by using the following formula:

$$AD_3 = (0.78513)\ Z_1 + (0.85548)\ Z_2 + (-0.22307)\ Z_3 + (0.70042)\ Z_4$$
$$+ (0.83471)\ Z_5 + (0.89635)\ Z_6 + (0.41540)\ Z_7 + (0.63158)\ Z_8$$
$$+ (0.36072)\ Z_9 + (0.51461)\ Z_{10} \quad \text{..... (III)}$$

Where, AD_3 is composite index of agricultural development of a district, $Z_1, Z_2, Z_3, Z_4, \ldots, Z_{10}$ are the values of variables in standardized form and the figures in parentheses are factor *loading or weights.*

The equation (III) reveals that the coefficient of correlation of agricultural development ranges between -0.22 and +0.89.

All the eighteen districts of West Bengal have been ranked according to their levels of agricultural development as per values of indices during three selected points of time, i.e. 1980-81, 1990-91 and 2000-01 (Table 3.12).

It is clear from the Table 3.12 (*Figure 3.1*) that on the basis of level of agricultural development in 1980-81, district Darjeeling was at the top position followed by Jalpaiguri, Nadia and Cooch Behar, in that order. On the other hand, district Dakshin Dinajpur was at bottom, preceded immediately by Uttar Dinajpur. After a decade, in 1990-91, district Hooghly was at the topmost position, followed by Nadia, Uttar Dinajpur, Murshidabad, Burdwan, Birbhum, Dakshin Dinajpur, Malda, Cooch Behar, 24 Parganas (N), Bankura and Jalpaiguri. On the other hand, district Kolkata was at the bottom, preceded immediately by Purulia. The comparative levels of agricultural development as reflected in the ranking of the districts in the year 2000-01 at top position was Nadia, followed by Hooghly, Cooch Behar, Malda, Burdwan, Murshidabad, Darjeeling, Birbhum, 24 Parganas (N), Uttar Dinajpur, Jalpaiguri, Midnapore, Dakshin Dinajpur and Howrah. On the other hand, district Kolkata was at the bottom preceded immediately by Purulia, 24 Parganas (S) and Bankura.

Table 3.12: District-wise Indices of Agricultural Development						
	1980-81		1990-91		2000-01	
Districts	*Index*	*Rank*	*Index*	*Rank*	*Index*	*Rank*
Burdwan	0.1399	9	0.8450	5	0.8429	5
Birbhum	0.0711	16	0.8285	6	0.7980	8
Bankura	0.1143	12	0.7546	11	0.7265	15
Midnapore	0.0810	15	0.7066	14	0.7700	12
Howrah	0.1260	11	0.7268	13	0.7519	14
Hooghly	0.1593	6	1.0000	1	0.9796	2
24 Parganas (N)	0.1313	10	0.7641	10	0.7949	9
24 Parganas (S)	0.1112	14	0.5443	17	0.5613	16
Nadia	0.2340	3	0.9409	2	1.0000	1
Murshidabad	0.1490	7	0.8451	4	0.8313	6
Malda	0.1115	13	0.8167	8	0.8490	4
Uttar Dinajpur	0.0692	17	0.8867	3	0.7933	10
Dakshin Dinajpur	0.0000	18	0.8183	7	0.7698	13
Jalpaiguri	0.5814	2	0.7518	12	0.7747	11
Darjeeling	1.0000	1	0.7054	15	0.8239	7
Cooch Behar	0.2273	4	0.8111	9	0.8559	3
Purulia	0.1633	5	0.5527	16	0.5586	17
Kolkata	0.1478	8	0.0000	18	0.0000	18
Mean	*0.2010*		*0.7388*		*0.7490*	
S.D.	*0.2621*		*0.2225*		*0.2171*	
C.V.	*130.43*		*30.11*		*28.99*	
Rank Correlation Coefficients are: R_{12} = -0.084 R_{13} = + 0.33, R_{23} = + 0.76						

It may be observed from the Table 3.12 that the absolute average index for the state as a whole has increased marginally during the three points of time as it increased by + 0.5378 and + 0.0102 points in the reference years. Thus, marginal increase points towards improvement in the level of agricultural development.

The extent of disparities may also be visualized from the Table 3.12. It is found that the value of coefficient of variation has shown declining trend during the period of 1980-81 to 2000-01.

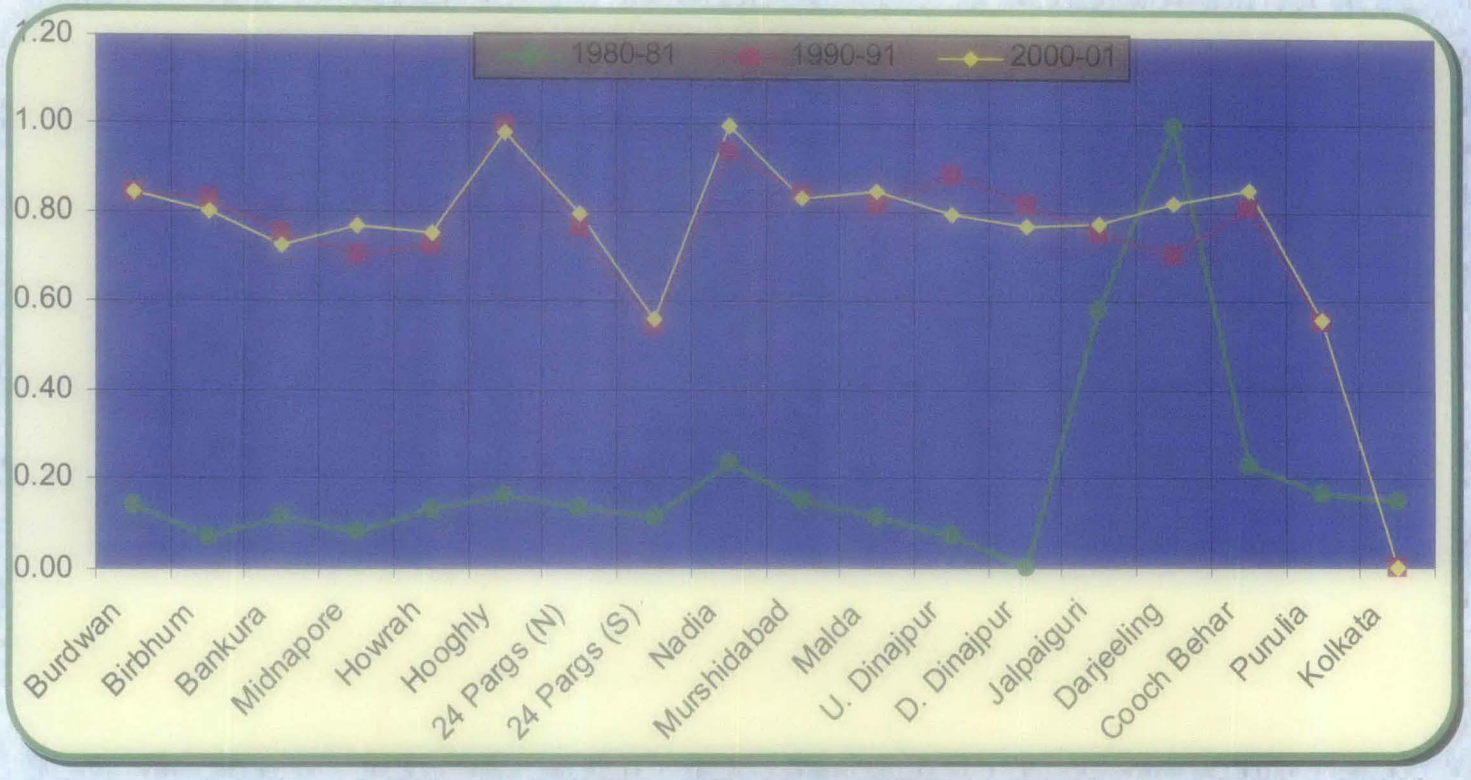


Figure: 3.1: Patterns of Agricultural Development

Further, the districts have been classified into two categories on the basis of their levels of agricultural development. On the basis of levels of development the districts have been classified as developed and developing. Developed districts are those which have the composite index value of agricultural development above the state average whereas developing districts have a value below the state average.

Table 3.13: Classification of District According to Level of Agricultural Development

1980-81		1990-91		2000-01	
Districts	*Index*	*Districts*	*Index*	*Districts*	*Index*
Developed Districts					
Darjeeling	1.0000	Hooghly	1.0000	Nadia	1.0000
Jalpaiguri	0.5814	Nadia	0.9409	Hooghly	0.9796
Nadia	0.2340	Uttar Dinajpur	0.8867	Cooch Behar	0.8559
Cooch Behar	0.2273	Murshidabad	0.8451	Malda	0.8490
		Burdwan	0.8450	Burdwan	0.8429
		Birbhum	0.8285	Murshidabad	0.8313
		Dakshin Dinajpur	0.8183	Darjeeling	0.8239
		Malda	0.8167	Birbhum	0.7980
		Cooch Behar	0.8111	24 Parganas (N)	0.7949
		24 Parganas (N)	0.7641	Uttar Dinajpur	0.7933
		Bankura	0.7546	Jalpaiguri	0.7747
		Jalpaiguri	0.7518	Midnapore	0.7700
				Dakshin Dinajpur	0.7698
				Howrah	0.7519
Mean	*0.5107*		*0.8386*		*0.8311*
C.V.	*66.61*		*16.50*		*17.27*
Developing Districts					
Purulia	0.1633	Howrah	0.7268	Bankura	0.7265
Hooghly	0.1593	Midnapore	0.7066	24 Parganas (S)	0.5613
Murshidabad	0.1490	Darjeeling	0.7054	Purulia	0.5586
Kolkata	0.1478	Purulia	0.5527	Kolkata	0.0000
Burdwan	0.1399	24 Parganas (S)	0.5443		
24 Parganas (N)	0.1313	Kolkata	0.0000		
Howrah	0.1260				
Bankura	0.1143				
Malda	0.1115				
24 Parganas (S)	0.1112				
Midnapore	0.0810				
Birbhum	0.0711				
Uttar Dinajpur	0.0692				
Dakshin Dinajpur	0.0000				
Mean	*0.1125*		*0.53932*		*0.46162*
C.V.	*95.80*		*56.47*		*70.24*

The classification of districts according to composite index of agricultural development for the year 1980-81, 1990-91 and 2000-01 is given in Table 3.13.

It is important to note that in order to compute mean and standard deviation, a positive constant of maximum minus value has been added to the entries in all the variables to have a data set with all positive values.

Inter-temporal analysis of Table 3.13 reveals that in 1980-81 four districts, viz. Darjeeling, Jalpaiguri, Nadia and Cooch Behar were in the developed districts category. In 1990-91, twelve districts, namely Hooghly, Nadia, Uttar Dinajpur, Murshidabad, Burdwan, Birbhum, Dakshin Dinajpur, Malda, Cooch Behar, 24 Parganas (N), Bankura and Jalpaiguri, got placed in this category. Further, in 2000-01, here also fourteen districts, viz. Nadia, Hooghly, Cooch Behar, Malda, Burdwan, Murshidabad, Darjeeling, Birbhum, 24 Parganas (N), Uttar Dinajpur, Jalpaiguri, Midnapore, Dakshin Dinajpur and Howrah fell in the developed category districts but some districts have changed their position in comparison to 1990-91.

Thus, it appears that the inter-district disparities of agricultural development, which actually featured in the year 1990-91 and also continued to exist up to 2000-01 with inconsequential shifting in the ranking pattern. But in the year 1980-81, the patterns of agricultural development have considerably changed. One district, viz. Darjeeling which was in the list of developed districts during 1980-81, but in 1990-91 and also in 2000-01 reshuffled some districts, namely, Uttar Dinajpur, Dakshin Dinajpur, Malda, Midnapore, Birbhum and 24 Parganas (N) are emerged from developing to developed districts. This fact may be seen in the context of considerable increase in some of the key indicators, viz. value of agricultural produce in terms of per hectare net area sown, per capita rural population, per agricultural workers and also percentage of area under commercial crops to gross cropped area in these districts.

Level of agricultural development at district level has further been analyzed with the help of varimax rotation of the factors of agricultural development so that various dimensions of agricultural development could be traced at district level.

3.4 District-wise Dimensions of Agricultural Development

The various dimensions *(see note end of the chapter-3)* of agricultural development at district level with the help of Factor Analysis (cluster analysis) as

the purpose of Factor Analysis is to identify groups of variables with shared common variance. The various dimensions of agricultural development have been identified by rotating the principal component matrix with varimax rotation (Kaiser Varimax Method) for the selected reference years, i.e. 1980-81, 1990-91 and 2000-01. It is relevant to mention that the Principal Component Matrices have further been transformed into Rotated Factor Matrices for identification of various dimensions and extent of dimensional agricultural development at district level. Further, districts have been ranked according to level of development in various dimensions. For studying the nature and extent of dimensional development of different districts similarly selected indicators of agricultural development have been taken for analysis.

Evaluation of the factor loadings for the years 1980-81, 1990-91 and 2000-01 enables us to determine the factors. Each variable has been assigned to the factor with which it has the highest loading. The second, third and fourth highest loadings, if significant have also been considered. Only those factor loadings, which are greater than 0.576 (or nearer to this value), are considered as significant. Therefore, for calculating composite scores of different dimensions of each district only significant factor loadings have been considered. It is evident from the Tables 3.14, 3.16 and 3.18 that each variable is significantly correlated with at least one factor.

3.4.1 (A) Dimensions of Agricultural Development, 1980-81:

For the year 1980-81, the *first factor* explains 29.66 per cent of the total variance and two indicators are positively correlated with this factor. These indicators are percentage of net area sown to total geographical area and percentage of agricultural workers to total (main) workers. Again two indicators, namely credit to agriculture (Rs. per capita) and average size of holdings are negatively and significantly correlated with this factor. Evidently, only two indicators are positively and significantly correlated with this dimension of agricultural development. Hence, this cluster does not point out towards specific dimension of agricultural development.

The *second factor* explains 21.54 per cent of the total variance and three indicators are positively and significantly correlated with this factor. These indicators are namely, percentage of area under commercial crops to gross cropped area, cropping intensity and credit to agriculture (Rs. per capita). The

positive and significant association of proportion of area under commercial crops to gross cropped area which is an outcome of utilization of several inputs like improved seeds, fertilizer and irrigation shows the extent of modernization in agriculture. Therefore, this dimension of agricultural development may be named as *Modernized Agricultural Development.*

Table 3.14: Rotated Factor Matrix (Varimax Method) 1980-81

Variable	*Factor-1*	*Factor-2*	*Factor-3*	*Factor-4*	*h2*
1	-0.070	-0.025	0.907	0.343	0.947
2	0.469	-0.160	0.162	0.841	0.979
3	-0.154	0.222	-0.032	0.915	0.911
4	0.043	0.979	-0.034	0.062	0.965
5	0.942	0.125	0.112	0.127	0.932
6	-0.492	0.649	0.166	-0.018	0.691
7	0.750	-0.262	-0.258	0.211	0.743
8	-0.657	0.672	-0.100	0.138	0.912
9	0.111	0.027	0.932	-0.193	0.919
10	-0.761	0.404	-0.244	0.291	0.886
Eigenvalue	*2.97*	*2.15*	*1.90*	*1.87*	
Percentage of Variance	*29.66*	*21.54*	*18.97*	*18.68*	
Cumulative Variance (%)	*29.66*	*51.20*	*70.17*	*88.85*	

Note: Critical value of a_i at 5 per cent level = 0.576
Critical value of a_i at 1 per cent level = 0.714

The *third factor* explains 18.97 per cent of the total variance which has positive and significant correlation with two indicators, namely gross value of agricultural produce per hectare of net area sown and consumption of fertilizer per hectare of gross cropped area. Hence, this cluster does not point out towards specific dimension of agricultural development.

The *fourth factor* explains 18.68 per cent of total variance which has positive and significant correlation with two indicators, namely gross value of agricultural produce per capita of rural population and gross value of agricultural produce per agricultural workers. This dimension of agricultural development may be given the name *traditional agricultural development.*

The factor scores with respect to the first, second, third and fourth factors for the year 1980-81 have been calculated with the help of the following equations and presented in Table 3.15.

First Dimension of Agricultural development

$$AD_4 = (0.9423)\ Z_5 + (0.7502)\ Z_7 + (-0.6570)\ Z_8 + (-0.7606)\ Z_{10} \quad \text{..... (IV)}$$

Where AD_4 is the first dimension of agricultural development; Z_5, Z_7, Z_8 and Z_{10} are values of variables in standardized form and the figures in parentheses are factor loadings with respect to the first factor.

Second Dimension of Agricultural development

$$AD_5 = (0.9789)\ Z_4 + (0.6486)\ Z_6 + (0.6717)\ Z_8 \quad \text{(V)}$$

Where AD_5 is the second dimension of agricultural development; Z_4, Z_6 and Z_8 are values of variables in standardized form and the figures in parentheses are factor loadings with respect to the second factor.

Third Dimension of Agricultural development

$$AD_6 = (0.9075)\ Z_1 + (0.9321)\ Z_9 \quad \text{(VI)}$$

Where AD_6 is the third dimension of agricultural development; Z_1 and Z_9 are values of variables in standardized form and the figures in parentheses are factor loadings with respect to the third factor.

Fourth Dimension of Agricultural development

$$AD_7 = (0.8407)\ Z_2 + (0.9152)\ Z_3 \quad \text{(VII)}$$

Where AD_7 is the fourth dimension of agricultural development; Z_2 and Z_3 are values of variables in standardized form and the figures in parentheses are factor loadings with respect to the fourth factor.

It may be observed from the Table 3.15 (Figures 3.2 and 3.3) that the first dimension of agricultural development is a cluster of indicators of agricultural sector. This dimension included the indicators percentage of net area sown to total geographical area and percentage of agricultural workers to total (main) workers, these two indicators has shown negative association with the factor. Therefore, proportion of geographical area and agricultural workers did not show any positive effect on development of agricultural sector relative to first dimension at district level. But two indicators are in positive association with the first factor which represents the performance of agricultural credit and land holdings on development of agricultural sector at district level, in these respects fourteen districts are positioned above the state average.

Likewise, second dimension of agricultural development during the same period was a cluster of indicators pertaining to multiple cropping intensity and agricultural credit which is dependency on agriculture sector for employment purpose. District Darjeeling emerged as the most developed, closely followed by

Jalpaiguri, Nadia, Hooghly, Cooch Behar, Uttar Dinajpur and Murshidabad as is evident from the ranking of these districts (Table 3.15).

The third dimension of agricultural development is a cluster of indicators of agricultural sector, which represent performance of value of agricultural produce and fertilizer consumption. In this respect district Hooghly was at the top in the list, closely followed by Howrah, Burdwan, 24 Parganas (N), Birbhum, Nadia and Darjeeling districts. On the other hand, the district which could be identified as the least developed was Kolkata, preceded by Jalpaiguri district.

The fourth dimension of agricultural development is cluster of indicators of agricultural sector, which represent performance of land and labour. In this respect district Dakshin Dinajpur was at the top in the Table 3.15 shown, closely followed by Burdwan, Hooghly, Birbhum, Bankura, Jalpaiguri, 24 Parganas (N), Cooch Behar, Purulia, Uttar Dinajpur and Midnapore districts. On the other hand, the district which could be identified as the least developed was Kolkata, preceded by 24 Parganas (S) district.

Table 3.15: Dimensions of Agricultural Development in 1980-81

Sl. No.	*Districts*	*First Dimension Index*	*Rank*	*Second Dimension Index*	*Rank*	*Third Dimension Index*	*Rank*	*Fourth Dimension Index*	*Rank*
1	Burdwan	0.7503	13	0.3709	9	0.6965	3	0.9743	2
2	Birbhum	0.8447	5	0.3009	12	0.4910	5	0.9051	4
3	Bankura	0.7693	11	0.2675	13	0.3037	13	0.8664	5
4	Midnapore	0.8310	6	0.2497	14	0.3900	9	0.6991	11
5	Howrah	0.7805	10	0.3155	11	0.8146	2	0.4716	16
6	Hooghly	0.8007	9	0.5568	4	1.0000	1	0.9157	3
7	24 Parganas (N)	0.7568	12	0.2494	15	0.5748	4	0.7699	7
8	24 Parganas (S)	0.7456	14	0.1931	16	0.2981	15	0.3984	17
9	Nadia	0.8141	7	0.6081	3	0.4589	6	0.6736	12
10	Murshidabad	0.8798	3	0.4777	7	0.4052	8	0.5887	15
11	Malda	0.8710	4	0.3777	8	0.3687	10	0.5969	14
12	Uttar Dinajpur	0.9911	2	0.4931	6	0.3088	12	0.7235	10
13	Dakshin Dinajpur	1.0000	1	0.3690	10	0.3229	11	1.0000	1
14	Jalpaiguri	0.3706	17	0.7361	2	0.2137	17	0.8129	6
15	Darjeeling	0.0000	18	1.0000	1	0.4227	7	0.6274	13
16	Cooch Behar	0.8097	8	0.5306	5	0.3006	14	0.7441	8
17	Purulia	0.6686	15	0.1736	17	0.2881	16	0.7423	9
18	Kolkata	0.5007	16	0.0000	18	0.0000	18	0.0000	18
Mean		*0.7325*		*0.4039*		*0.4255*		*0.6950*	
C.V.		*31.55*		*74.04*		*70.46*		*35.90*	

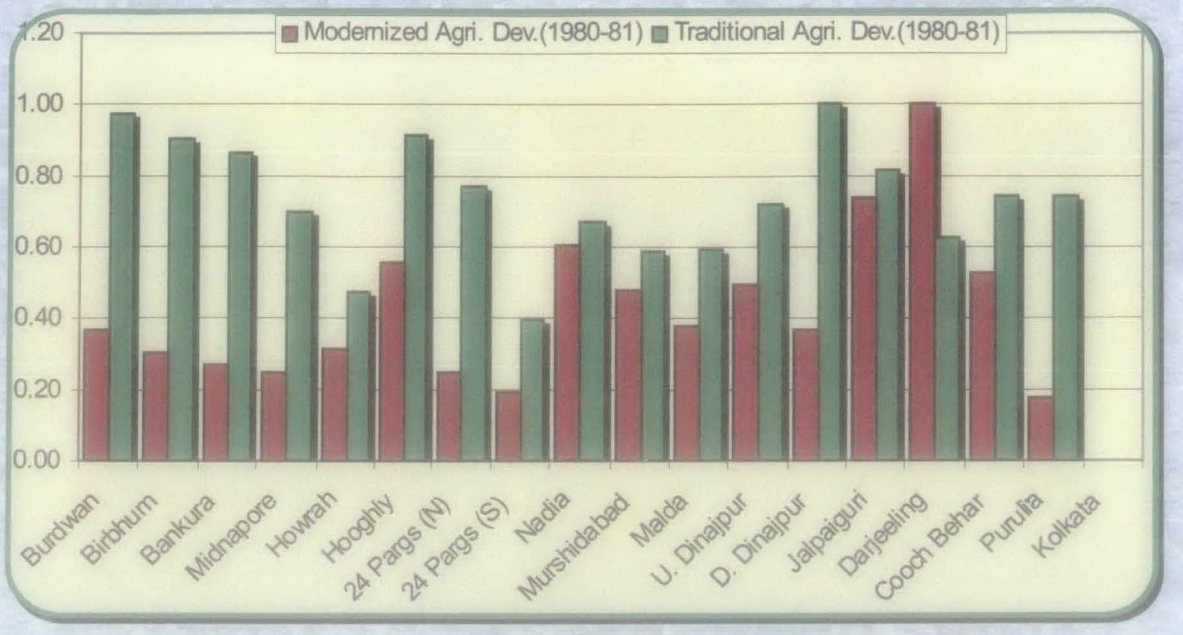


Figure 3.2: Dimensions of Agricultural Development in 1980-81

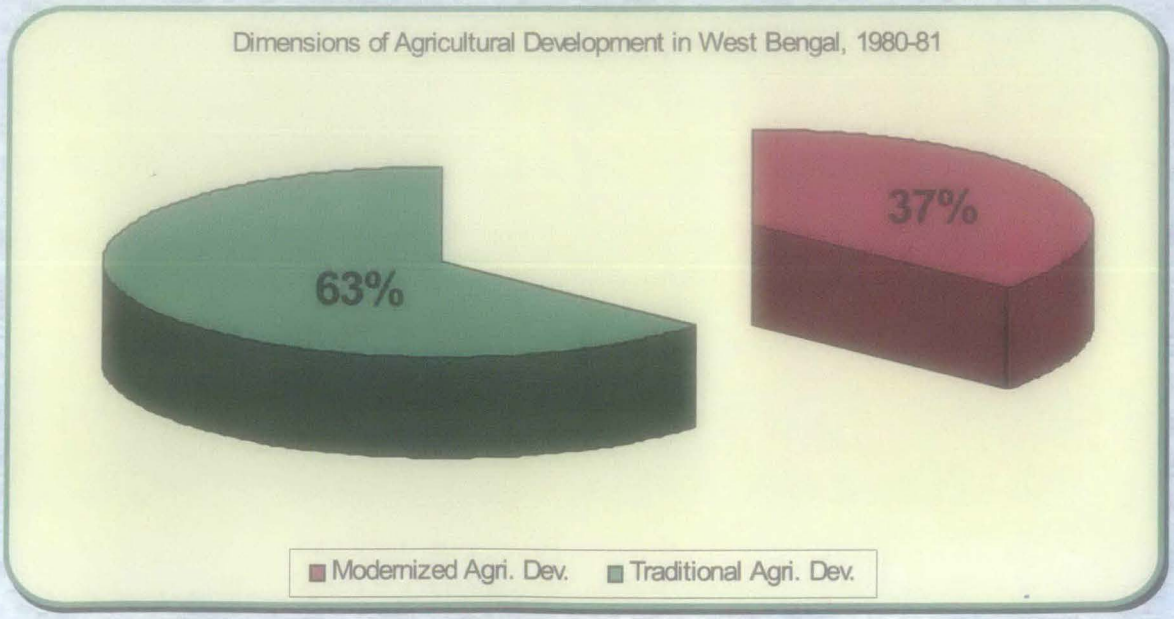


Figure 3.3

3.4.2 (B) Dimensions of Agricultural Development, 1990-91:

On the basis of three identified factors after rotating principal component matrix into varimax rotation, three dimensions of agricultural development have been worked for the year 1990-91.

Table 3.16: Rotated Factor Matrix (Kaiser Varimax Method) 1990-91

Variable	*Factor-1*	*Factor-2*	*Factor-3*	h^2
1	0.133	0.425	0.843	0.908
2	0.416	0.841	0.190	0.916
3	-0.728	0.484	-0.397	0.921
4	0.128	0.798	0.375	0.794
5	0.785	0.308	0.461	0.923
6	0.505	0.257	0.773	0.919
7	0.951	0.046	0.056	0.909
8	0.636	0.439	-0.161	0.623
9	-0.031	-0.141	0.873	0.783
10	-0.053	0.790	-0.044	0.629
Eigenvalue	*2.92*	*2.76*	*2.65*	
Percentage of Variance	*29.21*	*27.59*	*26.47*	
Cumulative Variance (%)	*29.21*	*56.79*	*83.27*	

Note: Critical value of a_i at 5 per cent level = 0.576
Critical value of a_i at 1 per cent level = 0.714

The *first dimension* of agricultural development exhibits a cluster of indicators, namely percentage of net area sown to total geographical area, cropping intensity, percentage of agricultural workers to total (main) workers and credit to agriculture (Rs. per capita), which has been named as *traditional agricultural development.*

The *second dimension* is group of indicators, viz. gross value of agricultural produce per capita of rural population, percentage of area under commercial crops to gross cropped area and average size of holdings. Hence, this cluster does not point out towards specific dimension of agricultural development.

The *third dimension* is group of indicators, viz. gross value of agricultural produce per hectare of net area sown, cropping intensity and consumption of fertilizer per hectare of gross cropped area, which has been named as *modernized agricultural development.*

The factor scores with respect to the first and third factors for the year 1990-91 have been calculated with the help of the following equations and presented in Table 3.17.

First Dimension of Agricultural development

$$AD_8 = (-0.7277)\ Z_3 + (0.7848)\ Z_5 + (0.5051)\ Z_6 + (0.9508)\ Z_7 + (0.6365)\ Z_8 \quad \text{..... (VIII)}$$

Where AD_8 is the first dimension of agricultural development; Z_3 Z_5, Z_6, Z_7 and Z_8 are values of variables in standardized form and the figures in parentheses are factor loadings with respect to the first factor.

Second Dimension of Agricultural development

$$AD_9 = (0.8410)\ Z_2 + (0.7979)\ Z_4 + (0.7901)\ Z_{10} \quad \text{..... (IX)}$$

Where AD_9 is the second dimension of agricultural development; Z_2, Z_4 and Z_{10} are values of variables in standardized form and the figures in parentheses are factor loadings with respect to the second factor.

Third Dimension of Agricultural development

$$AD_{10} = (0.8426)\ Z_1 + (0.7730)\ Z_6 + (0.8729)\ Z_9 \quad \text{..... (X)}$$

Where AD_{10} is the third dimension of agricultural development; Z_1, Z_6 and Z_9 are values of variables in standardized form and the figures in parentheses are factor loadings with respect to the third factor.

Table 3.17: Dimensions of Agricultural Development in 1990-91

Sl. No.	*Districts*	*First Dimension Index*	*Rank*	*Second Dimension Index*	*Rank*	*Third Dimension Index*	*Rank*
1	Burdwan	0.7456	8	0.7640	5	0.5986	8
2	Birbhum	0.8407	3	0.6577	8	0.5829	9
3	Bankura	0.7120	11	0.6816	7	0.5143	13
4	Midnapore	0.7266	9	0.4711	14	0.5254	11
5	Howrah	0.5701	12	0.2911	17	0.9837	2
6	Hooghly	0.7759	7	0.7785	4	1.0000	1
7	24 Parganas (N)	0.5680	13	0.5976	10	0.7188	4
8	24 Parganas (S)	0.5395	16	0.3254	16	0.4359	16
9	Nadia	0.8105	5	0.8028	3	0.7741	3
10	Murshidabad	0.7832	6	0.6539	9	0.6413	6
11	Malda	0.8121	4	0.5573	13	0.6556	5
12	Uttar Dinajpur	1.0000	1	0.5928	11	0.5250	12
13	Dakshin Dinajpur	0.8779	2	0.5666	12	0.4813	15
14	Jalpaiguri	0.5532	14	1.0000	1	0.4977	14
15	Darjeeling	0.5103	17	0.9885	2	0.5547	10
16	Cooch Behar	0.7257	10	0.7081	6	0.6174	7
17	Purulia	0.5515	15	0.4151	15	0.3825	17
18	Kolkata	0.0000	18	0.0000	18	0.0000	18
Mean		*0.6724*		*0.6029*		*0.5827*	
C.V.		*37.55*		*47.22*		*48.31*	

It is evident from the Table 3.17 (Figures 3.4 and 3.5) that second dimension revealed ten districts, namely Jalpaiguri, Darjeeling, Nadia, Hooghly, Burdwan, Cooch Behar, Bankura, Birbhum, Murshidabad and 24 Parganas (N) were fairly developed districts in respect of the second dimension or *traditional agricultural development*, and the remaining eight districts were found to be less developed due to their value of composite indices being lower than the state average.

Similarly, in the matter of third dimension, i.e., *modernized agricultural development* Hooghly, Howrah, Nadia, 24 Parganas (N), Malda, Murshidabad, Cooch Behar, Burdwan and Birbhum districts have emerged as developed districts and the remaining nine districts fall in the less developed category. It has been observed that commercialization of agricultural development has been taken place due to maximum use of fertilizer, which increases cropping intensity, which leads to increased value of agricultural produce in agricultural sector.

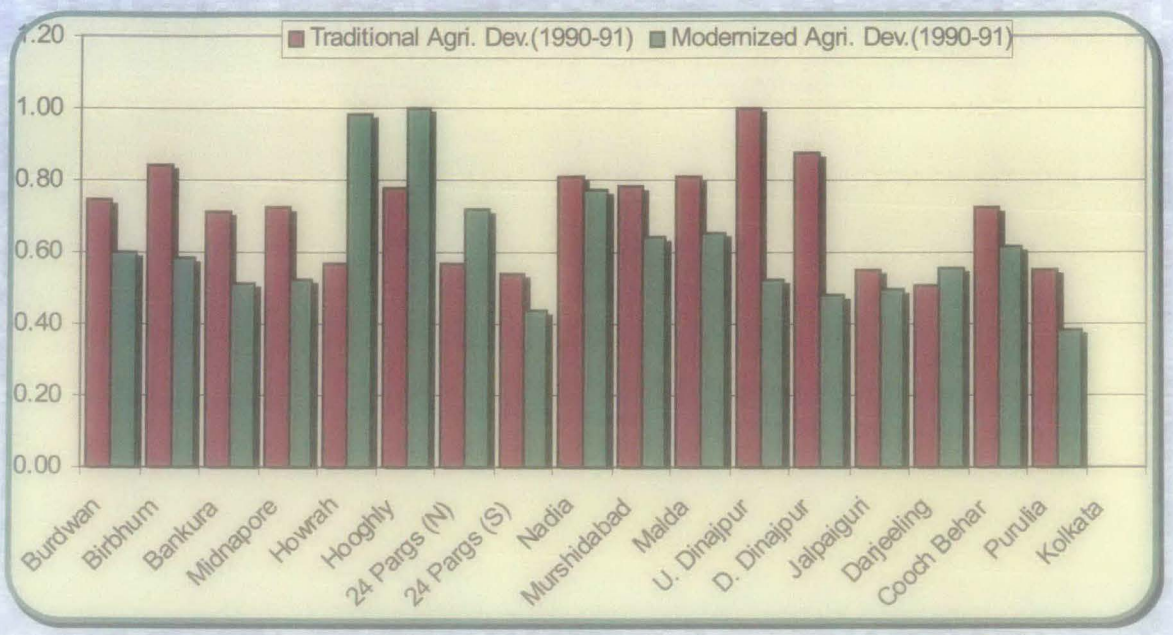


Figure 3.4: Dimensions of Agricultural Development in 1990-91

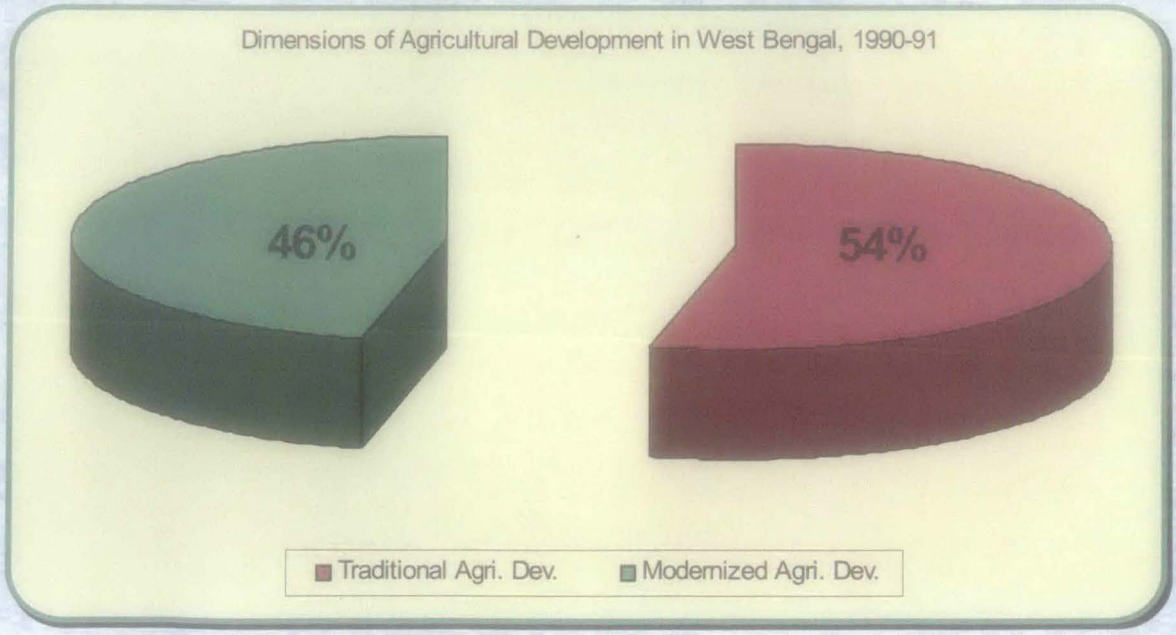


Figure 3.5

3.4.3 (C) Dimensions of Agricultural Development, 2000-01:

The *first factor* brings out the first dimension of agricultural development for the year 2000-01. This factor clearly forms a cluster of five variables, namely gross value of agricultural produce per hectare of net area sown, gross value of agricultural produce per capita of rural population, percentage of area under commercial crops to gross cropped area, percentage of net area sown to total geographical area and cropping intensity. This dimension may be designated as *overall agricultural development.*

The *second factor* brings out another dimension of agricultural development. This factor forms a cluster of three indicators, viz. gross value of agricultural produce in respect of per capita of rural population, credit to agriculture (Rs. per capita) and average size of holdings, but this cluster does not point out towards specific dimension of agricultural development.

The *third factor* explains 22.03 per cent of the total variance which has positive and significant correlation with two indicators, namely percentage of net area sown to total geographical area and percentage of agricultural workers to total (main) workers. Evidently, only one indicator is negative and significantly correlated with this dimension of agricultural development. Hence, this cluster does not point out towards specific dimension of agricultural development.

The *fourth factor* brings out the fourth dimension of agricultural development for the year 2000-01. This factor clearly forms a cluster of two variables, namely gross value of agricultural produce per hectare of net area sown and consumption of fertilizer per hectare of gross cropped area. This dimension may be designated as *modern agricultural development.*

The factor scores with respect to the first, second and fourth factors for the year 2000-01 have been calculated with the help of the following equations and presented in Table 3.19.

First Dimension of Agricultural development

$$AD_{11} = (0.7578)\, Z_1 + (0.6486)\, Z_2 + (0.9057)\, Z_4 + (0.7264)\, Z_5 + (0.8592)\, Z_6 \quad \text{(XI)}$$

Where AD_{11} is the first dimension of agricultural development; Z_1 Z_2, Z_4, Z_5 and Z_6 are values of variables in standardized form and the figures in parentheses are factor loadings with respect to the first factor.

Table 3.18: Rotated Factor Matrix (Varimax Method) 2000-01					
Variable	*Factor-1*	*Factor-2*	*Factor-3*	*Factor-4*	*h2*
1	0.758	0.159	-0.053	0.558	0.913
2	0.649	0.661	0.134	-0.069	0.881
3	-0.036	0.250	-0.924	-0.148	0.940
4	0.906	0.073	-0.109	-0.026	0.838
5	0.726	0.169	0.591	0.023	0.906
6	0.859	0.182	0.283	0.215	0.898
7	0.078	0.231	0.937	-0.195	0.975
8	0.161	0.854	0.060	0.276	0.835
9	0.098	0.125	-0.015	0.948	0.925
10	0.093	0.936	-0.071	0.005	0.890
Eigenvalue	*3.13*	*2.27*	*2.20*	*1.40*	
Percentage of Variance	*31.32*	*22.66*	*22.03*	*13.99*	
Cumulative Variance (%)	*31.32*	*53.99*	*76.02*	*90.01*	
Note: Critical value of a_i at 5 per cent level = 0.576 Critical value of a_i at 1 per cent level = 0.714					

Second Dimension of Agricultural development

$$AD_{12} = (0.6612)\ Z_2 + (0.8451)\ Z_8 + (0.9359)\ Z_{10} \quad \text{..... (XII)}$$

Where AD_{12} is the second dimension of agricultural development; Z_2, Z_8 and Z_{10} are values of variables in standardized form and the figures in parentheses are factor loadings with respect to the second factor.

Third Dimension of Agricultural development

$$AD_{13} = (-0.9245)\ Z_3 + (0.5908)\ Z_5 + (0.9369)\ Z_7 \quad \text{..... ..... (XIII)}$$

Where AD_{13} is the third dimension of agricultural development; Z_3, Z_5 and Z_7 are values of variables in standardized form and the figures in parentheses are factor loadings with respect to the third factor.

Fourth Dimension of Agricultural development

$$AD_{14} = (0.5578)\ Z_1 + (0.9484)\ Z_9 \quad \text{..... (XIV)}$$

Where AD_{14} is the fourth dimension of agricultural development; Z_1 and Z_9 are values of variables in standardized form and the figures in parentheses are factor loadings with respect to the fourth factor.

The district-wise indices of the first dimension i.e. overall agricultural development, have been presented in Table 3.19 (*Figures 3.6 and 3.7*). It may be observed from this table that twelve districts, namely Nadia, Hooghly, Murshidabad, Cooch Behar, 24 Parganas (N), Malda, Uttar Dinajpur, Dakshin Dinajpur, Jalpaiguri, Howrah, Burdwan and Darjeeling were above or near the value of the state average. Hence, these twelve districts may be considered as

developed districts in respect of overall agricultural development. On the other hand, remaining six districts were placed below the state average and as such these districts may be considered as less developed in this respect. It may also be observed that extent of inter-district disparity in respect of overall agricultural development was fairly low.

Table 3.19: Dimensions of Agricultural Development in 2000-01

Sl. No.	*Districts*	*First Dimension Index*	*Rank*	*Second Dimension Index*	*Rank*	*Third Dimension Index*	*Rank*	*Fourth Dimension Index*	*Rank*
1	Burdwan	0.6942	11	0.7106	3	0.8058	5	0.4920	5
2	Birbhum	0.5895	14	0.7290	2	0.9198	2	0.4128	9
3	Bankura	0.5491	15	0.6673	5	0.8057	6	0.3945	11
4	Midnapore	0.6421	13	0.5945	9	0.7921	8	0.4169	8
5	Howrah	0.7112	10	0.3369	17	0.5055	15	1.0000	1
6	Hooghly	0.9099	2	0.6387	7	0.7346	11	0.8173	2
7	24 Parganas (N)	0.7852	5	0.4841	12	0.5699	14	0.5259	4
8	24 Parganas (S)	0.4478	16	0.3933	16	0.6859	12	0.3910	12
9	Nadia	1.0000	1	0.6788	4	0.6425	13	0.4594	7
10	Murshidabad	0.8081	3	0.5089	11	0.7791	9	0.3627	15
11	Malda	0.7732	6	0.5899	10	0.7599	10	0.4763	6
12	Uttar Dinajpur	0.7505	7	0.4129	15	1.0000	1	0.3158	16
13	Dakshin Dinajpur	0.7477	8	0.4197	14	0.9108	3	0.2964	17
14	Jalpaiguri	0.7259	9	0.6522	6	0.4989	16	0.3640	14
15	Darjeeling	0.6644	12	1.0000	1	0.1050	17	0.5603	3
16	Cooch Behar	0.7862	4	0.6000	8	0.7988	7	0.4049	10
17	Purulia	0.3878	17	0.4484	13	0.8669	4	0.3704	13
18	Kolkata	0.0000	18	0.0000	18	0.0000	18	0.0000	18
Mean		*0.6652*		*0.5481*		*0.6767*		*0.4478*	
C.V.		*38.63*		*51.81*		*39.33*		*64.92*	

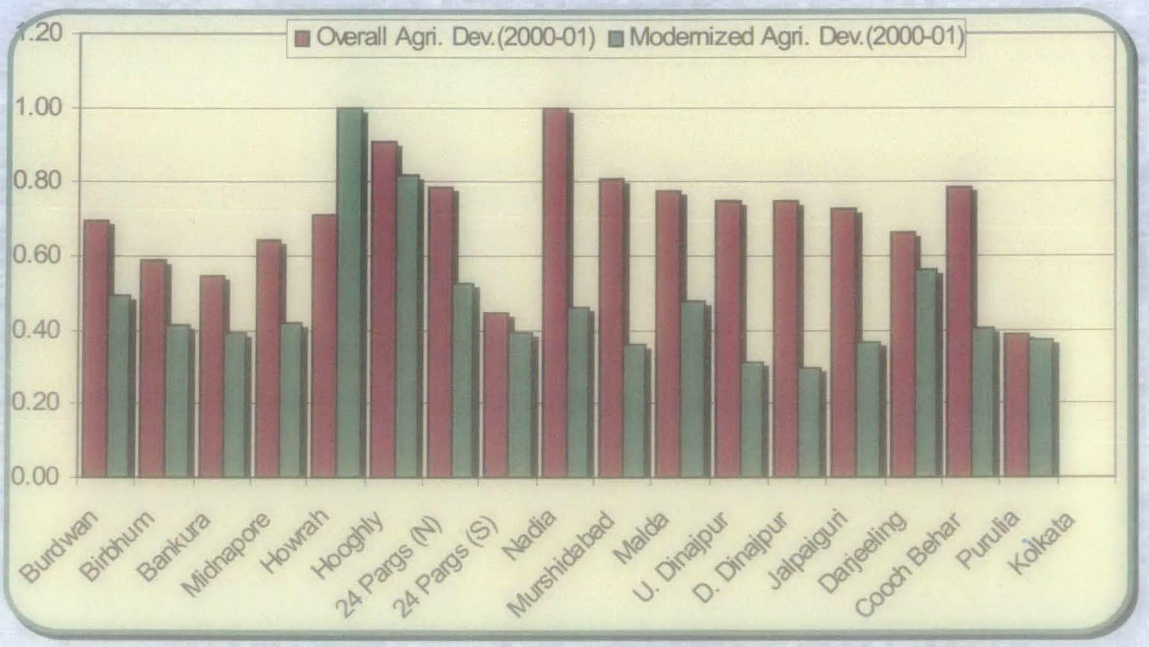


Figure 3.6: Dimensions of Agricultural Development in 2000-01

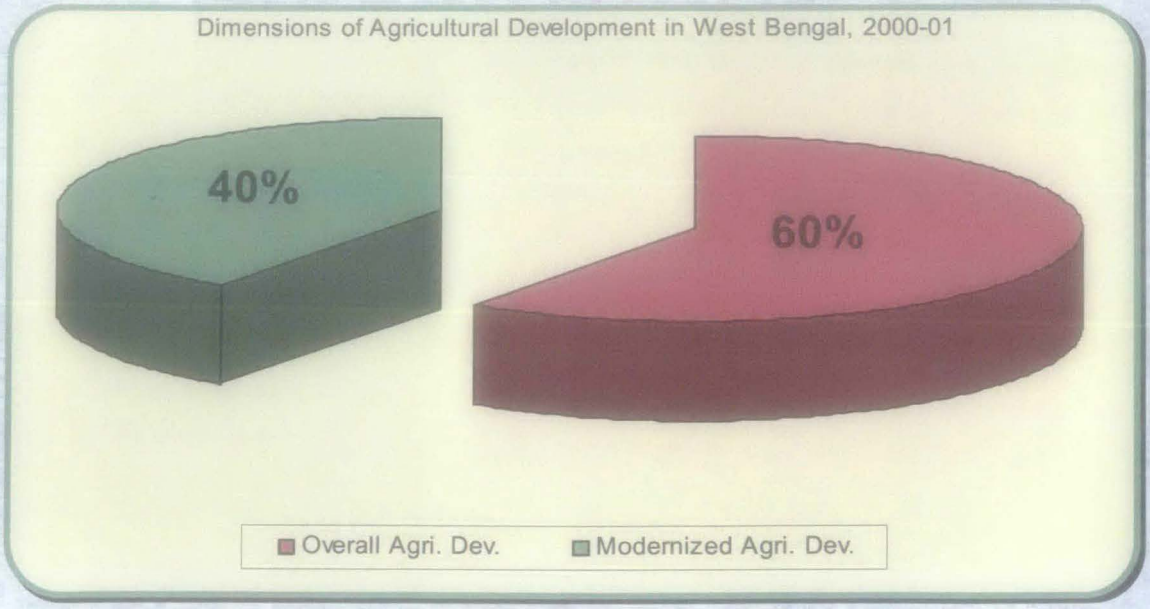


Figure 3.7

In the matter of fourth dimension i.e. modernized agricultural development, namely Howrah, Hooghly, Darjeeling, 24 Parganas (N), Burdwan, Malda and Nadia emerged as developed districts due to their placement above the state average. Remaining eleven districts were less developed in this respect. Extent of inter-district disparities was relatively high in this respect than the first dimension.

3.5 Summary

1. The problem of regional imbalances, at both inter-state and intra-state levels has persisted in India even during the post-plan era. Although concern was voiced about regional disparities in India right from the beginning of the planning era, yet a more concerted effort to address his problem was made only in the Third Five-Year Plan. In the subsequent plans also this problem was taken up seriously and as a consequence, several area development programmes were started to mitigate the extent of disparities in the socio-economic development. West Bengal is one of the recipients of funds under various Area Development Programmes initiated by the Central Government, under full or partial sponsorship.
2. Indicator-wise analysis revealed that there was incessant increase in the state average in terms of majority of indicators pertaining to key sector of the economy, i.e., agricultural sector.
3. It was noted that, inter-district disparities have shown increasing trend in respect of indicator such as gross value of agricultural produce per agricultural workers. On the other hand, decreasing trend in respect of indicators i.e. gross value of agricultural produce per hectare of net area sown, per capita of rural population, cropping intensity, credit to agriculture (Rs. per capita), consumption of fertilizer per hectare of gross cropped area and remaining other indicators have the mixed trend in the reference years.
4. The average level of agricultural development of West Bengal exhibits an increasing trend during 1980-81 to 2000-01. The ranking pattern of districts is similar in inter-district diversities, the rank correlation coefficient being R_{12} = -0.084 for the period 1980-81 and 1990-91. This shows that the level of agricultural development is not associated with resources endowment of the districts in this state.

5. Inter-district variations in levels of agricultural development demonstrate a declining trend in the reference years.
6. Various dimensions of agricultural development have been identified with the help of *Factor Analysis and Partial Cluster Analysis* in the reference years. These dimensions are mainly named as modernized agricultural development, traditional agricultural development and overall agricultural development- on the basis of formation of cluster in the reference years under study.
7. In the first dimension, i.e., modernized agricultural development shows that in the beginning, Hooghly, Howrah, Burdwan, 24 Parganas (N), Birbhum and Nadia were the developed districts but in the remaining twelve districts lagged behind. On the other hand, Dakshin Dinajpur, Jalpaiguri, Burdwan, Hooghly, Birbhum, Bankura, Darjeeling, Cooch Behar, Purulia and 24 Parganas (N) emerged as developed districts in respect of traditional agricultural development and the remaining eight districts remained in the backward category.
8. In the year 1990-91, Uttar Dinajpur, Dakshin Dinajpur, Birbhum, Malda, Nadia, Murshidabad, Hooghly, Burdwan, Midnapore, Cooch Behar and Bankura districts emerged as developed districts in the matter of first dimension, i.e., traditional agricultural development, and the remaining seven districts were less developed. Alternatively, nine districts, namely Hooghly, Howrah, Nadia, 24 Parganas (N), Malda, Murshidabad, Cooch Behar, Burdwan and Birbhum were identified as developed districts in respect of modernized agricultural development and the remaining nine districts were backward.
9. During 2000-01, two dimensions namely overall agricultural development and modernized agricultural development were recognized. Twelve districts namely Nadia, Howrah, Murshidabad, Cooch Behar, 24 Parganas (N), Malda, Uttar Dinajpur, Dakshin Dinajpur, Jalpaiguri, Howrah, Burdwan and Darjeeling emerged as developed districts in respect of overall agricultural development but the remaining six districts lagged behind. On the other hand, in the case of other dimension, i.e., modernized agricultural development, seven districts, namely Howrah, Hooghly, Darjeeling, 24

Parganas (N), Burdwan, Malda and Nadia emerged as developed districts but the remaining eleven districts were less developed.

Note: *Agricultural sector reveals three dimensional development– Modernized Agricultural Development, traditional Agricultural Development and Overall Agricultural Development. In the present study, modernized agricultural development is named to that dimension of agricultural development in which indicators such as consumption of fertilizer per hectare of gross cropped area, percentage of area under commercial crops to gross cropped area and credit to agriculture are positively and significantly associated with that dimension or factor in addition to other indicators. Traditional agricultural development points towards that dimensions in which above said three indicators do not have positive and significant correlation with that particular factor. Overall agricultural development is named to that dimension which is positively associated with first three indicators, viz. gross value of agricultural produce per hectare of net area sown, gross value of agricultural produce per capita of rural population and gross value of agricultural produce per agricultural workers (which are measuring performance of agriculture sector), along with indicators pertaining to modernization and commercialization of agriculture.*

CHAPTER 4

REGIONAL DISPARITIES IN INDUSTRIAL DEVELOPMENT

4.1 Introduction

Industrialization has a major role to play in the economic development of underdeveloped countries. The gap in per capita incomes between the developed and underdeveloped countries is largely reflected in the disparity in the structure of their economies; the former are largely industrial economies, while in the latter production is confined predominantly to agriculture. Undoubtedly, some countries have achieved relatively high per capita incomes by virtue of their fortunate national resource endowments. Petroleum exporting countries like Saudi-Arabia, Kuwait and UAE have achieved higher per capita income by exploiting the strong advantage that they enjoy in international trade. But these countries are a rather special case.

In many cases, the diversion of underdeveloped rural labour to non-agricultural occupations is an urgent requirement for development. But it does not mean that industrial development can be dissociated from progress in the agricultural sector. Improvement of productivity in agriculture creates surplus which can be utilized to support increasing labour force in industries. Besides providing a large part of the sustenance for the growing urban population, the agriculture sector supplies a market for manufactured goods out of higher real incomes and a source of foreign exchange to pay for imported capital goods for industry; it also provides a source of capital for industry through the medium of capital accumulated by traders and leads to the growth of an exchange economy— all these factors promote the growth of manufacturing industry. In fact, unless agriculture is modernized substantially, industrial expansion is likely to proceed at a slow speed due to lack of purchasing power in the hands of the bulk of population. The problem facing the less developed countries is, therefore, not one of choosing between primary and secondary activities but rather one of ensuring the balanced expansion of all appropriate sector of the economy.

The share of industry in national income in 1948-49 was 17 per cent. In 1996-97, it was around 23 per cent—an increase of just 4 per cent in 50 years.

Thus in terms of contribution of national product, the share of manufacturing industry sector continues to be low. In most of the developed nations, this share is between 30 and 50 per cent.

The structural reform programme as initiated by the Government of India particularly since 1991 aims at increasing the long-run growth rate of GDP through deregulation in commodity, money and factor markets. Attaining some poor growth, at about 3.5 per cent per annum, in the thirty years of the post-independence period, the Indian economy attained a growth rate of about 5.6 per cent during 1980-1990 and since mid 1990s, the economy grew by more than 6.3 per cent till 2004-05 and about 8.6 during 2005-06 to 2006-07. This has given rise to a vision of policy makers of attaining even higher growth rates. Some economists argue that one of the major indicators of planning in India is that despite a conscious effort made by the planners to promote labour intensive techniques of production, the growth of employment has continuously lagged behind the growth of labour force. The planners of Tenth Five Year Plan anticipated that in a labour surplus economy like India economic liberalization which includes trade openness, financial openness, outward orientation and minimal intervention in financial, goods, services and factor markets, was like to raise considerably the demand for skilled and unskilled labour. It is in this perspective that we need to assess the potential of Indian economy for attaining high growth of output and employment and ensuring stable price level.

But, when organized employment has almost been stagnant, unorganized sector, contributing almost half of the country's GDP, has performed well in terms of providing employment during the reform era. The NCEUS study estimates the number of such workers to be 23.5 crore constituting 77 per cent of the working population. This has only aggravated poverty due to the casual nature of the jobs and low wages.

The above factors have led to a significant opportunity to increase in industrial investment in West Bengal. Between 1991 and December 2005 the state received a large number of approvals for industrial investment entailing an invested capital of more than Rs. 36,210 crore in organized sector which led to highest net state domestic product. Moreover, the share of West Bengal in total approvals for foreign direct investment in the country between August 1991 and March 2005 was about 18 per cent, with only Maharashtra having a large share.

The actual implementation of projects has also picked up. After the new industrial policy was announced by the state government in 1994, *Shilpa Bandhu,* the 'single window' agency operating in the state, handled so far 1,000 investment proposals of which about 900 for new units and about 60 for expansion of existing units, with total capital outlay of about more than Rs. 50,000 crore.

4.2 Industrial Decline and the Need for Industrialization in West Bengal

Let us discuss the need for industrial priority in West Bengal, which is a big long-term question and an extremely important issue.

It is sometimes underestimated the extent to which Bengal has de-industrialized. Bengal was one of the major industrial centers in the world, not only in India. In European writings, Bengal has again and again come as being one of the most prosperous areas in the world as an industrial base, the kind of reputation that some parts of Italy gained later. We argue that it is often said that historically, Calcutta was found 300 years ago by Job Charnok (although this has been questioned by some historians) but it is also true that there was an urban settlement based on trade and industry, apart from agriculture, in this area. This we see not only from Indian records but also from the writings of Ptolemy and Pliny the Elder. Again very near from Calcutta, there were industrial areas of huge prosperity. There is also mention in the writings of Fa Hien who came here in 401 and spent 10 years. He went back by boat. He took the boat from Tamralipta, which is very close to Calcutta. Effectively, it was greater Calcutta. So this has been a trading and industrial area for a very long time. When Charnok came and the Battle of Palasi happened, there was not only English but also the French, the Portuguese, the Spanish, the Flemish and the Danish merchants. They were all interested in the industrial products of this area. Under the British, there was de-industrialization of classical industry but new industries came in the form, for example, of jute. But gradually that went off after independence and there was further de-industrialization. In fact, during the colonial era Bengal became the leading industrialized province in the erstwhile British India. In 1921, Bengal accounted for 35.1 per cent of the total number of industrial workers in India. In 1939, that is, just prior to the Second World War, Bengal accounted to be the major industrialized state in India accounting for 28.7 per cent of the total number of industrial workers in British India (BCCI, 1971).

If we go back in 1946, according to the first census of manufacturing industries in India (which covered all factories employing 20 or more workers using power) West Bengal continued to lead other states in terms of its share in total number of industrial workers in India, though in terms of value added in the manufacturing sector, West Bengal was second to Bombay.

Industrial employment in the engineering and other major industries in 1948 as reproduced in BCCI, (1971:11), West Bengal had a much higher level of employment in the engineering industries than Bombay. In case of chemicals and food, drink, tobacco, Bombay had marginally higher employment than West Bengal; and in chemicals (leaving out dyeing and bleaching) West Bengal had greater employment. In other industries such as paper and leather, West Bengal had higher employment than Bombay. It is only in textiles, in terms of employment, that Bombay had a clear superiority over West Bengal. Besides this, the industrial structure of West Bengal was more diversified than that of Bombay.

We know that planned industrialization began in India from 1951 with the beginning of the First Plan. The annual industrial growth rate (compound) was 5.7 per cent in the First Plan, 7.2 per cent in the Second Plan and 9.0 per cent during the Third Plan (5^{th} Five Year / Plan document, Planning Commission, Govt. of India). After 1965, industrial growth slackened and averaged about 3.7 per cent per annum between 1965 and 1975, and it is only in the 1980s that it achieved the rate of the pre-1965 era. During the period 1951-65, West Bengal continued to prosper. In the period between 1951 and 1965, the value of industrial output in West Bengal increased by 287 per cent (BCCI 1971:41). Registered factory employment in West Bengal in the same period increased from 6, 51, 944 to 8, 80, 270 (Economic Review, GoWB, various issues). But West Bengal fell behind Maharashtra in terms of the number of industrial licenses received although they together still accounted for over 40 per cent of licenses issued.

In fact, West Bengal never recovered from the industrial recession and the related political turmoil of the late 1960s. Data on licenses show that industrial investment in the state was very sluggish in the 1970s and 1980s (Economic Review, GoWB, various issues). This is also indicated by data on the state wise fixed capital per employee in the factory sector. West Bengal had the lowest fixed capital per employee in 1977-78 among the eight states. In 2004-05, West

Bengal in terms of fixed capital per employee was ranked fifth (ASI, Govt. of India, various issues).

So, in addition to a low level of capital formation West Bengal also experienced a sharp decline in employment during this period. It must be emphasized that the case of an initially industrialized region slowly losing its importance is not unheard of. Then one may cite the example that West Bengal was an exactly opposite case of Myrdal's concept of 'cumulative causation' which led to the belief that developed regions would always continue to grow at the expense of the poor regions (North East England and Wallonia in Belgium are also classic examples during seventies in this regard). What is more, the introduction of freight equalization for steel in the mid-1950s had made new locations for engineering industries, at a distance from steel plants, viable. Damette (1980:84) had observed this elsewhere, though in a different context and has stated that the state often reduces the cost of new locations for entrepreneurs. Then the culmination of this policy measure led to the growth of engineering industry outside West Bengal. Moreover, the recession of 1966-67 affected most severely the engineering industry in West Bengal which was still dominated by old units, while other states could absorb the impact of recession without great damage to their industrial structure.

An argument that has considerable adherents is that investments are not affected by labour trouble, the protagonists point to the case of Maharashtra where the number of industrial disputes has been consistently higher than that in West Bengal. Banerjee (1982, 337-340) for instance makes out a case along these lines. But we think that it misses out on the main issue. Actually industrialists are willing and even able to cope with 'normal' labour disputes as long as the state authorities are investor friendly but when organized labour bids for political power it becomes a different issue. Therefore, the crucial factor in West Bengal's decline was thus, the lack of industrial investments to modernized existing industries and no development of new industries. As a result, West Bengal was losing its export competitiveness to other regions because of high cost of production. It further squeezed the field for employment of capital and labour and led to the phenomenon of capital and labour moving out of the state.

We know that the effects of poor infrastructure are much more palpable. A recent study puts West Bengal 14th among Indian states in 1997-98 in terms of

an index of infrastructure, as compared with 4th position in 1971-72. The index comprises (a) roads, railways, ports (b) irrigation (c) electricity (d) telephone (d) loan-deposit ratios of banks and (f) tax collection of the state government. In terms of each of these individual items, West Bengal has fallen below the national average whereas in 1964-65 it either came first or second. These facts therefore suggest infrastructure to be a key factor explaining the declining of West Bengal's industrial performance relative to the rest of the country. The first drive for industrialization in India took place during 1956-65; four decades later the second one has just begun.

Industrialization is supposed to be the engine as well as a versatile indicator of economic development. It involves major transformation of an economy from one, which is dominated by primary activities to one containing a large industrial sector. This transformation is accompanied by the development of transport and communication, trade and commerce, services and overall urbanization, and necessitates the reorganization of economic, social and cultural life of the people. It is complementary, not contrary to the rural development. It is because industrialization provides market for agricultural products, produces appropriate farm inputs and jobs to unemployed and is capable of triggering off a chain of development in rural areas. But the development of industries, more specifically location of industries is determined by several factors. Among them, raw materials, power and energy, market, capital, transport and labour are key factors. Nevertheless, from the economic point of view, manufacturing industries are located at a place where cost of bringing together of production factors and delivery cost of manufactured goods to consumers are the lowest, thus yielding maximum profit.

In West Bengal the state government always makes endeavour to foster the growth of cottage and small-scale industries because of its employment potentiality and capability to spread through a wide network. The Directorate of cottage and small-scale industries of the state government has the system of registering these small-scale industries and providing necessary support so that these units can flourish in near future (Chatterjee, and Ghosh, 2001, p.24).

"West Bengal once industrially the foremost state in India is striving to regain its former glory" says the Annual Report, 1998-99 of Commerce and Industries Department, Govt. of West Bengal. For achieving the goal the state

government always patronizes the case of setting up industrial units in this state. According to the Incentive Scheme introduced by the state government for industrialization of the economy, the districts are arranged in three groups, viz. A, B, C on the basis of the industrialization achieved.

4.3 Indicators of Industrial Development

In order to show the inter-district disparity in industrial development we have used the following indicators *(see in Appendix to chapter-4)*.

I-1: Number of registered factories per thousand Sq. Kms. of area

I-2: Number of registered factories per lakh of population

I-3: Number of workers engaged in registered factories per thousand Sq. Kms. of area

I-4: Number of workers engaged in registered factories per lakh of population

I-5: Number of industrial units (small-scale) per thousand Sq. Kms. of area

I-6: Number of industrial units (small-scale) per lakh of population

I-7: Percentage of workers in manufacturing to total workers

4.3.1 Rationale for the Choice of Indicators of Industrial Development

The level of industrial development can be measured by using indicators of different characteristics. But in the present case, the above mentioned seven indicators have been selected for analyzing the level of industrial development at district level in West Bengal. The first and the fifth indicators show the density of factories and the density of small-scale industrial units respectively in a district. Similarly, the second and sixth indicators exhibit the number of factories and number of small-scale industrial units in relation to population. The remaining three indicators, I-3, I-4 and I-7 show how far the industrial sector has succeeded in providing employment.

4.3.2 Share of Manufacturing Sector (in percentage) in DDP by West Bengal Districts

The share of manufacturing sector in DDP for the period 1980-81 to 2000-01 is presented in Table 4.1. The manufacturing sector takes into account both the registered and unregistered units. In the registered manufacturing sector the SDP at constant prices showed a marginal decline from Rs. 2245.02 crores in 1991-92 to Rs. 2214.39 crores in 1992-93.

According to the Economic Review 1993-94 published by the Govt. of West Bengal "this decline is related to the decline in industrial production in the

state because of the severe recession in the industrial sector in the country as a whole. The SDP in unregistered manufacturing sector however increased from Rs. 1221.08 crores in 1991-92, in percentage term 0.92 percent. The setting up of large number of units mostly in the tiny and cottage industries sector especially under IRDP (Integrated Rural Development Programme) contributed to this increase" (Economic Review, 1993-94 GoWB). From Table 4.1, it can be seen that Howrah retained the first position among 18 districts throughout the reference period. On the other hand, the share of Dakshin Dinajpur district the share of manufacturing sector in DDP remained the lowest. Most of the districts in North Bengal may be identified as industrially backward.

Table 4.1: Share of Manufacturing Sector (in percentage) in DDP

Districts	1980-81	1990-91	2000-01
Burdwan	25.861	20.439	17.538
Birbhum	17.490	7.765	5.082
Bankura	10.036	9.349	7.642
Midnapore	16.616	14.510	12.122
Howrah	47.587	44.232	27.489
Hooghly	32.167	28.073	20.472
24 Parganas (N)	45.589	27.430	26.215
24 Parganas (S)	18.605	11.194	21.485
Nadia	13.052	9.560	16.573
Murshidabad	7.712	17.038	15.635
Malda	16.449	10.577	8.596
Uttar Dinajpur	7.018	3.912	5.125
Dakshin Dinajpur	4.877	2.719	5.932
Jalpaiguri	16.745	9.475	10.198
Darjeeling	42.347	8.083	6.772
Cooch Behar	8.838	5.583	5.688
Purulia	16.787	10.966	11.894
Kolkata	14.047	16.981	7.288
West Bengal,	24.679	17.702	14.999

Source: Statistical Abstract, the Bureau of Applied Economics and Statistics, GoWB (various years)

4.4 District-wise Industrial Sector Development: Indicator-wise Assessment

Inter-District Disparities in Terms of the Indicator of Industrial Development

The distribution of districts according to their respective levels of development with respect to different indicators of industrial development is shown in Table 4.2, Table 4.3 and Table 4.4 for the years 1980-81, 1990-91 and 2000-01 respectively.

Table 4.2: Distribution of Districts by Relative Levels of Industrial Development in 1980-81

Sl. No.	Indicators	State Average	Developed Districts	Developing Districts
1	No. of registered factories per 1000 sq. kms. of area	280.62	Kolkata, Howrah, 24 Parganas (N)	24 Parganas (S), Hooghly, Darjeeling, Burdwan, Jalpaiguri, Nadia, Birbhum, Bankura, Purulia, Midnapore, Uttar Dinajpur, Cooch Behar, Dakshin Dinajpur, Murshidabad, Malda
2	No. of registered factories per lakh of population	10.16	Howrah, 24 Parganas (N), 24 Parganas (S), Kolkata, Darjeeling, Jalpaiguri	Burdwan, Hooghly, Birbhum, Nadia, Bankura, Purulia, Midnapore, Uttar Dinajpur, Dakshin Dinajpur, Cooch Behar, Malda, Murshidabad
3	No. of workers engaged in registered factories per 1000 sq kms. of area	18940.76	Howrah, Kolkata, 24 Parganas (N), Hooghly	24 Parganas (S), Burdwan, Jalpaiguri, Darjeeling, Nadia, Midnapore, Birbhum, Purulia, Uttar Dinajpur, Dakshin Dinajpur, Murshidabad, Bankura, Cooch Behar, Malda
4	No. of workers engaged in registered factories per lakh of Population	1236.99	Howrah, 24 Parganas (N), 24 Parganas (S), Hooghly, Burdwan	Darjeeling, Jalpaiguri, Kolkata, Nadia, Midnapore, Purulia, Birbhum, Bankura, Dakshin Dinajpur, Uttar Dinajpur, Cooch Behar, Murshidabad, Malda
5	No. of industrial units (small scale) per 1000 sq. kms of area	337.44	Kolkata, Howrah, Nadia	24 Parganas (N), Burdwan, Hooghly, Malda, Cooch Behar, Birbhum, Jalpaiguri, Midnapore, Darjeeling, Murshidabad, Bankura, Dakshin Dinajpur, Uttar Dinajpur, Purulia, 24 Parganas (S)
6	No. of industrial units (small scale) per lakh of	24.01	Nadia, Howrah, Burdwan, Jalpaiguri, Malda, Cooch Behar,	24 Parganas (N), Hooghly, Bankura, Midnapore, Kolkata, Purulia,

	population		Darjeelig, Birbhum	Dakshin Dinajpur, Uttar Dinajpur, Murshidabad, 24 Parganas (S)
7	Percentage of workers in manufacturing to total workers	5.55	24 Parganas (N), 24 Parganas (S), Howrah, Burdwan, Hooghly	Jalpaiguri, Midnapore, Kolkata, Darjeeling, Nadia, Purulia, Birbhum, Bankura, Murshidabad, Uttar Dinajpur, Cooch Behar, Dakshin Dinajpur, Malda

It may be noticed from Tables 4.2, 4.3 and 4.4 that the number of registered factories per thousand of Sq. Kms. of area and percentage of workers in manufacturing to total workers between 1980-81 and 2000-01 have increased manifold in absolute terms. However, the number of small-scale industrial units in relation to population has shown a declining trend during the same period. Number of workers engaged in registered factories per thousand Sq. Kms. of area and in relation to population has shown declining trend during the period 1980-81 and 2000-01.

Table 4.3: Distribution of Districts by Relative Levels of Industrial Development in 1990-91

Sl. No.	*Indicators*	*State Average*	*Developed Districts*	*Developing Districts*
1	No. of registered factories per 1000 sq. kms. of area	419.09	Kolkata, Howrah, 24 Parganas (N)	24 Parganas (S), Hooghly, Burdwan, Darjeeling, Jalpaiguri, Nadia, Birbhum, Bankura, Midnapore, Uttar Dinajpur, Purulia, Cooch Behar, Malda, Dakshin Dinajpur, Murshidabad
2	No. of registered factories per lakh of population	11.97	Howrah, 24 Parganas (N), 24 Parganas (S), Kolkata, Darjeeling, Jalpaiguri	Hooghly, Burdwan, Birbhum, Nadia, Bankura, Purulia, Midnapore, Uttar Dinajpur, Cooch Behar, Dakshin Dinajpur, Malda, Murshidabad
3	No. of workers engaged in registered factories per 1000 sq kms. of area	18411.62	Howrah, Kolkata, 24 Parganas (N), Hooghly	24 Parganas (S), Darjeeling, Jalpaiguri, Nadia, Burdwan, Midnapore, Birbhum, Purulia, Murshidabad, Uttar Dinajpur, Dakshin Dinajpur, Bankura, Cooch Behar, Malda
4	No. of workers engaged in	894.07	Howrah, 24 Parganas (N), 24 Parganas (S), Hooghly	Darjeeling, Jalpaiguri, Kolkata, Nadia, Midnapore, Burdwan,

	registered factories per lakh of population			Purulia, Birbhum, Dakshin Dinajpur, Bankura, Murshidabad, Uttar Dinajpur, Cooch Behar, Malda
5	No. of industrial units (small scale) per 1000 sq. kms of area	617.06	Kolkata, Howrah, 24 Parganas (N), Nadia	Hooghly, Darjeeling, Burdwan, Malda, Cooch Behar, Midnapore, Murshidabad, Birbhum, Dakshin Dinajpur, Jalpaiguri, Bankura, Uttar Dinajpur, 24 Parganas (S), Purulia
6	No. of industrial units (small scale) per lakh of population	42.56	Darjeeling, Nadia, 24 Parganas (N), Howrah, Malda, Cooch Behar, Burdwan, Midnapore	Hooghly, Bankura, Jalpaiguri, Murshidabad, Birbhum, Dakshin Dinajpur, 24 Parganas (S), Uttar Dinajpur, Purulia, Kolkata
7	Percentage of workers in manufacturing to total workers	5.55	24 Parganas (N), 24 Parganas (S), Howrah, Hooghly	Midnapore, Jalpaiguri, Kolkata, Burdwan, Nadia, Darjeeling, Birbhum, Purulia, Murshidabad, Bankura, Uttar Dinajpur, Dakshin Dinajpur, Cooch Behar, Malda

According to the Table 4.3 Kolkata, Howrah and 24 Parganas (N) were above the state average in respect of number of registered factories relative to geographical area in the year 2001. In the matter of concentration of registered factories relative to population, Howrah, 24 Parganas (N), 24 Parganas (S), Hooghly and Burdwan districts were also in the developed category of districts. Majority of districts were categorized as less developed districts in respect of most of the indicators of industrial development.

Table 4.4: Distribution of Districts by Relative Levels of Industrial Development in 2000- 01

Sl. No.	*Indicators*	*State Average*	*Developed Districts*	*Developing Districts*
1	No. of registered factories per 1000 sq. kms. of area	476.61	Kolkata, Howrah, 24 Parganas (N)	24 Parganas (S), Hooghly, Burdwan, Darjeeling, Jalpaiguri, Nadia, Birbhum, Bankura, Midnapore, Uttar Dinajpur, Purulia, Malda, Dakshin Dinajpur, Cooch Behar, Murshidabad
2	No. of registered factories per lakh of population	12.83	Howrah, 24 Parganas (N), 24 Parganas (S), Kolkata, Darjeeling, Jalpaiguri	Burdwan, Hooghly, Birbhum, Bankura, Nadia, Purulia, Midnapore, Uttar Dinajpur, Dakshin Dinajpur, Cooch Behar, Malda, Murshidabad

3	No. of workers engaged in registered factories per 1000 sq kms. of area	19265.89	Howrah, Kolkata, 24 Parganas (N), Hooghly	24 Parganas (S), Burdwan, Jalpaiguri, Darjeeling, Nadia, Midnapore, Birbhum, Bankura, Uttar Dinajpur, Dakshin Dinajpur, Purulia, Murshidabad, Malda, Cooch Behar
4	No. of workers engaged in registered factories per lakh of population	857.22	Howrah,24 Parganas (N), 24 Parganas (S), Hooghly, Burdwan	Darjeeling, Jalpaiguri, Kolkata, Midnapore, Nadia, Bankura, Purulia, Birbhum, Dakshin Dinajpur, Uttar Dinajpur, Murshidabad, Malda, Cooch Behar
5	No. of industrial units (small scale) per 1000 sq. kms of area	176.62	Kolkata, Howrah, Nadia, 24 Parganas (N), Malda	Hooghly, Burdwan, Darjeeling, Midnapore, Murshidabad, Dakshin Dinajpur, Uttar Dinajpur, Jalpaiguri, Bankura, Cooch Behar, Birbhum, Purulia, 24 Parganas (S)
6	No. of industrial units (small scale) per lakh of population	11.11	Nadia, Malda, Darjeeling, Howrah, Bankura, 24 Parganas (N)	Midnapore, Jalpaiguri, Dakshin Dinajpur, Burdwan, Hooghly, Purulia, Uttar Dinajpur, Cooch Behar, Murshidabad, Birbhum, Kolkata, 24 Parganas (S)
7	Percentage of workers in manufacturing To total workers	5.55	24 Parganas (N), Howrah, 24 Parganas (S), Hooghly, Burdwan	Midnapore, Jalpaiguri, Kolkata Nadia, Darjeeling, Bankura, Birbhum, Purulia, Murshidabad, Uttar Dinajpur, Dakshin Dinajpur, Malda, Cooch Behar

Inter-district disparities in the state, as per data in the Table 4.5, have got exacerbated for the reason that density of industries was growing in some special sites on the periphery of the state. High inter-district disparities were found in the case of number of registered factories as well as number of workers engaged in such factories both in terms of area and population. On the other hand, relatively low inter-district disparities emerged in terms of the indicator such as number of industrial units (small-scale) in relation to population.

Table 4.5: Indicator-wise Co-efficient of Variation (percentage)				
Sl. No.	Indicator	1980-81	1990-91	2000-01
1	Number of registered factories per 1000 sq. kms of area	267.03	268.37	253.63
2	Number of registered factories per 100000 (lakh) of population	125.54	124.25	123.95
3	Number of workers engaged in registered factories per 1000 sq. kms of area	171.01	181.12	172.90
4	Number of workers engaged in registered factories per 100000 (lakh) of population	134.70	141.44	123.70
5	Number of industrial units (small Scale) per 1000 sq. kms. of area	198.56	153.16	145.78
6	Number of industrial units (small Scale) per 100000 (lakh) of population	54.98	53.04	61.91
7	Percentage of workers in manufacturing to total workers	152.47	163.53	142.90
Source: Authors Calculation				

4.5 District-wise Composite Indices of Industrial Sector Development:

District-wise Analysis of the Level of Industrial Development

The district-wise levels of industrial development have been analyzed with the help of composite indices of industrial development. These indices have been calculated by taking first Principal Component (PC) matrix. It has been obtained from the inter-correlation matrix of such variables for the year 1980-81, 1990-91 and 2000-01, as shown in Tables 4.6, 4.7 and 4.8 respectively.

We have used the same seven indicators of industrial development as noted earlier in this chapter. It may be observed from Table 4.6 that number of registered factories relating to geographical area is positively and significantly correlated with number of workers engaged in registered factories per thousand Sq. Kms. of area and number of industrial units (small-scale) per thousand Sq. Kms. of area, other three variables namely, I-2, I-4 and I-7 are positively correlated but statistically insignificant even at 10% level with the first indicator. Only I-6 variable that is number of industrial units (small-scale) relative to population is negatively correlated and statistically insignificant even at 10% level with the first indicator.

Table 4.6: Inter-Correlation Matrix of Industrial Development (1980-81)							
Variable	I - 1	I - 2	I – 3	I – 4	I – 5	I - 6	I – 7
I - 1	1.000						
I - 2	0.419	1.000					
I - 3	0.756	0.826	1.000				
I - 4	0.149	0.866	0.716	1.000			
I - 5	0.984	0.324	0.699	0.069	1.000		
I - 6	-0.054	0.123	0.094	0.099	0.065	1.000	
I - 7	0.101	0.758	0.607	0.944	0.019	-0.011	1.000
Note: Critical value of r at 10 percent level = 0.497 Critical value of r at 5 percent level = 0.576 Critical value of r at 1 percent level = 0.714							

Similarly, it may also be observed from Table 4.7 that a positive and significant correlation exists among the number of workers engaged in registered factories per thousand Sq. Kms. of area and number of industrial units (small-scale) per thousand Sq. Kms. of area.

Table 4.7: Inter-Correlation Matrix of Industrial Development (1990-91)							
Variable	I - 1	I - 2	I – 3	I – 4	I – 5	I – 6	I – 7
I - 1	1.000						
I - 2	0.394	1.000					
I - 3	0.804	0.780	1.000				
I - 4	0.163	0.907	0.671	1.000			
I - 5	0.980	0.428	0.844	0.225	1.000		
I - 6	-0.175	0.255	0.050	0.246	-0.026	1.000	
I - 7	0.129	0.812	0.587	0.939	0.193	0.177	1.000
Note: Critical value of r at 10 percent level = 0.497 Critical value of r at 5 percent level = 0.576 Critical value of r at 1 percent level = 0.714							

Further, Table 4.8 depicts a positive and significant correlation among registered factories in relative to geographical area and number of industrial units (small-scale) in relation to area. But three indicators are positively and insignificantly correlated with the first indicator.

Table 4.8: Inter-Correlation Matrix of Industrial Development (2000-01)							
Variable	I - 1	I - 2	I – 3	I - 4	I – 5	I - 6	I – 7
I - 1	1.000						
I - 2	0.428	1.000					
I - 3	0.821	0.794	1.000				
I - 4	0.202	0.920	0.683	1.000			
I - 5	0.947	0.306	0.744	0.105	1.000		
I - 6	-0.214	-0.113	-0.148	-0.090	0.072	1.000	
I - 7	0.149	0.814	0.577	0.919	0.070	-0.127	1.000
Note: Critical value of r at 10 percent level = 0.497 Critical value of r at 5 percent level = 0.576 Critical value of r at 1 percent level = 0.714							

Table 4.9: Principal Component Matrix of Industrial Development (1980-81)				
Variable	P_1	P_2	P_3	h^2
1	0.6703	0.7348	-0.0802	0.9957
2	0.9084	-0.2514	0.0313	0.8893
3	0.9663	0.1643	0.0114	0.9608
4	0.8266	-0.5493	-0.0147	0.9853
5	0.6032	0.7875	0.0476	0.9862
6	0.0985	-0.0583	0.9924	0.9980
7	0.7533	-0.5816	-0.1328	0.9234
Eigenvalue	*3.8324*	*1.8936*	*1.0125*	
Percentage Variance	*54.7492*	*27.0520*	*14.4650*	
Cumulative Variance (%)	*54.7492*	*81.8013*	*96.2662*	

The data in the above tables, depicting inter-correlation matrices, bring out by and large, a positive correlation among all the seven indicators of industrial development in the reference years. The inter-correlation matrices for the years 1980-81, 1990-91 and 2000-01 have been further transformed into Principal Component matrices and presented in Tables 4.9, 4.10 and 4.11 respectively.

In respect of 1980-81, on the basis of Principal Component matrix, three Principal Component (PCs) have been retained which taken together explained 96.27 per cent of the total variance. It may be observed from Table 4.9 that out of seven indicators, six indicators are positively correlated with the first Principal Component. The first principal component explains 54.75 per cent of the total variance. Further, all the Communalities (h^2) are very high ranging from +0.8893 to +0.9980, which indicates that each variable taken for analysis is significantly correlated with all the variables.

Table 4.10: Principal Component Matrix of Industrial Development (1990-91)			
Variable	P_1	P_2	h^2
1	0.6760	-0.7260	0.9841
2	0.9068	0.3060	0.9160
3	0.9534	-0.2403	0.9667
4	0.8280	0.5220	0.9580
5	0.7242	-0.6513	0.9486
6	0.1598	0.4863	0.2620
7	0.7712	0.5240	0.8694
Eigenvalue	*4.0186*	*1.8862*	
Percentage Variance	*57.4083*	*26.9458*	
Cumulative Variance (%)	*57.4083*	*84.3540*	

The selected indicators were, by and large, correlated with each other in the reference years, i.e. 1980-81, 1990-91 and 2000-01 and in most of the cases

the correlation was significant as well. The first Principal Component explained 54.75 per cent of the total variance in 1980-81, 57.41 per cent in 1990-91 and 55.98 per cent in 2000-01.

Table 4.11: Principal Component Matrix of Industrial Development (2000-01)

Variable	P_1	P_2	P_3	h^2
1	0.7104	0.6908	-0.1149	0.9950
2	0.9089	-0.3135	0.0605	0.9280
3	0.9565	0.2225	0.0145	0.9646
4	0.8272	-0.5386	0.0807	0.9809
5	0.6133	0.7636	0.1576	0.9840
6	-0.1793	0.0381	0.9829	0.9997
7	0.7622	-0.5700	0.0336	0.9070
Eigenvalue	*3.9190*	*1.8245*	*1.0157*	
Percentage Variance	*55.9862*	*26.0638*	*14.5096*	
Cumulative Variance (%)	*55.9862*	*82.0501*	*96.5597*	

The composite indices of industrial development for three selected points of time for each district were constructed. These indices for the year 1980-81 were constructed by using the following equation:

$$ID_1 = (0.6703)\,Z_1 + (0.9084)\,Z_2 + (0.9663)\,Z_3 + (0.8266)\,Z_4 + (0.6032)\,Z_5 + (0.0985)\,Z_6 + (0.7533)\,Z_7 \quad \text{(I)}$$

Where, ID_1 stands for composite index of industrial development for a district, Z_1, Z_2, Z_3,..., Z_7 are standardized values of variables and figure in parentheses are factor loadings or weights of the variables concerned.

Similarly, the composite index of industrial development for each district has been constructed for the year 1990-91 by using the equation given below:

$$ID_2 = (0.6760)\,Z_1 + (0.9068)\,Z_2 + (0.9534)\,Z_3 + (0.8280)\,Z_4 + (0.7242)\,Z_5 + (0.1598)\,Z_6 + (0.7712)\,Z_7 \quad \text{(II)}$$

Where, ID_2 stands for composite index of industrial development for a district. Z_1, Z_2, Z_3, ..., Z_7 are standardized values of variables and figure in parentheses are factor loadings or weights of the variable concerned.

In the same manner the composite index of industrial development for each district for the year 2000-01 has been constructed in terms of the following equation:

$$ID_3 = (0.7104)\,Z_1 + (0.9089)\,Z_2 + (0.9565)\,Z_3 + (0.8272)\,Z_4 + (0.6133)\,Z_5 + (-0.1793)\,Z_6 + (0.7622)\,Z_7 \quad \text{(III)}$$

Where, ID_3 stands for composite index of industrial development for a district, Z_1, Z_2, Z_3 ... Z_7 are standardized values of variables and figure in parentheses are factor loadings or weights.

All the eighteen districts of the state have been ranked according to their levels of industrial development as per the indices of infrastructure development during the three selected years of our study (Table 4.12 and Fig 4.1).

It is apparent from the Table 4.12 that, according to the level of industrial development in 1980-81, district Howrah was at the top, followed by Kolkata, 24 Parganas (N), Hooghly and Burdwan. Conversely, district Murshidabad was at the bottom, preceded immediately by Dakshin Dinajpur. Correspondingly, in 1990-91, district Howrah was again at the top followed by Kolkata, 24 Parganas (N), 24 Parganas (S) and Hooghly. On the contrary, Dakshin Dinajpur was at the bottom, preceded immediately by Dakshin Dinajpur, Uttar Dinajpur, Murshidabad, Purulia, Bankura, Cooch Behar, Malda and Birbhum. After a decade, the comparative levels of industrial development as reflected in the ranking of the districts did not show any significant change, only at the bottom position there occurred a slight reshuffle, i.e. Malda, Cooch Behar, Dakshin Dinajpur, Murshidabad, Uttar Dinajpur, Purulia, Bankura and Birbhum in the reference year 2000-01.

It may be observed from Table 4.12 that the value of coefficient of variation increased from 141.61 per cent in 1980-81 to 147.75 per cent in 1990-91 and further slightly decreased is 145.76 per cent in the year 2000-01. This increase indicates that the disparities in the level of industrial development have increased during the period between 1980-81 and 1990-91, but in 2000-01 slightly decreased, which is a good sign for pace of industrial development in West Bengal.

Further, the districts have been classified into two categories on the basis of their levels of industrial development. As pointed out at *methodology part*, the levels of development in which districts have been classified are developed and developing. Developed districts are those, which have the composite index value of industrial development above the state average whereas developing districts have a value below the state average.

The classification of districts according to composite index of industrial development for the years 1980-81, 1990-91 and 2000-01 is given in Table 4.13.

The most interesting and remarkable feature of industrial development in West Bengal over the twenty year period of study is that the pattern of industrialization has remained the same. That is, the districts which are historically developed industrially, there position remained the same. Thus there has been no dispersal of industries to the districts which are industrially backward. This may be a matter of concern to the policy makers in West Bengal.

Inter-temporal analysis of Table 4.13 reveals that in 1980-81, 1990-91 and 2000-01 fairly five districts, namely Howrah, Kolkata, 24 Parganas (N), 24 Parganas (S) and Hooghly were in the category of developed districts.

It is apparent from the above analysis that industrial development has operated according to the hypothesis of cumulative causation with the result that the advanced districts have developed further in relation to backward ones and the backward districts have developed less in relation to advanced ones. According to the value of composite indices of industrial development, Table 4.13 shows that Howrah district has been progressing rapidly in the process of industrialization throughout the reference period i.e. from 1980-81 to 2000-01 and also maintaining its ranking at the top among the districts.

Table 4.12: District-wise Indices of Industrial Development

Districts	1980-81		1990-91		2000-01	
	Index	*Rank*	*Index*	*Rank*	*Index*	*Rank*
Burdwan	0.2880	6	0.0881	9	0.2248	6
Birbhum	0.0447	10	0.0282	11	0.0360	11
Bankura	0.0210	13	0.0168	14	0.0273	12
Midnapore	0.0383	11	0.0567	10	0.0564	10
Howrah	1.0000	1	1.0000	1	1.0000	1
Hooghly	0.3413	5	0.3487	5	0.3444	5
24 Parganas (N)	0.7888	3	0.8034	3	0.7353	3
24 Parganas (S)	0.4396	4	0.4685	4	0.4660	4
Nadia	0.1017	9	0.1054	8	0.0623	9
Murshidabad	0.0000	18	0.0083	16	0.0117	15
Malda	0.0175	15	0.0233	12	0.0000	18
Uttar Dinajpur	0.0057	16	0.0001	17	0.0160	14
Dakshin Dinajpur	0.0030	17	0.0000	18	0.0089	16
Jalpaiguri	0.1409	8	0.1180	7	0.1317	7
Darjeeling	0.1578	7	0.1965	6	0.1255	8
Cooch Behar	0.0181	14	0.0215	13	0.0043	17
Purulia	0.0269	12	0.0097	15	0.0198	13
Kolkata	0.7944	2	0.8190	2	0.7935	2
Mean	*0.2349*		*0.2285*		*0.2258*	
S.D.	*0.3326*		*0.3375*		*0.3291*	
C.V.	*141.61*		*147.75*		*145.76*	
Rank Correlation of Coefficient, R_{12} = + 0.96, R_{13} = + 0.96, R_{23} = + 0.91						

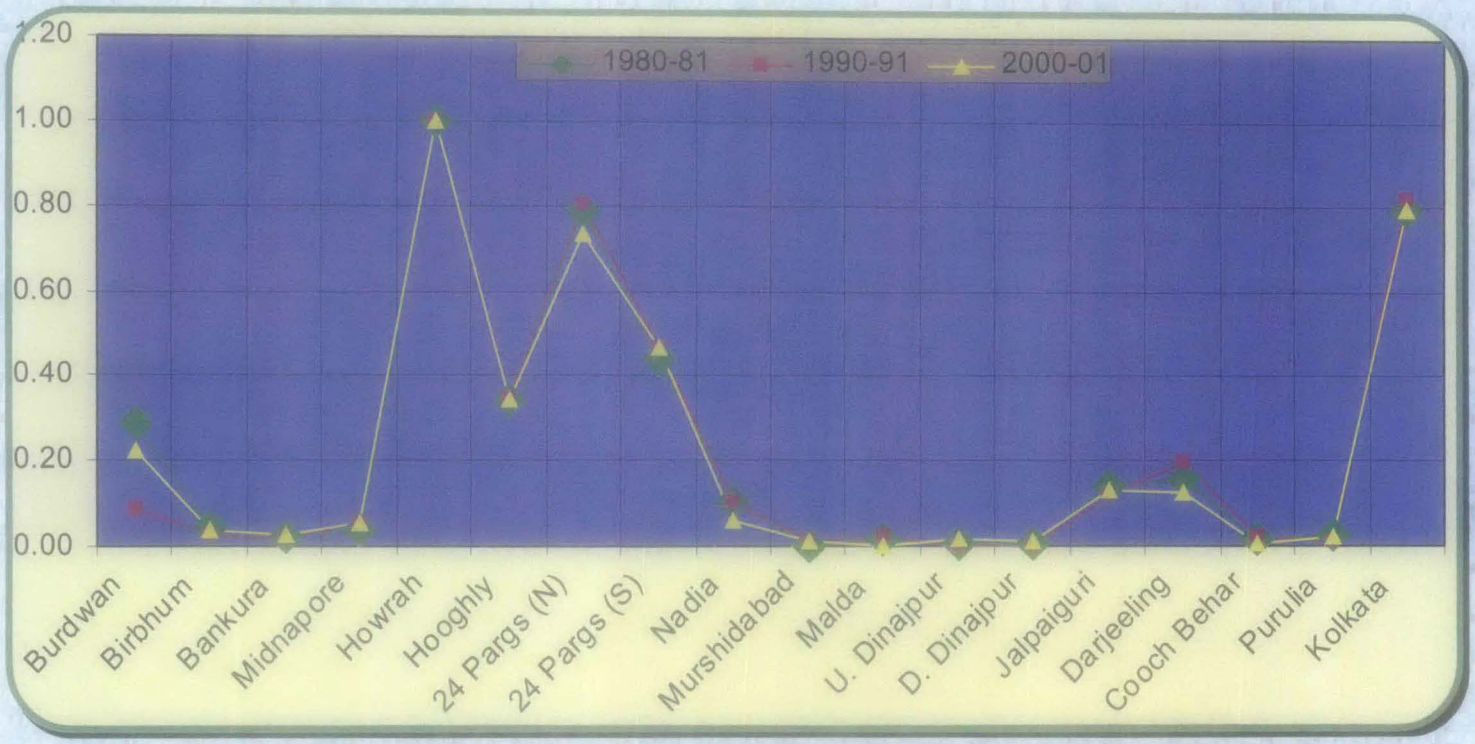


Figure 4.1: Patterns of Industrial Development in West Bengal

Table 4.13: Classification of Districts According to Level of Industrial Development					
1980-81		1990-91		2000-01	
Districts	*Index*	*Districts*	*Index*	*Districts*	*Index*
Developed Districts					
Howrah	1.0000	Howrah	1.0000	Howrah	1.0000
Kolkata	0.7944	Kolkata	0.8190	Kolkata	0.7935
24 Parganas (N)	0.7888	24 Parganas (N)	0.8034	24 Parganas (N)	0.7353
24 Parganas (S)	0.4396	24 Parganas (S)	0.4685	24 Parganas (S)	0.4660
Hooghly	0.3413	Hooghly	0.3487	Hooghly	0.3444
Burdwan	0.2880				
Mean	*0.60866*		*0.6879*		*0.6678*
C.V.	*48.23*		*37.18*		*39.23*
Developing Districts					
Darjeeling	0.1578	Darjeeling	0.1965	Burdwan	0.2248
Jalpaiguri	0.1409	Jalpaiguri	0.1180	Jalpaiguri	0.1317
Nadia	0.1017	Nadia	0.1054	Darjeeling	0.1255
Birbhum	0.0447	Burdwan	0.0881	Nadia	0.0623
Midnapore	0.0383	Midnapore	0.0567	Midnapore	0.0564
Purulia	0.0269	Birbhum	0.0282	Birbhum	0.0360
Bankura	0.0210	Malda	0.0233	Bankura	0.0273
Cooch Behar	0.0181	Cooch Behar	0.0215	Purulia	0.0198
Malda	0.0175	Bankura	0.0168	Uttar Dinajpur	0.0160
Uttar Dinajpur	0.0057	Purulia	0.0097	Murshidabad	0.0117
Dakshin Dinajpur	0.0030	Murshidabad	0.0083	Dakshin Dinajpur	0.0089
Murshidabad	0.0000	Uttar Dinajpur	0.0001	Cooch Behar	0.0043
		Dakshin Dinajpur	0.0000	Malda	0.0000
Mean	*0.0480*		*0.0517*		*0.0557*
C.V.	*143.12*		*143.46*		*146.66*

It may be observed from the Table 4.13 that during the year 1980-81, Darjeeling, Jalpaiguri and Nadia was in the list of relatively backward or developing category districts. During 1990-91, Darjeeling, Jalpaiguri, Nadia, Burdwan and Midnapore, similarly in he reference year 2000-01, the number of backward districts rose from three to five. Therefore, this type of tendency, wherein number of districts under backward category has been increasing eventually may not be considered desirable for overall economic prosperity of the state.

4.6 Districts-wise Dimensions of Industrial Development

The catalysis of any industrialization process, particularly in areas where there are severe topographical, geographical and socio-economic constraints, is largely dependent on infrastructural development. Progressive planned outlay for creation of economic infrastructural amenities, coupled with well defined industrial

policy with scientific management, has noticeably improved the pace of industrial development in the state of West Bengal during the period post-1970 period.

In the present chapter dimensions *(see note end of the chapter-4)* of industrial development have been analyzed with the help of the previously noted indicators for the three points of time i.e. 1980-81, 1990-91 and 2000-01.

4.6.1 (A) Dimensions of Industrial Development, 1980-81:

The various dimensions of industrial development have been examined with the help of Rotated Factor Matrix. The Principal Component Matrix of Industrial Development is converted into Factor Matrix after Varimax Rotation, which is presented in Table 4.14.

Table 4.14: Rotated Factor Matrix (Varimax Method) 1980-81

Variable	*Factor-1*	*Factor-2*	*Factor-3*	*h2*
1	0.1177	0.9888	-0.0645	0.9957
2	0.8786	0.3283	0.0980	0.8893
3	0.6837	0.6992	0.0666	0.9608
4	0.9901	0.0393	0.0579	0.9853
5	0.0233	0.9912	0.0567	0.9862
6	0.0413	0.0032	0.9981	0.9980
7	0.9584	-0.0289	-0.0633	0.9234
Eigenvalue	*3.15*	*2.56*	*1.03*	
Percentage of Variance	*45.06*	*36.56*	*14.64*	
Cumulative Variance (%)	*45.06*	*81.62*	*96.27*	

Note: Critical value at 5 per cent level = 0.576
Critical value at 1 per cent level = 0.714

It may be observed from Table 4.14 that the factor loadings of seven variables are having positive correlation with the first factor. Four indicators, namely number of registered factories per lakh of population, number of workers engaged in registered factories per thousand Sq. Kms. of area, number of workers engaged in registered factories per lakh of population, percentage of workers in manufacturing to total workers, has positive and significant correlation with first factor. But the indicators number of small-scale units relative to population is insignificant with this factor. Thus, the first factor measures *modern industrial development.*

First dimension of industrial development for the year 1980-81 has been worked out as follows:

$$ID_4 = (0.8786)\, Z_2 + (0.6837)\, Z_3 + (0.9901)\, Z_4 + (0.9584)\, Z_7 \ldots\ldots\ldots\ldots\ldots \text{(IV)}$$

Where ID_4 is the first dimension of industrial development, Z_2, Z_3, Z_4 and Z_7 are values of variables in standardized form and the figures in parentheses are factor scores with respect to the first factor.

Similarly, the second dimension of industrial development is formed as a cluster of three indicators, namely number of registered factories per thousand Sq. Kms. of area, number of workers engaged in registered factories per thousand Sq. Kms. of area and number of industrial units (small-scale) per thousand Sq. Kms. of area. The above mentioned three indicators are significantly and positively correlated with the second factor. Thus, the second factor measures *overall industrial development.*

Second dimension of industrial development for the year 1980-81 has been calculated with the help of following equation:

$$ID_5 = (0.9888)\, Z_1 + (0.6992)\, Z_3 + (0.9912)\, Z_5 \quad \text{..... (V)}$$

Where ID_5 is the second dimension of industrial development, Z_1, Z_3 and Z_5 are values of variables in standardized form and the figures in parentheses are factor scores with respect to the second factor.

Table 4.15 (Figures 4.2 and 4.3) reveals that six districts, namely Howrah, 24 Parganas (N), 24 Parganas (S), Hooghly, Kolkata and Burdwan have attained higher value of composite indices relative to the state average in respect of *modernized (first dimension) Industrial development.* Therefore, these districts are classified as developed districts in terms of the modernized industrial development index and remaining twelve districts lagged behind in this dimension of industrial development.

In the matter of *overall industrial development (second dimension),* it is evident from Table 4.15 that three districts, namely Kolkata, Howrah and 24 Parganas (N) came to be categorized as developed districts, while remaining fifteen districts lagged behind in this respect. Further, it may be observed from the values of coefficient of variation (Table 4.15) that extent of inter-district disparities was comparatively higher for (second dimension) overall industrial development during the year 1980-81.

Table 4.15: Dimensions of Industrial Development in 1980-81					
Sl. No.	*Districts*	*First Dimension Index*	*Rank*	*Second Dimension Index*	*Rank*
1	Burdwan	0.3346	6	0.0639	6
2	Birbhum	0.0396	11	0.0130	12
3	Bankura	0.0215	13	0.0027	15
4	Midnapore	0.0450	10	0.0077	13
5	Howrah	1.0000	1	0.4456	2
6	Hooghly	0.3994	4	0.1017	4
7	24 Parganas (N)	0.9066	2	0.2186	3
8	24 Parganas (S)	0.5578	3	0.0466	7
9	Nadia	0.0505	9	0.0670	5
10	Murshidabad	0.0028	17	0.0028	14
11	Malda	0.0000	18	0.0162	10
12	Uttar Dinajpur	0.0112	14	0.0000	17
13	Dakshin Dinajpur	0.0068	15	0.0002	18
14	Jalpaiguri	0.1541	8	0.0200	8
15	Darjeeling	0.1773	7	0.0170	9
16	Cooch Behar	0.0045	16	0.0137	11
17	Purulia	0.0357	12	0.0004	16
18	Kolkata	0.3446	5	1.0000	1
Mean		*0.2273*		*0.1132*	
C.V.		*144.02*		*223.29*	

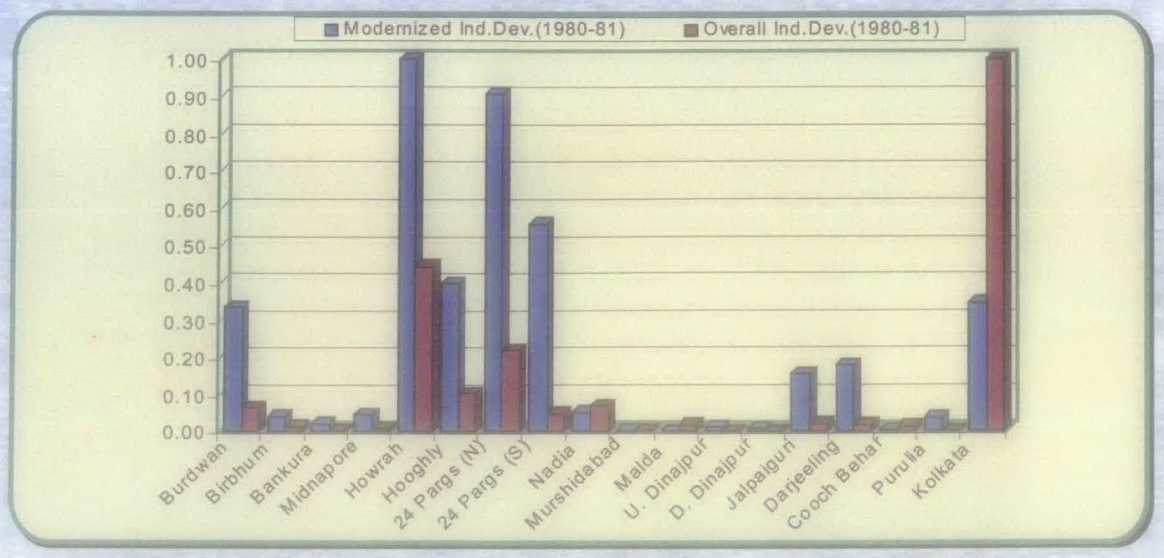


Figure 4.2: Dimensions of Industrial Development in 1980-81

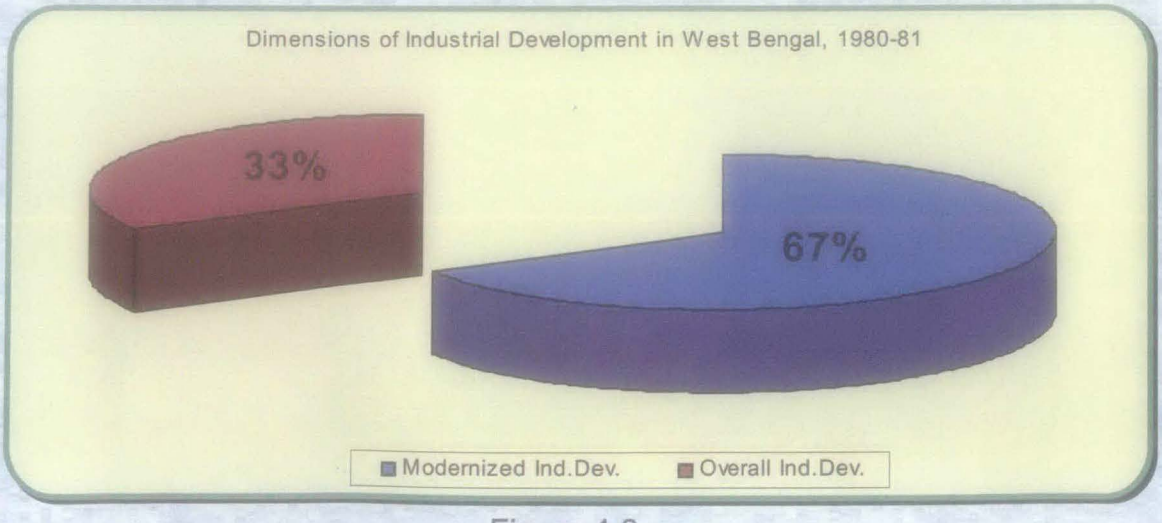


Figure 4.3

4.6.2 (B) Dimensions of Industrial Development, 1990-91:

For the year 1990-91 two Principal Component Matrix of industrial development has been transformed into the Rotated Factor Matrix with the help of Varimax Method, which is presented in Table 4.16.

Table 4.16 reveals that four indicators, namely number of registered factories per lakh of population, number of workers engaged in registered factories per thousand Sq. Kms. of area, number of workers engaged in registered factories per lakh of population, percentage of workers in manufacturing to total workers have positive and significant correlation with the first factor of industrial development. This factor explains 43.04 per cent of the total variance. Thus, as noted above the first dimension measures *modern industrial development* for the year 1990-91.

Table 4.16: Rotated Factor Matrix (Varimax Method) 1990-91

Variable	*Factor-1*	*Factor-2*	*h2*
1	-0.0073	0.9920	0.9841
2	0.8693	0.4004	0.9160
3	0.5279	0.8294	0.9667
4	0.9603	0.1892	0.9580
5	0.0791	0.9707	0.9486
6	0.4501	-0.2437	0.2620
7	0.9205	0.1488	0.8694
Eigenvalue	*3.01*	*2.89*	
Percentage of Variance	*43.04*	*41.31*	
Cumulative Variance (%)	*43.04*	*84.35*	

Note: Critical value at 5 per cent level = 0.576
Critical value at 1 per cent level = 0.714

First dimension of industrial development has been calculated with the help of following equation:

$$ID_6 = (0.8693)\, Z_2 + (0.5279)\, Z_3 + (0.9603)\, Z_4 + (0.9205)\, Z_7 \quad \text{..... (VI)}$$

Where ID_6 is the first dimension of industrial development, Z_2, Z_3, Z_4 and Z_7 are values of variables in standardized form and the figures in parentheses are factor scores with respect to the first factor.

The second dimension of industrial development is nothing but cluster of indicators, which are significantly correlated with second factor. The second factor has positive and significant association with three indicators, namely number of registered factories per thousand Sq. Kms. of area, number of workers engaged in registered factories per thousand Sq. Kms. of area and number of

industrial units (small-scale) per thousand Sq. Kms. of area. Accordingly, the second dimension measures *overall industrial development* for the year 1990-91.

Overall industrial development (second dimension) for the year 1990-91, has been worked out by using the following equation:

$$ID_7 = (0.9920)\, Z_1 + (0.8294)\, Z_3 + (0.9707)\, Z_5 \quad \text{..... (VII)}$$

Where ID_7 is second dimension of industrial development for the year 1990-91, Z_1, Z_3 and Z_5 are values of the standardized respective variables. The figures in parentheses are factor scores with respect to the second factor.

The composite factor scores of different dimensions of industrial development for the year 1990-91 have been presented in Table 4.17.

It may be noted from Table 4.17 (Figures. 4.4 and 4.5) that five districts—Howrah, 24 Parganas (N), 24 Parganas (S), Kolkata, Hooghly and Kolkata emerged as developed category districts, having relatively higher value of indices relative to the state average in respect of (first dimension) modernized industrial development and remaining thirteen districts lagged behind in this respect.

Likewise, in case of overall industrial development (second dimension) four districts, namely Kolkata, Howrah, 24 Parganas (N) and Hooghly districts emerged as developed category districts, but majority of the districts, i.e. fourteen districts, fell in the category of backward when compared with the state average. It is to be mentioned that in respect of ranking district Howrah change their position in lieu of first to second in the second dimension in industrial development.

Table 4.17: Dimensions of Industrial Development in 1990-91					
Sl. No.	*Districts*	*First Dimension Index*	*Rank*	*Second Dimension Index*	*Rank*
1	Burdwan	0.0824	8	0.0379	8
2	Birbhum	0.0391	11	0.0099	14
3	Bankura	0.0226	13	0.0056	16
4	Midnapore	0.0623	9	0.0203	11
5	Howrah	1.0000	1	0.4873	2
6	Hooghly	0.4095	4	0.1248	4
7	24 Parganas (N)	0.9035	2	0.2872	3
8	24 Parganas (S)	0.6357	3	0.0543	6
9	Nadia	0.0622	10	0.0686	5
10	Murshidabad	0.0066	15	0.0169	12
11	Malda	0.0000	18	0.0262	9
12	Uttar Dinajpur	0.0102	14	0.0051	17
13	Dakshin Dinajpur	0.0063	16	0.0058	15
14	Jalpaiguri	0.1569	7	0.0159	13
15	Darjeeling	0.1749	6	0.0461	7
16	Cooch Behar	0.0030	17	0.0220	10
17	Purulia	0.0297	12	0.0000	18
18	Kolkata	0.3328	5	1.0000	1
Mean		*0.2188*		*0.1241*	
C.V.		*150.91*		*208.18*	

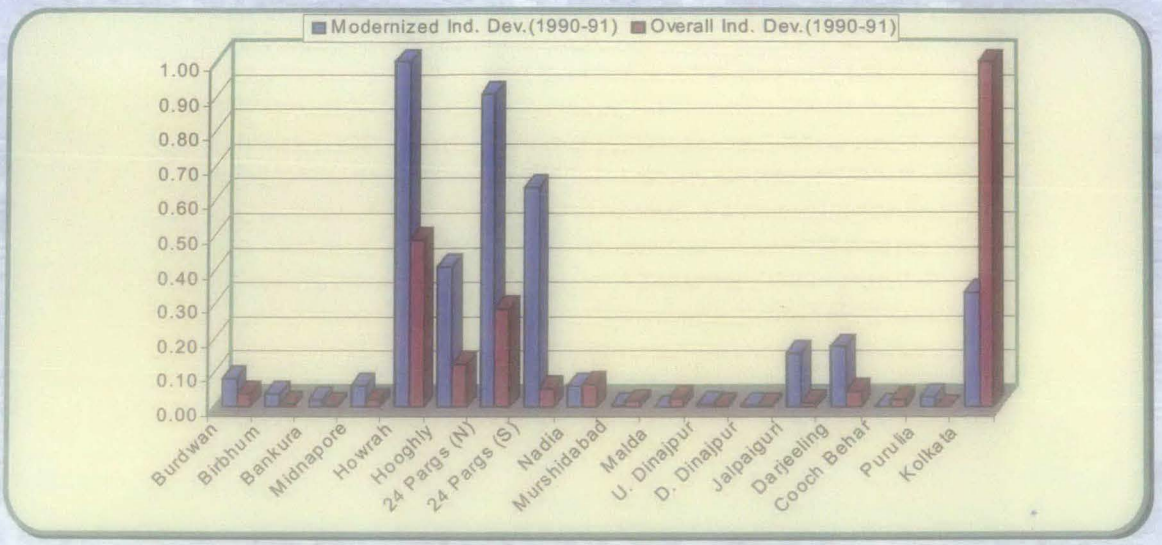


Figure 4.4: Dimensions of Industrial Development in 1990-91

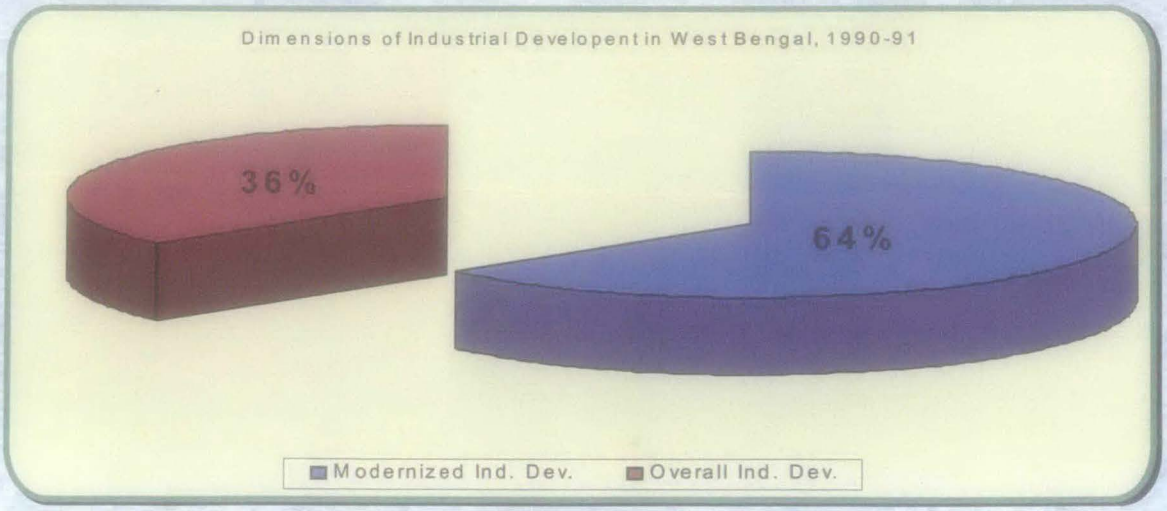


Figure 4.5

4.6.3 (C) Dimensions of Industrial Development, 2000-01:

Different dimensions of industrial development for the year 2000-01 have been examined with the help of Rotated Factor Matrix. For this purpose, the Principal Component Matrix has been transformed into Factor Matrix after Varimax Rotation and is presented in Table 4.18.

From Table 4.18, it is apparent that the six selected indicators of industrial development are positively correlated with the first factor. Out of seven, four indicators, namely number of registered factories per lakh of population, number of workers engaged in registered factories per thousand Sq. Kms. of area, number of workers engaged in registered factories per lakh of population and percentage of workers in manufacturing to total workers have positive and significantly correlated with the first factor of industrial development. Thus, first factor measures *overall industrial development* in the year 2000-01. Further, first factor explains 44.37 per cent of the total variance.

The indices corresponding to the first factor have been calculated with the help of the equation:

$$ID_8 = (0.9110)\, Z_2 + (0.6159)\, Z_3 + (0.9867)\, Z_4 + (0.9501)\, Z_7 \quad \text{..... (VIII)}$$

Where ID_8 is the first dimension of industrial development, Z_2, Z_3, Z_4 and Z_7 are values of variables in standardized form and the figures in parentheses are factor scores with respect to the first factor.

Table 4.18: Rotated Factor Matrix (Varimax Method) 2000-01

Variable	*Factor-1*	*Factor-2*	*Factor-3*	*h2*
1	0.1233	0.9756	-0.1675	0.9950
2	0.9110	0.3098	-0.0449	0.9280
3	0.6159	0.7609	-0.0792	0.9646
4	0.9867	0.0828	-0.0232	0.9809
5	0.0303	0.9847	0.1158	0.9840
6	-0.0639	-0.0401	0.9970	0.9997
7	0.9501	0.0164	-0.0642	0.9070
Eigenvalue	*3.11*	*2.61*	*1.05*	
Percentage of Variance	*44.37*	*37.22*	*14.98*	
Cumulative Variance (%)	*44.37*	*81.58*	*96.56*	

Note: Critical value at 5 per cent level = 0.576
Critical value at 1 per cent level = 0.714

It may be observed that the three indicators, namely number of registered factories per thousand Sq. Kms. of area, number of workers engaged in registered factories per thousand Sq. Kms. of area and number of industrial units

(small-scale) per thousand Sq. Kms. of area have positive and significant correlation with second factor of industrial development. This factor can be identified with the development of *small-scale industrial development.* The second factor explains 37.22 per cent of the total variance.

The second factor scores of this dimension have been calculated with the help of following equation:

$$ID_9 = (0.9756)\, Z_1 + (0.7609)\, Z_3 + (0.9847)\, Z_5 \quad \text{..... (IX)}$$

Where ID_9 is second dimension of industrial development, Z_1, Z_3 and Z_5 are values of variables in standardized form and the figures in parentheses are factor scores with respect to the second factor.

Table 4.19: Dimensions of Industrial Development in 2000-01

Sl. No.	*Districts*	*First Dimension Index*	*Rank*	*Second Dimension Index*	*Rank*
1	Burdwan	0.2733	6	0.0519	7
2	Birbhum	0.0376	12	0.0049	17
3	Bankura	0.0399	11	0.0098	14
4	Midnapore	0.0741	9	0.0193	11
5	Howrah	1.0000	1	0.4846	2
6	Hooghly	0.3943	4	0.1165	5
7	24 Parganas (N)	0.8193	2	0.2629	3
8	24 Parganas (S)	0.5752	3	0.0477	8
9	Nadia	0.0585	10	0.1289	4
10	Murshidabad	0.0038	16	0.0114	12
11	Malda	0.0011	17	0.0681	6
12	Uttar Dinajpur	0.0132	14	0.0095	15
13	Dakshin Dinajpur	0.0087	15	0.0106	13
14	Jalpaiguri	0.1642	7	0.0210	10
15	Darjeeling	0.1626	8	0.0320	9
16	Cooch Behar	0.0000	18	0.0060	16
17	Purulia	0.0266	13	0.0000	18
18	Kolkata	0.3197	5	1.0000	1
Mean		*0.2207*		*0.1269*	
C.V.		*143.44*		*202.72*	

It may be observed from Table 4.19 (Figures 4.6 and 4.7) that six districts — Howrah, 24 Parganas (N), 24 Parganas (S), Hooghly, Kolkata and Burdwan were positioned above the state average in respect of overall industrial development (i.e., first dimension) but majority of the districts were placed in less developed category districts. Therefore, remaining twelve districts are identified

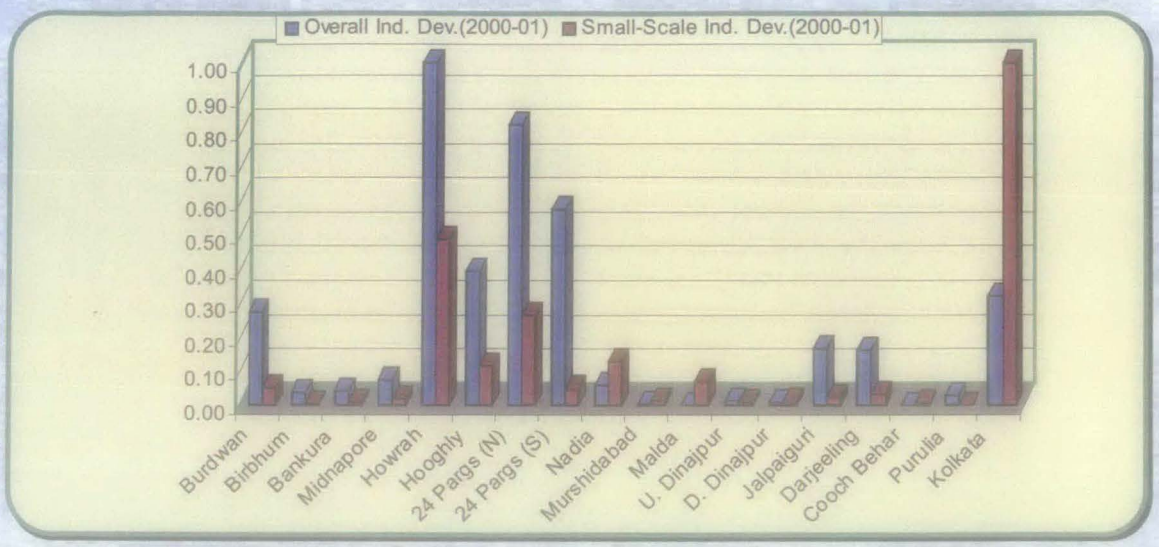


Figure 4.6: Dimensions of Industrial Development in 2000-01

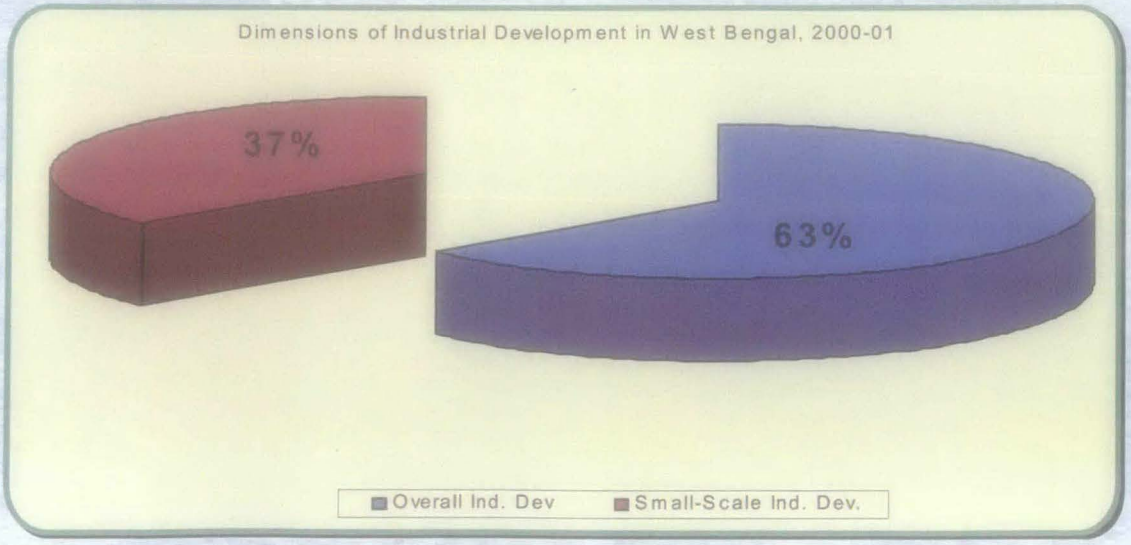


Figure 4.7

as industrially backward districts. Obviously, extent of inter-district disparities was very high i.e. 143.44 per cent.

In the matter of small-scale industrial development (i.e., second dimension) in the year 2000-01, it is obvious from Table 4.19 that district Kolkata attained the top position, followed by Howrah, 24 Parganas (N) and Nadia. On the other hand, the least developed districts in respect of small-scale industrial development are Purulia just preceded by Birbhum, Cooch Behar, Uttar Dinajpur, Bankura and Dakshin Dinajpur.

4.7 Summary

The main points which emerge from the analyses done in this chapter are as follows:

1. Inter-district variations in the variables of industrial development have shown rising trend in the consecutive reference years, i.e.1980-81, 1990-91 and 2000-01. This is due to varied scope of industrialization of districts, bearing in mind the diverse geographical characteristic of the state.
2. Industrialization is the key to restructuring the economy and hence the role of industrial sector in economic development of different districts seems to be the most important. Adverse geographical features of the districts are the main factors of slow pace of industrial development and as such it may be observed that state level arithmetical mean of its composite indices for all the 18 districts has declined from 0.2349 in 1980-81, 0.2285 in 1990-91 and has marginally decreased to 0.2258 during 2000-01.
3. It has also been discerned (realized) from the Table 4.12 that inter-district disparities in levels of industrial development substantially increased from 141.61 per cent in 1980-81 to 147.75 per cent in 1990-91 and further slightly decreased to 145.76 per cent in 2000-01. This type of increasing trend in inter-district variations is mainly due to heterogeneous prospects of industrial development of the districts but after one decade has shown a decreasing trend which indicates a good prospect of industrial development of the districts as well as of the state of West Bengal.
4. Further, because of agglomerative tendencies of industries, Howrah, Kolkata, 24 Parganas (N), 24 Parganas (S), Hooghly and Burdwan districts emanated (emerged) as developed category districts in respect of industrial sector whereas remaining twelve districts were classified as backward districts

during the reference years. It is noticed that concentration of all factories per thousand of Sq. Kms. of area is very high in Howrah followed by Kolkata, 24 Parganas (N) and Hooghly districts. Whereas, Cooch Behar, Malda, Bankura, Murshidabad, Uttar Dinajpur, Dakshin Dinajpur and Purulia districts have almost trifling possibility of modern industrial development. Thus these districts are placed in backward category districts. Nevertheless, there is enough possibility for traditional artisan-based industries in the backward districts.

5. Various dimensions of industrial development in the state have also been identified at these points of time. These dimensions are modern industrial development, small-scale industrial development and overall industrial development.
6. In 1980-81, two dimensions of industrial development were recognized. First dimension was referred to as modernized industrial development due to positive association of indicators relating to factories with the first factor. At that point of time, six districts namely Howrah, 24 Parganas (N), 24 Parganas (S), Hooghly, Kolkata and Burdwan emerged as developed districts in respect of modern industrial development. Remaining twelve districts were categorized as backward due to their placement below the state average in respect of this dimension of industrial development. On the other hand, in respect of overall industrial development i.e. second dimension three districts, namely Kolkata, Howrah and 24 Parganas (N) districts fall in the developed category and remaining fifteen districts are less developed category in industrial development. After one decade, i.e. in 1990-91, Howrah, 24 Parganas (N), 24 Parganas (S), Hooghly and Kolkata districts are developed districts in respect of first dimension index. On the other hand, Kolkata, Howrah, 24 Parganas (N), and Hooghly districts are developed category in respect of second dimension index and others are lagged behind in respect of industrial development.
7. For the year 2000-01, two dimensions i.e. overall industrial development and small-scale industrial development were taken up. In the matter of overall industrial development Howrah, 24 Parganas (N), 24 Parganas (S), Hooghly, Kolkata and Burdwan appeared clearly as developed districts and two more districts, namely 24 Parganas (S) and Burdwan also came to be included in

the developed category, as composite factor scores of these districts are nearer to the value of the state average. But, the remaining twelve districts are identified as backward districts in respect of overall industrial development. In terms of the other dimensions, i.e. small-scale industrial development, district Kolkata achieved the top position, followed by Howrah, 24 Parganas (N) and Nadia. On the other hand, the least developed districts in this respect were Purulia preceded by Birbhum and Cooch Behar.

Note: *In the present study, three dimensions of industrial development have been identified. Modernized industrial development is a cluster of indicators pertaining to factories; small-scale industrial development is a cluster of indicators relating to only small-scale industrial units. Overall industrial development presents positive association of indicators relating to both factories and small-scale industrial units.*

CHAPTER 5

REGIONAL VARIATION IN ECONOMIC INFRASTRUCTURAL DEVELOPMENT

5.1 Introduction

The prosperity of a country depends directly upon the development of agriculture and it industry. Agricultural production, however, requires irrigation, power credit, transport facilities, etc. industrial production requires not only machinery and equipment but also skilled manpower management, energy, banking and insurance facilities, marketing facilities, transport services which include railways, road and shipping, communication facilities, etc. all these facilities and services which help in industrial and agricultural production constitute collectively in the infrastructure of an economy. The development and expansion of these facilities are an essential pre-condition for increasing agricultural and industrial production in a country. In the last 200 years or more, industrial and agricultural revolutions in England and in other countries were accompanied by a revolution in transport and communications, the extensive use of coal and later oil as source of energy, tremendous expansion in banking, insurance and other financial institutions to finance production and trade, an explosion of knowledge of science and technology and so on.

Infrastructure facilities—often referred to as economic and social overheads consist of:

(a) Irrigation: including flood control and command area development.

(b) Energy: coal, electricity, oil and non-conventional sources.

(c) Transport: Railways, roads, shipping and civil aviation.

(d) Communications: Posts and telegraphs, telephones, telecommunications, etc.

(e) Banking, finance and insurance.

(f) Science and technology.

(g) Social overheads: health and hygiene and education.

Indian planners were fully aware of the link between infrastructural facilities and general economic development and accordingly, they gave high

priority to the rapid expansion of these facilities right from the First Plan itself. The plans have generally devoted over 50 per cent of the total plan outlay on infrastructure development. As a result, there has been phenomenal increase in infrastructural facilities.

According to the Economic Survey 2007-08, we should however, note three basic features of infrastructural development here—

(a) The heavy investments by the Government on infrastructural facilities could be easily justified since they had provided the necessary impetus for rapid agricultural development and industrial expansion. In fact, without the rapid development of the infrastructure, it would have been impossible to register the threefold rise in agriculture production and seven fold rise in industrial production during the last six decades.

(b) Though infrastructural facilities were not altogether neglected for the rural areas—for example, expansion of irrigation, rural electrification, etc. —the overwhelming emphasis was on the provision of infrastructural facilities mainly for the urban areas. It is the people in our cities and towns who could take full advantage of the development of power, transport, communication, banking and such social overheads as education and health. The concentration of infrastructure in urban areas and their relative neglect in rural areas resulted in inadequate development and therefore, of inadequate employment opportunities in rural areas. This lead to mass exodus of the rural poor to urban areas—causing problems of urban congestion, growth of slums, acute housing shortage, transport bottlenecks, and so on.

Infrastructural development has not only shown an urban-bias, but it has also shown a bias in favour of the rich and the more affluent. It is the higher income groups who could take full advantages of such facilities, as power, transport and communications, health, etc. The major and medium irrigation works have generally benefited the rich farmers. Our planner generally neglected the minor irrigation works which would have benefited a large number of small and marginal farmers.

The role of infrastructure in fostering economic growth and enhancing public welfare is more pronounced in developing economies like India. At the time of our independence, the national government was unanimous in accepting that a much wider base of infrastructure was the "sine qua non" of economic

development of this country. The complete consensus obviated the need for any debate on this issue and it was taken for granted that infrastructure sector needed both large action and outlay.

It is generally agreed that rapid industrial growth depends critically upon the availability of infrastructure support in the form of electric power, road and rail transportation and telecommunications. Similarly, agricultural growth depends upon rural infrastructure such as spread and quality of irrigation, land development, extent of rural electrification and increase of rural roads. A set of 10 indicators has been considered to represent the level and pattern of economic infrastructural development at the district level. The two aspects that have been given due consideration in the present context are the level of infrastructural facilities per unit of geographical area and the proportion of total population that partake of these facilities.

The economic infrastructure includes all such activities that provide general facilities for carrying on economic activities. These facilities mainly take the form of physical asset formation and termed as hard core of infrastructure. Such facilities are basic for general economic activity to continue smoothly.

5.2 Indicators of Economic Infrastructure Development

In order to show the inter-district disparity in infrastructural sector development we have used the following indicators *(see in Appendix to chapter-5)*.

EI-1: Length of roads per 100 Sq. Kms. of area

EI- 2: Length of roads per lakh of population

EI- 3: Gross irrigated area as percentage of gross cropped area

EI- 4: Number of tractors per ten thousand hectare of net area sown

EI- 5: Number of bank offices per hundred Sq. Kms. of area

EI- 6: Number of bank offices per lakh of population

EI- 7: Number of veterinary institutions per lakh of livestock population

EI- 8: Number of post offices per hundred Sq. Kms. of area

EI- 9: Number of post offices per lakh of population

EI-10: Percentage of villages electrified

5.2.1 Rationale for the Choice of Indicators of Economic Infrastructure

The indicators EI-1 and EI-2 have been selected for measuring the level of development of road infrastructure. Roads are considered as the only effective transport infrastructure in the absence of other modes of transportation. The

indicators EI-3 and EI-4 have been selected because of their significance and role in modernization of agriculture. Indicators EI-5 and EI-6 have been selected because bank offices play a pivotal role in catering to the financial needs of the villagers through advancing loans for the development of agriculture and industry. The choice of indicator EI-7 is made to show the extent of veterinary services available in different districts for providing proper health cover to the existing livestock population. The indicators EI-8, EI-9 and EI-10 have been selected for measuring the level of development of communication infrastructure.

5.2.2 District-wise Economic Infrastructure Development: Indicator-wise Assessment

Inter-District Disparities in Terms of the Indicator of Economic Infrastructural Development

The distribution of districts according to their respective level of development with respect to different indicators of economic infrastructural development is shown in Tables 5.1, 5.2 and 5.3 for the years 1980-81, 1990-91 and 2000-01 respectively.

A cursory look at the listing of indicators reveals that there has been significant increase in the various components of economic infrastructural facilities. Highest increase, during 1980-81 to 2000-01, has been observed in communication and electricity facilities, particularly availability of length of roads relative to population and electricity connection relative to villages. Uneven geographical characteristics of cultivable lands in the West Bengal districts limits have expansion in gross irrigation facilities. It may be observed that gross irrigation facilities have marginally increased during the two decades.

Table 5.1: Distribution of Districts by Relative Levels of Economic Infrastructural Development in West Bengal in 1980-81

Sl. No.	*Indicator*	*State Average*	*Developed Districts*	*Developing Districts*
1	Length of roads per 100 S.q. Kms. of area	20.30	Cooch Behar, Howrah, Hooghly, Darjeeling, Nadia, Burdwan	Birbhum, Murshidabad, Jalpaiguri, 24 Parganas (S), 24 Parganas (N), Malda, Uttar Dinajpur, Dakshin Dinajpur, Bankura, Midnapore, Purulia, Kolkata
2	Length of roads per lakh of population	36.18	Darjeeling, Cooch Behar, Jalpaiguri, Bankura, Birbhum, Dakshin Dinajpur, Purulia	Uttar Dinajpur, 24 Parganas (S), Burdwan, Hooghly, Nadia, Malda, Murshidabad, Midnapore, Howrah,

				24 Parganas (N), Kolkata
3	Gross Irrigated Area (% of GCA)	4.37	Burdwan, Birbhum Hooghly, 24 Parganas (N), Murshidabad, Bankura	Nadia, Howrah, Midnapore Malda, Darjeeling 24-Parganas (S), Cooch Behar, Uttar Dinajpur, Dakshin Dinajpur, Purulia, Jalpaiguri, Kolkata
4	No. of tractors per ten thousand hectare of net sown area	3.00	Burdwan, Hooghly, 24 Parganas (N), Howrah	Nadia, Birbhum , 24 Parganas (S), Midnapore, Uttar Dinajpur, Malda, Murshidabad, Bankura, Purulia, Dakshin Dinajpur, Cooch Behar, Kolkata, Jalpaiguri, Darjeeling
5	No. of Bank offices per 100 S.q. Kms. of area	22.93	Kolkata	Howrah, Hooghly, 24 Parganas (N), Burdwan, Nadia, Birbhum, Darjeeling, Malda, Murshidabad, 24 Parganas (S), Cooch Behar, Midnapore , Purulia, Jalpaiguri, Bankura, Dakshin Dinajpur, Uttar Dinajpur
6	No. of Bank Offices per lakh of population	4.07	Kolkata, Darjeeling, Birbhum, Howrah	Hooghly, Burdwan, Purulia, 24 Parganas (N), Malda, Nadia, Bankura, Jalpaiguri, Midnapore, 24 Parganas (S), Cooch Behar, Murshidabad, Dakshin Dinajpur, Uttar Dinajpur
7	No. of veterinary institutions per lakh of livestock population	6.49	Kolkata, Darjeeling, Dakshin Dinajpur	Howrah, Purulia, Cooch Behar, Burdwan, Birbhum, Murshidabad, Hooghly, Midnapore, Nadia, Jalpaiguri, 24 Parganas (N), Malda, Bankura, Uttar Dinajpur, 24 Parganas (S)
8	No. of post offices Per 100 S.q.Kms. of area	15.83	Kolkata, Howrah	Hooghly, 24 Parganas (N), Nadia, Burdwan, Birbhum, Murshidabad, Midnapore, Cooch Behar, Malda, 24 Parganas (S), Bankura, Purulia, Dakshin Dinajpur, Uttar Dinajpur, Darjeeling, Jalpaiguri
9	No. of post offices per lakh of population	14.25	Purulia, Birbhum, Midnapore, Bankura, Darjeeling, Cooch Behar Burdwan	Dakshin Dinajpur, Nadia, Hooghly, Murshidabad, Malda, 24 Parganas (S), Jalpaiguri, Uttar Dinajpur, Howrah, 24 Parganas (N), Kolkata

10	Villages electrified (% of Villages)	37.38	Nadia, Hooghly, Howrah, Burdwan, Malda, Murshidabad, Jalpaiguri, Birbhum	Cooch Behar, Darjeeling, 24 Parganas (S), Bankura, Midnapore, Purulia, Uttar Dinajpur, 24 Parganas (N), Dakshin Dinajpur, Kolkata

Table 5.2: Distribution of Districts by Relative Levels of Economic Infrastructural Development in West Bengal in 1990-91

Sl. No.	*Indicator*	*State Average*	*Developed Districts*	*Developing Districts*
1	Length of roads per 100 S.q. Kms. of area	20.67	Howrah, Hooghly, Cooch Behar, Darjeeling, Burdwan, Nadia, Murshidabad, Jalpaiguri	Brigham, Uttar Dinajpur, Dakshin Dinajpur, Bankura, Malda, 24 Parganas (S), 24 Parganas (N), Midnapore, Purulia, Kolkata
2	Length of roads per lakh of population	29.91	Darjeeling, Cooch Behar, Jalpaiguri, Bankura, Purulia, Birbhum , Dakshin Dinajpur	Uttar Dinajpur, Burdwan, 24 Parganas (S), Midnapore, Hooghly, Murshidabad, Nadia, Malda, Howrah, 24 Parganas (N), Kolkata
3	Gross Irrigated Area (% of GCA)	18.51	Burdwan, Brigham, Hooghly, 24 Parganas (N), Bankura, Murshidabad, Nadia, Howrah	Midnapore, Malda, Darjeeling, 24 Parganas (S), Cooch Behar, Uttar Dinajpur, Purulia, Dakshin Dinajpur, Jalpaiguri, Kolkata
4	No. of tractors per ten thousand hectare of net sown area	20.93	Hooghly, Burdwan, Howrah, 24 Parganas (N), Nadia	Bankura, Brigham, Murshidabad, Malda, 24 Parganas (S), Uttar Dinajpur, Midnapore, Cooch Behar, Dakshin Dinajpur, Darjeeling, Jalpaiguri, Purulia, Kolkata
5	No. of Bank offices per 100 S.q. Kms. of area	31.40	Kolkata	Howrah, 24 Parganas (N), Hooghly, Burdwan, Nadia, Murshidabad, Brigham, Malda, Midnapore, Cooch Behar, Darjeeling, Dakshin Dinajpur, Uttar Dinajpur, Bankura, 24 Parganas (S), Jalpaiguri, Purulia
6	No. of Bank Offices per lakh of population	6.14	Kolkata, Darjeeling, Birbhum	Burdwan, Bankura, Midnapore, Howrah Hooghly, Malda, Dakshin Dinajpur, Purulia, Cooch Behar, Jalpaiguri, Nadia, Murshidabad, 24 Parganas (N), Uttar Dinajpur,

				24 Parganas (S)
7	No. of veterinary institutions per lakh of livestock population	4.89	Darjeeling, Kolkata, Howrah	Purulia, Jalpaiguri, Burdwan, Midnapore, Dakshin Dinajpur, 24 Parganas (N), Hooghly, Uttar Dinajpur, Brigham, 24 Parganas (S), Cooch Behar, Murshidabad, Bankura, Nadia, Malda
8	No. of post offices Per 100 S.q.Kms. of area	17.03	Kolkata, Howrah	Hooghly, 24 Parganas (N), Nadia, Burdwan, Murshidabad, Brigham, Cooch Behar, Midnapore, Malda, 24 Parganas (S), Dakshin Dinajpur, Bankura, Purulia, Uttar Dinajpur, Darjeeling, Jalpaiguri
9	No. of post offices per lakh of population	12.57	Purulia, Brigham, Bankura, Midnapore, Cooch Behar, Darjeeling, Dakshin Dinajpur, 24 Parganas (S)	Burdwan, Malda, Nadia, Hooghly, Murshidabad, Jalpaiguri, Uttar Dinajpur, Howrah, 24 Parganas (N), Kolkata
10	Villages electrified (% of Villages)	72.33	Nadia, Brigham, Howrah, Malda, Jalpaiguri, Hooghly, Cooch Behar, Burdwan, Murshidabad, 24 Parganas (S), Darjeeling	Bankura, Purulia, Uttar Dinajpur, Midnapore , 24 Parganas (N), Dakshin Dinajpur, Kolkata

Table 5.3: Distribution of Districts by Relative Levels of Economic Infrastructural Development in West Bengal in 2000-01

Sl. No.	*Indicator*	*State Average*	*Developed Districts*	*Developing Districts*
1	Length of roads per 100 S.q. Kms. of area	20.04	Howrah, Hooghly, Cooch Behar, Burdwan, Nadia, Murshidabad, Brigham, Jalpaiguri	24 Parganas (S), 24 Parganas (N), Uttar Dinajpur, Malda, Bankura, Darjeeling, Midnapore, Dakshin Dinajpur, Purulia, Kolkata
2	Length of roads per lakh of population	23.77	Cooch Behar, Jalpaiguri Bankura, Brigham, Purulia, Darjeeling, Burdwan, 24 Parganas (S)	Hooghly, Uttar Dinajpur, Nadia, Midnapore, Dakshin Dinajpur, Murshidabad, Malda, Howrah, 24 Parganas (N), Kolkata
3	Gross Irrigated Area (% of GCA)	12.57	Burdwan, Brigham, Hooghly, 24 Parganas (N), Murshidabad, Nadia, Bankura	Midnapore, Howrah, Malda, Darjeeling, 24 Parganas (S), Uttar Dinajpur, Cooch Behar, Dakshin Dinajpur, Purulia, Jalpaiguri, Kolkata

4	No. of tractors per ten thousand hectare of net sown area	57.35	Hooghly, Howrah, Burdwan, 24 Parganas (N), Nadia	Bankura, 24 Parganas (S), Murshidabad, Malda, Brigham, Uttar Dinajpur, Cooch Behar, Dakshin Dinajpur, Midnapore, Purulia, Jalpaiguri, Darjeeling, Kolkata
5	No. of Bank offices per 100 S.q. Kms. of area	34.02	Kolkata	Howrah, 24 Parganas (N), Hooghly, Burdwan, Nadia, Murshidabad, Malda, Birbhum , Darjeeling, Midnapore, Cooch Behar, Dakshin Dinajpur, Uttar Dinajpur, Bankura, 24 Parganas (S), Jalpaiguri, Purulia
6	No. of Bank Offices per lakh of population	5.56	Kolkata, Darjeeling, Birbhum	Burdwan, Bankura, Howrah, Hooghly, Midnapore, Malda, Cooch Behar, Purulia, Dakshin Dinajpur, 24 Parganas (N), Jalpaiguri, Nadia, Murshidabad, 24 Parganas (S), Uttar Dinajpur
7	No. of veterinary institutions per lakh of livestock population	21.99	Howrah, Hooghly, 24 Parganas (N), Darjeeling, Nadia, 24 Parganas (S)	Jalpaiguri, Malda, Midnapore, Murshidabad, Cooch Behar, Burdwan, Purulia, Brigham, Bankura, Dakshin Dinajpur, Uttar Dinajpur, Kolkata
8	No. of post offices Per 100 S.q.Kms. of area	17.84	Kolkata, Howrah	Hooghly, 24 Parganas (N), Nadia, Burdwan, Cooch Behar, Murshidabad, Brigham, Midnapore, Malda, 24 Parganas (S), Dakshin Dinajpur, Purulia, Bankura, Darjeeling, Uttar Dinajpur, Jalpaiguri
9	No. of post offices per lakh of population	11.29	Purulia, Brigham, Bankura, Midnapore, Cooch Behar, Darjeeling, Nadia, 24 Parganas (S)	Burdwan, Dakshin Dinajpur, Hooghly, Malda, Murshidabad, Jalpaiguri, Uttar Dinajpur, Howrah, 24 Parganas (N), Kolkata
10	Villages electrified (% of Villages)	78.01	Howrah, Hooghly Nadia, Brigham, Jalpaiguri, Cooch Behar, Burdwan, Malda, 24 Parganas (N), Murshidabad, Darjeeling, 24 Parganas (S)	Bankura, Purulia, Midnapore, Uttar Dinajpur, Dakshin Dinajpur, Kolkata

Table 5.4: Indicator-wise Co-efficient of Variation (in Percentage)				
Sl. No.	Indicator	1980-81	1990-91	2000-01
1	Length of roads per 100 S.q. kms. of area	48.01	39.80	43.08
2	Length of roads per lakh of population	54.32	46.41	42.61
3	Gross irrigated area as percentage of gross cropped area	147.65	91.31	100.33
4	Number of tractors per ten thousand hectare of net sown area	170.74	125.55	107.86
5	Number of bank offices per hundred S.q. kms. of area	373.19	354.58	356.59
6	Number of bank offices per lakh of population	104.19	58.68	71.54
7	Number of Veterinary institutions per lakh of livestock population	141.38	59.94	43.78
8	Number of post offices per hundred S.q. kms. of area	178.13	174.01	172.97
9	Number post offices per lakh of population	24.87	26.35	27.67
10	Percentage of villages electrified	57.67	41.01	36.06
Source: Author's Calculation				

Indicator-wise inter-district variations have been noted with the help of coefficient of variation which are presented in Table 5.4. It is evident from the above table that inter-district disparities in case of length of roads per lakh of population, number of tractors per ten thousand hectare of net sown area, number of veterinary institutions per lakh of livestock population, number of post offices per hundred Sq. kms. of area and villages electrified percentages of villages of economic infrastructural facilities have come down considerably during 1980-81 to 2000-01 due to concerted planned efforts. Nevertheless, highest inter-district disparity has been observed in case of number of bank offices relative to area followed by number of post offices in relative to area.

5.3 District-wise Composite Indices of Economic Infrastructural Development:

District-wise Analysis of the Level of Economic Infrastructure Development

The district-wise levels of economic infrastructure development have been evaluated with the help of composite indices of infrastructural development. These indices have been calculated by taking first Principal Component (PC) matrix. It has been obtained from the inter-correlation matrix of ten indicators. The list of indicators is noted earlier in this chapter.

The inter-correlation matrices of the selected ten variables of economic infrastructural development separately for the years 1980-81, 1990-91 and 2000-01 are given in Tables 5.5, 5.6 and 5.7 respectively.

It may be observed from Table 5.5 that the length of roads relative to geographical area has positive and significant correlation with length of roads per lakh of population. Again, length of roads relative to geographical area is insignificant and positive correlation with gross irrigated area as percentage of gross cropped area, number of tractors per thousand hectare of net area sown and percentage of villages electrified. On the other hand, remaining indicators have insignificant and negative correlation with the first indicator.

Table 5.5: Inter-Correlation Matrix of Economic Infrastructure development in1980-81

Variable	EI-1	EI-2	EI-3	EI-4	EI-5	EI-6	EI-7	EI-8	EI-9	EI-10
EI-1	1.000									
EI-2	0.569	1.000								
EI-3	0.228	-0.013	1.000							
EI-4	0.272	-0.177	0.824	1.000						
EI-5	-0.333	-0.374	-0.159	0.439	1.000					
EI-6	-0.269	-0.275	-0.075	0.344	0.972	1.000				
EI-7	-0.327	-0.280	-0.210	-0.130	0.967	0.978	1.000			
EI-8	-0.261	-0.403	-0.116	0.484	0.992	0.968	0.954	1.000		
EI-9	-0.149	0.310	0.173	-0.177	-0.482	-0.434	-0.430	-0.509	1.000	
EI-10	0.247	0.047	0.410	0.440	-0.412	-0.340	-0.440	-0.355	0.029	1.000

Note: Critical value of r at 10 percent level = 0.497
Critical value of r at 5 percent level = 0.576
Critical value of r at 1 percent level = 0.714

Table 5.6 depicts a positive and significant correlation among length of roads, number of tractors per ten thousand hectare of net area sown and percentage of villages electrified. On the contrary, length of roads relative to both area and population is significant and negatively correlated with number of bank offices and number of post offices per hundred sq. kms. of area.

Similarly, it may also be observed from Table 5.7 that length of roads is positively and significantly correlated with number of tractors relative to area, number of veterinary institutions relative to livestock population and percentage of villages electrified. On the other hand, length of road has significant and negative correlation with number of bank offices relative to area and population.

Table 5.6: Inter-Correlation Matrix of Economic Infrastructure development in1990-91

Variable	EI-1	EI-2	EI-3	EI-4	EI-5	EI-6	EI-7	EI-8	EI-9	EI-10
EI-1	1.000									
EI-2	0.306	1.000								
EI-3	0.390	-0.157	1.000							
EI-4	0.652	-0.413	0.716	1.000						
EI-5	-0.595	-0.536	-0.255	0.632	1.000					
EI-6	-0.555	-0.424	-0.181	0.131	0.974	1.000				
EI-7	-0.148	-0.023	-0.277	-0.012	0.598	0.688	1.000			
EI-8	-0.526	-0.602	-0.194	0.666	0.992	0.964	0.600	1.000		
EI-9	0.047	0.603	0.113	-0.329	-0.508	-0.399	-0.306	-0.542	1.000	
EI-10	0.743	0.355	0.389	0.348	-0.586	-0.551	-0.353	-0.552	0.184	1.000

Note: Critical value of r at 10 percent level = 0.497
Critical value of r at 5 percent level = 0.576
Critical value of r at 1 percent level = 0.714

Table 5.7: Inter-Correlation Matrix of Economic Infrastructure development in 2000-01

Variable	EI-1	EI-2	EI-3	EI-4	EI-5	EI-6	EI-7	EI-8	EI-9	EI-10
EI-1	1.000									
EI-2	0.299	1.000								
EI-3	0.451	0.022	1.000							
EI-4	0.784	-0.359	0.609	1.000						
EI-5	-0.548	-0.582	-0.234	0.730	1.000					
EI-6	-0.528	-0.518	-0.172	0.161	0.979	1.000				
EI-7	0.613	-0.215	0.017	0.500	-0.256	-0.242	1.000			
EI-8	-0.471	-0.631	-0.190	0.737	0.993	0.972	-0.166	1.000		
EI-9	0.025	0.706	0.057	-0.393	-0.437	-0.338	-0.238	-0.467	1.000	
EI-10	0.769	0.415	0.469	0.432	-0.664	-0.632	0.510	-0.617	0.140	1.000

Note: Critical value of r at 10 percent level = 0.497
Critical value of r at 5 percent level = 0.576
Critical value of r at 1 percent level = 0.714

On the basis of correlation matrices for the reference years 1980-81, 1990-91 and 2000-01, no clear-cut relationship emerges. Therefore, it is imperative to examine the inter-relationship with the help of Principal Component matrices of the reference years. The inter-correlation matrix for the year 1980-81 has been transformed into a Principal Component matrix, which is presented in Table 5.8.

It may be observed from Table 5.8 that the Principal Component matrix has retained four Principal Components which taken together, explain 83.42 per cent of the total variance. It may be noted that out of 10 indicators, 6 indicators are significantly correlated with the first principal component P_1 (a_i's > or = 0.576 is significant for 10 degrees of freedom at 5 per cent level of significance). It explained 36.17 per cent of the total variance. It is evident from the last column of

Table 5.8 that all the communalities (h^2), which is the proportion of variance for each variable, accounted for by all the components are very high, ranging from +0.4734 to +0.9595. This indicates that each variable taken for analysis was significantly correlated with all the variables.

Table 5.8: Principal Component Matrix of Economic Infrastructure Development in1980-81

Variable	P_1	P_2	P_3	P_4	h^2
1	0.6217	0.3407	-0.4360	0.5166	0.9595
2	-0.0611	0.7941	-0.0416	0.5535	0.9423
3	0.6065	-0.1605	0.6674	0.2786	0.9166
4	0.7605	-0.2106	0.4331	0.1474	0.8320
5	0.8610	0.0510	-0.3213	-0.2788	0.9249
6	0.5310	0.6954	0.3177	-0.2276	0.9184
7	0.0276	0.7992	0.0101	-0.5013	0.8909
8	0.8568	-0.1430	-0.2713	-0.1623	0.8544
9	-0.3730	0.2555	0.6497	-0.0539	0.6294
10	0.6195	-0.1989	0.1885	-0.1206	0.4734
Eigenvalue	*3.6174*	*2.0670*	*1.5603*	*1.0972*	
Percentage Variance	*36.1738*	*20.6696*	*15.6026*	*10.9722*	
Cumulative Variance (%)	*36.1738*	*56.8434*	*72.4460*	*83.4182*	

Similarly, the inter-correlation matrix for the year 1990-91 has been transformed into a Principal Component matrix (PCs), and presented in Table 5.9. On the basis of the principal component matrix, four Principal Components (PCs) have been retained which taken together explain 88.86 per cent of the total variance. It may be realized that out of 10 indicators, 6 indicators are significantly correlated. All the communalities are very high ranging from +0.7634 to +0.9549. This shows that each variable taken for analysis is significantly correlated with all the variables.

For the year 2000-01, the inter-correlation matrix has further transformed into a Principal Component (PCs) matrix, and represented in Table 5.10. On the basis of Principal Component matrix, three principal components have been retained which taken together explain 79.39 per cent of the total variance. It is observed from the Table 5.10 that out of 10 indicators, 6 indicators are significantly and positively correlated with the first principal component. It explains 49.83 per cent of the total variance. Further, all the communalities are very high ranging +0.5304 to +0.9462, which clearly shows that each variable taken for analysis is significantly correlated with all the variables.

The composite index of economic infrastructural development for three selected points of time for each district has been constructed. The indices have been constructed by using the following formula:

For the year 1980-81,

$$EI_1 = (0.6217)\ Z_1 + (-0.0611)\ Z_2 + (0.6065)\ Z_3 + (0.7605)\ Z_4 + (0.8610)\ Z_5 + (0.5310)\ Z_6 + (0.0276)\ Z_7 + (0.8568)\ Z_8 + (-0.3730)\ Z_9 + (0.6195)\ Z_{10} \quad \ldots\ldots (I)$$

Where EI_1 stands for component index of economic infrastructural development for a district, Z_1, Z_2, Z_3,..., Z_{10} are standardized values of variables and figures in parentheses are factor loadings or weights.

Table 5.9: Principal Component Matrix of Economic Infrastructure Development in 1990-91

Variable	P_1	P_2	P_3	P_4	h^2
1	0.7628	0.3913	-0.2476	0.3138	0.8947
2	-0.5938	0.6995	-0.1201	0.2815	0.9356
3	0.6242	0.1290	0.6947	-0.0772	0.894h
4	0.8422	0.0705	0.2767	0.0461	0.7930
5	0.9174	-0.0111	-0.2212	-0.2535	0.9549
6	0.0708	0.8821	0.2423	-0.2873	0.9245
7	0.0868	0.7369	-0.5273	-0.3319	0.9387
8	0.9258	-0.0653	-0.0679	-0.2209	0.9147
9	-0.5376	0.4026	0.5380	-0.1511	0.7634
10	0.4539	0.3033	0.0759	0.7537	0.8718
Eigenvalue	*4.2397*	*2.2436*	*1.3203*	*1.0824*	
Percentage Variance	*42.3970*	*22.4359*	*13.2034*	*10.8238*	
Cumulative Variance (%)	*42.3970*	*64.8329*	*78.0363*	*88.8602*	

Table 5.10: Principal Component Matrix of Economic Infrastructure Development in 2000-01

Variable	P_1	P_2	P_3	h^2
1	0.8063	0.3133	-0.0283	0.7490
2	-0.5476	0.6527	0.0960	0.7351
3	0.4580	0.5088	-0.6222	0.8558
4	0.8506	0.1797	-0.2672	0.8272
5	0.9456	-0.1194	0.1947	0.9462
6	0.1423	0.7086	0.3889	0.6736
7	0.8026	-0.1768	0.5188	0.9446
8	0.9399	-0.0337	0.1499	0.9070
9	-0.5425	0.6219	0.2996	0.7708
10	0.6029	0.4012	-0.0772	0.5304
Eigenvalue	*4.9827*	*1.9118*	*1.0451*	
Percentage Variance	*49.8272*	*19.1183*	*10.4505*	
Cumulative Variance (%)	*49.8272*	*68.9455*	*79.3960*	

For the year 1990-91,

$$EI_2 = (0.7628)\ Z_1 + (-0.5938)\ Z_2 + (0.6242)\ Z_3 + (0.8422)\ Z_4 + (0.9174)\ Z_5 + (0.0708)\ Z_6 + (0.0868)\ Z_7 + (0.9258)\ Z_8 + (-0.5376)\ Z_9 + (0.4539)\ Z_{10} \quad \text{(II)}$$

Where EI_2 stands for component index of economic infrastructural development for a district, Z_1, Z_2, Z_3, ..., Z_{10} are standardized values of variables and figures in parentheses are factor loadings or weights.

For the year 2000-01,

$$EI_3 = (0.8063)\ Z_1 + (-0.5476)\ Z_2 + (0.4580)\ Z_3 + (0.8506)\ Z_4 + (0.9456)\ Z_5 + (0.1423)\ Z_6 + (0.8026)\ Z_7 + (0.9399)\ Z_8 + (-0.5425)\ Z_9 + (0.6029)\ Z_{10} \quad \text{(III)}$$

Where EI_3 stands for component index of economic infrastructural development for a district, Z_1, Z_2, Z_3, ..., Z_{10} are standardized values of variables and figures in parentheses are factor loadings or weights.

Table 5.11: District-wise Indices of Economic Infrastructural Development

Sl. No.	*District*	1980-81		1990-91		2000-01	
		Index	*Rank*	*Index*	*Rank*	*Index*	*Rank*
1	Burdwan	0.7337	2	0.7222	4	0.6141	4
2	Birbhum	0.3036	6	0.3906	8	0.2806	10
3	Bankura	0.0958	15	0.1978	14	0.1309	16
4	Midnapore	0.0593	17	0.1634	16	0.1594	15
5	Howrah	0.5378	4	0.8301	3	1.0000	1
6	Hooghly	0.6756	3	0.9232	2	0.8427	2
7	24 Parganas (N)	0.2953	7	0.5194	5	0.5986	5
8	24 Parganas (S)	0.1573	13	0.2301	11	0.3069	9
9	Nadia	0.3919	5	0.5098	6	0.4885	6
10	Murshidabad	0.2574	8	0.4421	7	0.4217	7
11	Malda	0.2143	10	0.3223	9	0.3491	8
12	Uttar Dinajpur	0.1047	14	0.2291	13	0.1809	14
13	Dakshin Dinajpur	0.0632	16	0.1326	17	0.0931	17
14	Jalpaiguri	0.1923	11	0.2295	12	0.2486	12
15	Darjeeling	0.1883	12	0.1637	15	0.2011	13
16	Cooch Behar	0.2546	9	0.2602	10	0.2512	11
17	Purulia	0.0000	18	0.0000	18	0.0000	18
18	Kolkata	1.0000	1	1.0000	1	0.7934	3
Mean		*0.3069*		*0.4037*		*0.3867*	
S.D.		*0.3085*		*0.3304*		*0.3240*	
C.V.		*100.50*		*81.84*		*83.77*	
Rank Correlation Coefficient: R_{12} = +0.96, R_{13} =+ 0.93, R_{23} = +0.72							

The district-wise indices are shown in Table 5.11. All the districts have been ranked according to their level of economic infrastructure development during the three selected years, i.e. 1980-81, 1990-91 and 2000-01.

It is observable from the Table 5.11 that in 1980-81, Kolkata district attained the top position, followed by Burdwan, Hooghly, Howrah and Nadia. On the other hand, the least developed district in respect of infrastructural facilities is Purulia followed by Midnapore.

In the year 1990-91, Kolkata district attained the top position but the follower districts have changed their positions i.e. Hooghly, Howrah, Burdwan, 24 Parganas (N), Nadia and Murshidabad. Conversely, district Purulia rank to the bottom, preceded immediately by Dakshin Dinajpur.

There has, however, not been any significant change in the ranking of the districts in the next reference year, i.e. 2000-01.

It may also be observed from Table 5.11 that the absolute average index for the state as a whole has changed notably as it increased substantially by 0.0968 points during the first decade and decreased by 0.017 points in the succeeding decade. The value of the coefficient of variation decreased from 100.50 per cent in 1980-81 to 81.84 per cent in the year 1990-91, but extent of disparities slightly increased in the year 2000-01.

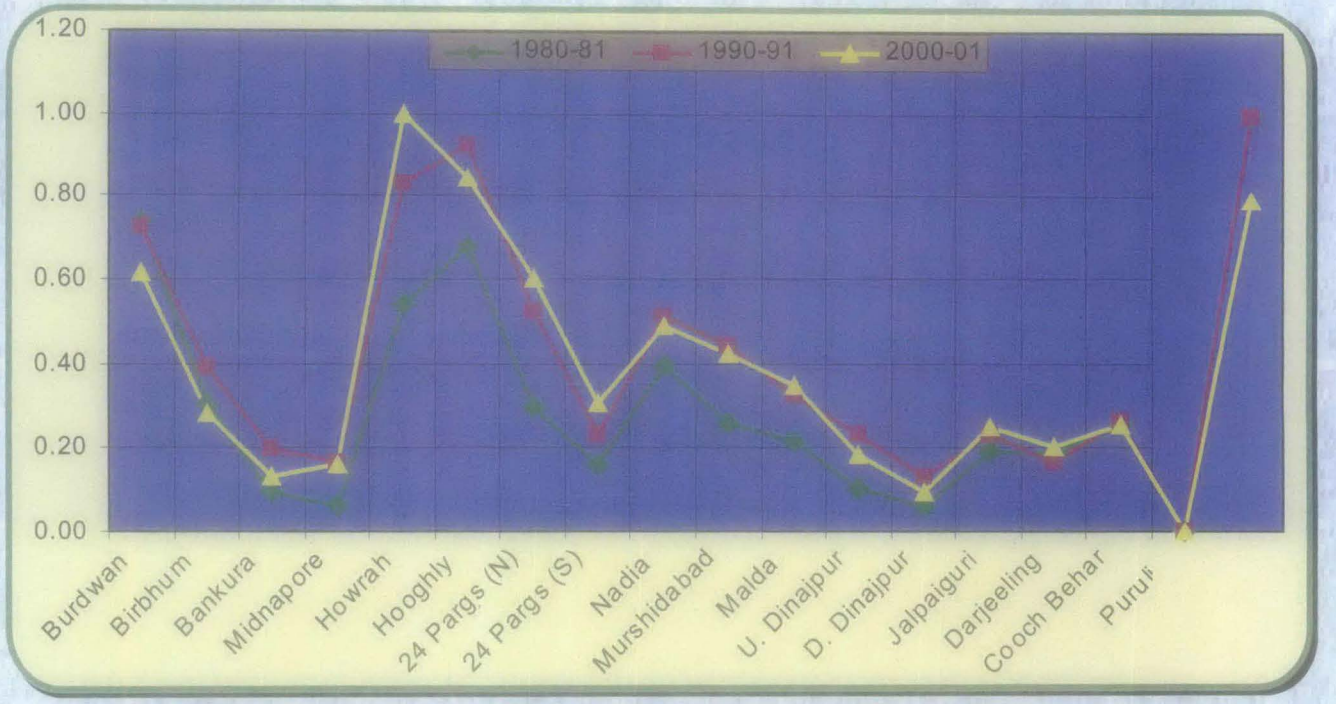


Figure 5.1: Patterns of Infrastructure Development in West Bengal

The classification of districts according to level of economic infrastructural development has been presented in Table 5.12.

It is observed from Table 5.12 that five districts, namely Kolkata, Burdwan, Hooghly, Howrah and Nadia fall in the developed category districts during 1980-81, seven districts namely Kolkata, Hooghly, Howrah, Burdwan, 24 Parganas (N), Nadia and Murshidabad are placed in this category during 1990-91, Kolkata, Hooghly, Howrah, Burdwan, 24 Parganas (N), Nadia and Murshidabad retained their position in developed category even during 2000-01, while districts 24 Parganas (N) and Murshidabad which was in developing category shifted to developed category.

Table 5.12: Classification of Districts According to Level of Economic Infrastructural Development

1980-81		1990-91		2000-01	
Districts	*Index*	*Districts*	*Index*	*Districts*	*Index*
Developed Districts					
Kolkata	1.0000	Kolkata	1.0000	Howrah	1.0000
Burdwan	0.7337	Hooghly	0.9232	Hooghly	0.8427
Hooghly	0.6756	Howrah	0.8301	Kolkata	0.7934
Howrah	0.5378	Burdwan	0.7222	Burdwan	0.6141
Nadia	0.3919	24 Parganas (N)	0.5194	24 Parganas (N)	0.5986
		Nadia	0.5098	Nadia	0.4885
		Murshidabad	0.4421	Murshidabad	0.4217
Mean	*0.6678*		*0.7067*		*0.6799*
C.V.	*37.77*		*5.91*		*35.90*
Developing Districts					
Birbhum	0.3036	Birbhum	0.3906	Malda	0.3491
24 Parganas (N)	0.2953	Malda	0.3223	24 Parganas (S)	0.3069
Murshidabad	0.2574	Cooch Behar	0.2602	Birbhum	0.2806
Cooch Behar	0.2546	24 Parganas (S)	0.2301	Cooch Behar	0.2512
Malda	0.2143	Jalpaiguri	0.2295	Jalpaiguri	0.2486
Jalpaiguri	0.1923	Uttar Dinajpur	0.2291	Darjeeling	0.2011
Darjeeling	0.1883	Bankura	0.1978	Uttar Dinajpur	0.1809
24 Parganas (S)	0.1573	Darjeeling	0.1637	Midnapore	0.1594
Uttar Dinajpur	0.1047	Midnapore	0.1634	Bankura	0.1309
Bankura	0.0958	Dakshin Dinajpur	0.1326	Dakshin Dinajpur	0.0931
Dakshin Dinajpur	0.0632	Purulia	0.0000	Purulia	0.0000
Midnapore	0.0593				
Purulia	0.0000				
Mean	*0.1682*		*0.2108*		*0.2002*
C.V.	*97.60*		*88.98*		*91.09*

5.4 Dimensions of Economic Infrastructural Development

One can not undermine the importance of the catalytic role that economic infrastructure plays in the process of both economic and social development. The function of infrastructure is to release latent productivity in the factors of production singly and in coordination and bring about not only an increase in the output of individual factors and units of production but also a mutually additive effect through coordination in inputs, outputs, space and time and thus maximize the overall rate of economic growth.

Rotating the Principal Component Matrix with Varimax Rotation so as to obtain Rotated Factor Matrix has helped in identifying various dimensions *(see note end of the chapter-5)* of economic infrastructural development for three selected points of time i.e. 1980-81, 1990-91 and 2000-01. The following selected indicators of economic infrastructure have been taken for analyzing various dimensions of infrastructural development.

5.4.1 (A) Dimension of Economic Infrastructural Development, 1980-81:

Rotated Factor Matrix for the year 1980-81 has been presented in Table 5.13. The first factor explains 41.76 per cent and the second and third factors explain 21.42 and 19.06 per cent variance respectively. All the three factors taken together give a cumulative variance of 82.25 per cent. Thus, economic infrastructure sector manifests three dimensions of development, though only two dimensions appear to be meaningful as the cumulative variance of first two factors taken together is 63.18 per cent of the total variance.

It may be observed from Table 5.13 that 5 indicators are significantly correlated with the first factor. Out of 5 indicators, 4 indicators, namely number of bank offices in relation to area and population, number of veterinary institutions per lakh of livestock population, number of post offices in relative to area and population is negatively and significantly associated with this factor. The first factor shows first dimension of economic infrastructural development in 1980-81. Thus, this dimension may be christened as *population based infrastructure development.*

On the other hand, second factor has positive and significant correlation with two indicators, namely, gross irrigated area as percentage of gross cropped area and number of tractors per ten thousand hectare of net area sown, all related to geographical area. The second factor represents the second dimension

of economic infrastructural development, which may be called the *area-based infrastructure development.*

Table 5.13: Rotated Factor Matrix (Varimax Method) 1980-81				
Variable	*Factor-1*	*Factor-2*	*Factor-3*	h^2
1	-0.2009	0.0880	0.9141	0.8837
2	-0.4364	-0.4507	0.4590	0.6043
3	-0.1337	0.9083	0.0106	0.8430
4	0.0178	0.9088	0.2288	0.8785
5	0.9194	-0.0781	-0.3434	0.9694
6	0.9167	-0.0327	-0.2693	0.9140
7	0.9048	-0.1721	-0.2730	0.9228
8	0.9416	-0.0132	-0.2907	0.9714
9	-0.7089	-0.0487	-0.2070	0.5477
10	-0.1838	0.4906	0.6445	0.6898
Eigenvalue	*4.1765*	*2.1418*	*1.9064*	
Percentage of Variance	*41.76*	*21.42*	*19.06*	
Cumulative Variance (%)	*41.76*	*63.18*	*82.25*	
Note: Critical value of a_i at 5 per cent level = 0.576 Critical value of a_i at 1 per cent level = 0.714				

On the basis of these two identified dimensions of development, it is observable that the first dimension indicators availability of economic infrastructural facilities relative to population but second dimension shows availability of economic infrastructural facilities relative to geographical area. It is undeniable fact that diverse demographic character of districts in the state bestows different picture of attainment of level of infrastructural facilities on them. It is important to remember that infrastructural facilities are essential ingredients for shaping the pace of economic development. Hence, quantitative expansion of these facilities has no meaning until and unless the qualitative aspects of these facilities are not taken into consideration.

The factor scores of first dimension of economic infrastructural development for each district have been calculated by applying the following equation and presented in Table 5.14:

$$EI_4 = (0.9194)\, Z_5 + (0.9167)\, Z_6 + (0.9048)\, Z_7 + (0.9416)\, Z_8 + (-0.7089)\, Z_9 \quad \text{(IV)}$$

Where EI_4 is the first dimension of economic infrastructural development, Z_5, Z_6, Z_7, Z_8 and Z_9 are values of variables in standardized form and the figures in parentheses are factor scores with respect to the first factor. In the same way,

factor scores of second dimension of economic infrastructure have been calculated with the help of the following equation and presented in Table 5.14.

$$EI_5 = (0.9083)\ Z_3 + (0.9088)\ Z_4 \quad \text{..... (V)}$$

Where EI_5 is the second dimension of economic infrastructural development, Z_3 and Z_4 are values of variables in standardized form and the figures in parentheses are factor scores with respect to the second factor.

Table 5.14: Dimensions of Economic Infrastructural Development in 1980-81

Sl. No.	*District*	*First Dimension Index*	*Rank*	*Second Dimension Index*	*Rank*
1	Burdwan	0.0791	7	1.0000	1
2	Birbhum	0.0250	15	0.3544	3
3	Bankura	0.0101	17	0.1147	8
4	Midnapore	0.0102	16	0.0622	9
5	Howrah	0.1630	2	0.1675	5
6	Hooghly	0.1007	5	0.6246	2
7	24 Parganas (N)	0.1247	4	0.2891	4
8	24 Parganas (S)	0.0744	9	0.0428	10
9	Nadia	0.0717	12	0.1543	6
10	Murshidabad	0.0681	13	0.1383	7
11	Malda	0.0761	8	0.0341	11
12	Uttar Dinajpur	0.0729	10	0.0215	12
13	Dakshin Dinajpur	0.0718	11	0.0108	13
14	Jalpaiguri	0.0841	6	0.0000	17
15	Darjeeling	0.1263	3	0.0053	16
16	Cooch Behar	0.0480	14	0.0105	14
17	Purulia	0.0000	18	0.0104	15
18	Kolkata	1.0000	1	0.0000	18
Mean		*0.12257*		*0.16893*	
C.V.		*190.91*		*164.56*	

The districts-wise indices are shown in Table 5.14 (Figures 5.2 and 5.3). All the districts have been ranked according to their level of economic infrastructural development in respect of first and second dimensions of development for the year 1980-81. It is apparent from Table 5.14 that Kolkata, Howrah, Darjeeling and 24 Parganas (N) districts were placed above the state average in respect of first dimension of economic infrastructural development. On the other hand, in respect of second dimension, Burdwan, Hooghly, Birbhum, 24 Parganas (N) and Howrah districts have emerged in developed category and Kolkata district are found to be in backward category of district due to high density of population.

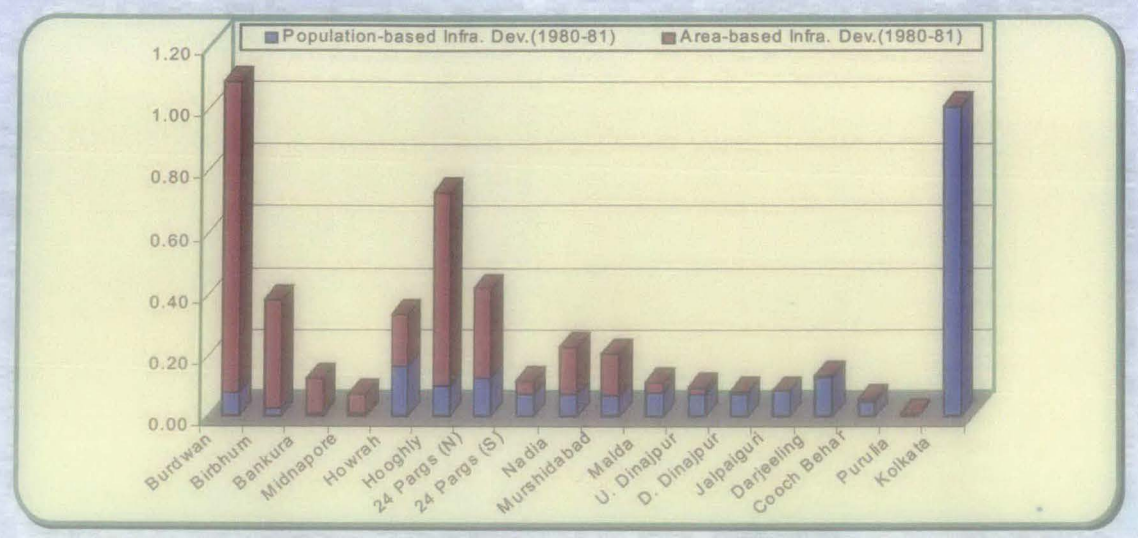


Figure 5.2: Dimensions of Infrastructural Development in 1980-81

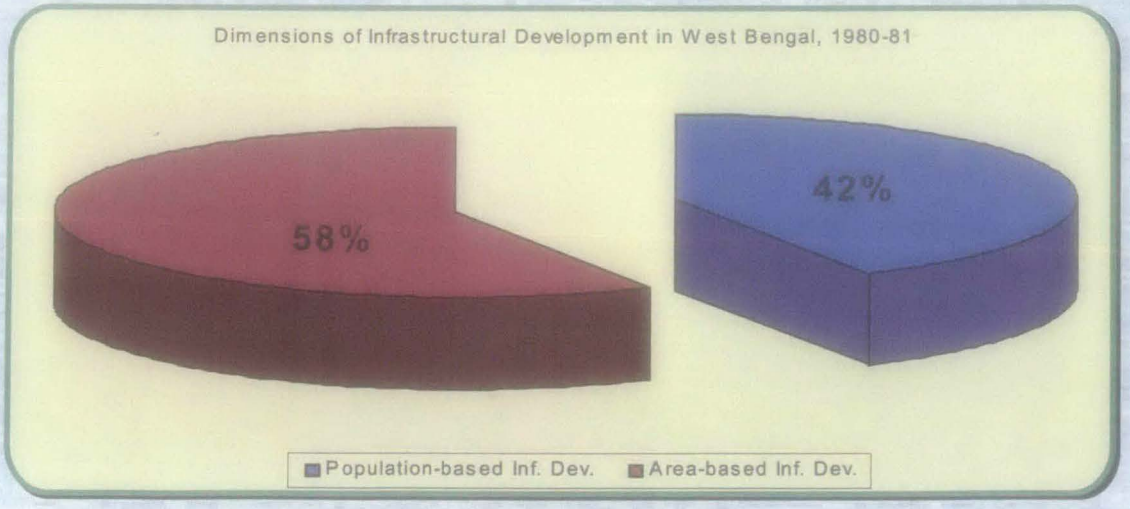


Figure 5.3

5.4.2 (B) Dimensions of Economic Infrastructural Development, 1990-91:

The rotated factor matrix of economic infrastructural development for the year 1990-91 has been presented in Table 5.15. The first factor explains 30.20 per cent of the total variance and the second factor explains 27.74 per cent. Only two dimensions of development as both the factors taken together explain as much as 57.94 per cent of the total variance. Moreover, out of ten indicators, a cluster of 4 indicators is positively and significantly correlated with the first dimension, similarly a cluster of 3 indicators representing second dimension of development is positively and significantly associated with the second factor.

As pointed out earlier, the first dimension is a cluster of 4 indicators, namely, number of bank offices relative to area and population, number of veterinary institutions per lakh of livestock population and number of post offices per hundred Sq. Kms. of area.

On the other hand, the second dimension forms a group of two indicators, namely, gross irrigated area as percentage of gross cropped area and number of tractors per ten thousand hectare of net area sown.

Table 5.15: Rotated Factor Matrix (Varimax Method) 1990-91

Variable	*Factor-1*	*Factor-2*	*Factor-3*	h^2
1	-0.0991	0.8282	0.4454	0.8941
2	-0.1317	-0.0749	0.9263	0.8811
3	-0.2557	0.7289	-0.2638	0.6663
4	-0.0177	0.9028	-0.2392	0.8727
5	0.7471	-0.3229	-0.5366	0.9503
6	0.8028	-0.2856	-0.4290	0.9101
7	0.9238	-0.1069	0.1333	0.8826
8	0.7548	-0.2351	-0.5763	0.9572
9	-0.4820	-0.1832	0.5146	0.5308
10	-0.2621	0.6709	0.4392	0.7117
Eigenvalue	*3.0197*	*2.7742*	*2.4629*	
Percentage of Variance	*30.20*	*27.74*	*24.63*	
Cumulative Variance (%)	*30.20*	*57.94*	*82.57*	

Note: Critical value of a_i at 5 per cent level = 0.576
Critical value of a_i at 1 per cent level = 0.714

The composite index of first dimension of economic infrastructural development for each district has been calculated by applying the following equation:

$$EI_6 = (0.7471)\, Z_5 + (0.8028)\, Z_6 + (0.9238)\, Z_7 + (0.7548)\, Z_8 \quad \ldots\ldots\ldots\ldots\ldots \text{(VI)}$$

Where EI_6 is the first dimension of economic infrastructural development, Z_5, Z_6, Z_7 and Z_8 are values of variables in standardized form and the figures in parentheses are factor scores with respect to the first factor.

Similarly, composite indices of second dimension of economic infrastructure have been calculated with the help of the following equation:

$$EI_7 = (0.8282)\ Z_1 + (0.7289)\ Z_3 + (0.9028)\ Z_4 + (0.6709)\ Z_{10} \quad \text{..... (VII)}$$

Where EI_7 is the second dimension of economic infrastructural development, Z_1, Z_3, Z_4 and Z_{10} are values of variables in standardized form and the figures in parentheses are factor scores with respect to the second factor.

Table 5.16: Dimensions of Economic Infrastructural Development in 1990-91

Sl. No.	*District*	*First Dimension Index*	*Rank*	*Second Dimension Index*	*Rank*
1	Burdwan	0.0665	4	0.8465	2
2	Birbhum	0.0630	5	0.6161	4
3	Bankura	0.0253	13	0.4462	9
4	Midnapore	0.0536	7	0.3115	14
5	Howrah	0.1830	3	0.7788	3
6	Hooghly	0.0598	6	1.0000	1
7	24 Parganas (N)	0.0471	9	0.4547	8
8	24 Parganas (S)	0.0096	17	0.3616	13
9	Nadia	0.0146	15	0.6031	5
10	Murshidabad	0.0187	14	0.5386	6
11	Malda	0.0000	18	0.4238	10
12	Uttar Dinajpur	0.0132	16	0.3006	15
13	Dakshin Dinajpur	0.0413	10	0.2535	16
14	Jalpaiguri	0.0379	11	0.4055	12
15	Darjeeling	0.2895	2	0.4229	11
16	Cooch Behar	0.0254	12	0.5067	7
17	Purulia	0.0494	8	0.2405	17
18	Kolkata	1.0000	1	0.0000	18
Mean		*0.1110*		*0.4728*	
C.V.		*215.81*		*63.99*	

The results giving district-wise index in terms of factors scores based on the first and second factors for the year 1990-91 are given in Table 5.16 (Figures 5.4 and 5.5).

It is clear from Table 5.16 that in 1990-91, districts Kolkata, Darjeeling and Howrah occupied the top position in respect of first dimension of infrastructural development and most backward district was Malda followed by 24 Parganas (S) and Uttar Dinajpur districts.

On the other hand, Hooghly, Burdwan, Howrah, Birbhum, Nadia, Murshidabad and Cooch Behar districts were placed above the state average in respect of second dimension of economic infrastructural development. Kolkata district were found in developing category in respect of second dimension of infrastructural development followed by Purulia and Dakshin Dinajpur districts.

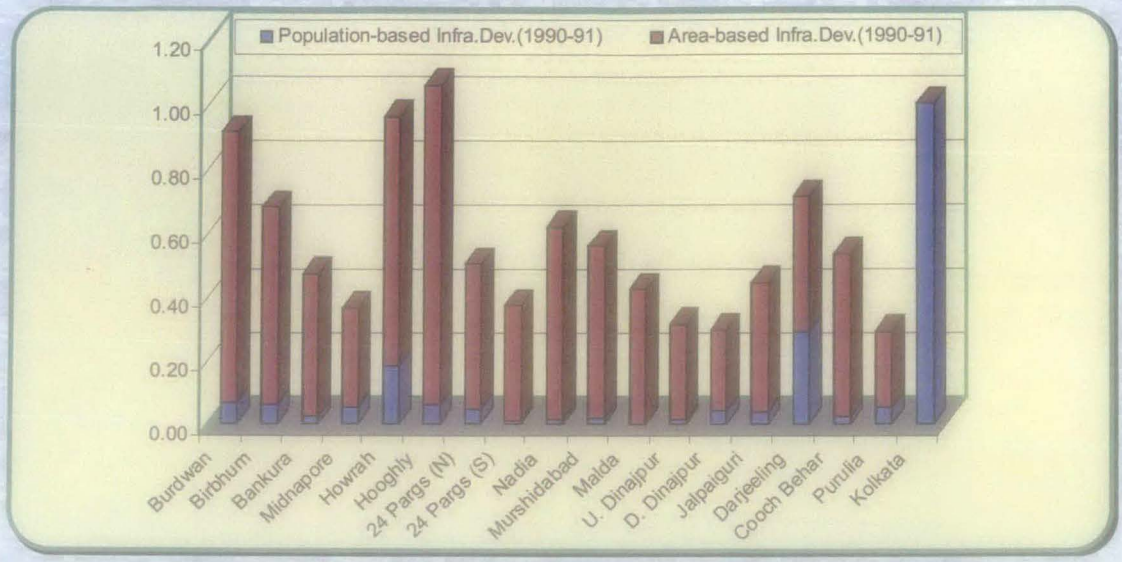


Figure 5.4: Dimensions of Infrastructural Development in 1990-91

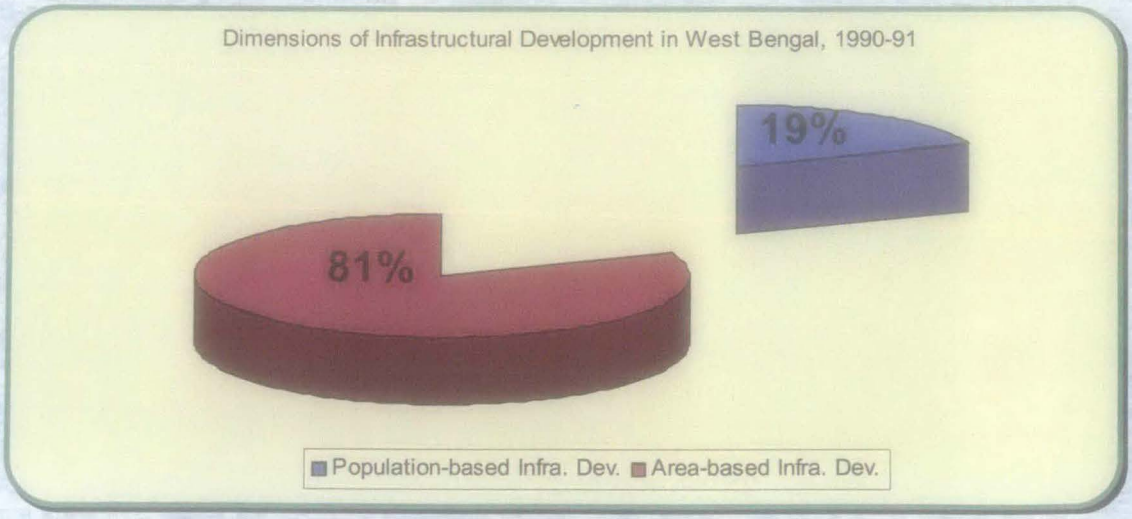


Figure 5.5

5.4.3 (C) Dimensions of Economic Infrastructural Development, 2000-01:

For the year 2000-01, various dimensions of economic infrastructural development have been identified by rotating the principal component matrix with varimax rotation, which has been presented in Table 5.17. The first factor explains 42.78 per cent of the total variance and second factor explains 22.73 per cent. For this year too, not more than two dimensions of development have been considered for appraising dimensional development owing to following facts. Firstly, the first two factors taken together explain 65.51 per cent of the total variance. Secondly, out of ten indicators, as many as 3 indicators have been incorporated in both the dimensions of economic infrastructural development.

It is observable from the Table 5.17 that each variable is significantly correlated with at least one factor. Six indicators, namely length of roads per lakh of population, number of bank offices relative to area and population, number of post offices relative to area and population and Percentage of villages electrified are positively and significantly correlated with the first factor.

On the other hand, three indicators, namely length of roads, gross irrigated area as percentage of gross cropped area and number of tractors all relative to area, are positively and significantly correlated with the second factor.

Table 5.17: Rotated Factor Matrix (Varimax Method) 2000-01

Variable	*Factor-1*	*Factor-2*	*Factor-3*	h^2
1	-0.4846	0.6301	0.4646	0.8477
2	-0.7565	0.0202	-0.4448	0.7706
3	-0.0531	0.9372	-0.1573	0.9059
4	-0.0185	0.8129	0.4635	0.8760
5	0.9515	-0.1593	-0.1060	0.9420
6	0.9250	-0.1019	-0.1636	0.8928
7	-0.1891	0.1624	0.8812	0.8387
8	0.9609	-0.0974	-0.0273	0.9335
9	-0.5818	-0.0262	-0.6034	0.7033
10	-0.6399	0.5135	0.3211	0.7762
Eigenvalue	*4.2783*	*2.2725*	*1.9358*	
Percentage of Variance	*42.78*	*22.73*	*19.36*	
Cumulative Variance (%)	*42.78*	*65.51*	*84.87*	

Note: Critical value of a_i at 5 per cent level = 0.576
Critical value of a_i at 1 per cent level = 0.714

The composite index of first dimension of economic infrastructural development for each district has been calculated by following equation:

$$EI_8 = (-0.7565)\, Z_2 + (0.9515)\, Z_5 + (0.9250)\, Z_6 + (0.9609)\, Z_8$$

$$+ (0.5818)\ Z_9 + (-0.6399)\ Z_{10} \quad \text{..... (VIII)}$$

Where EI_8 is the first dimension of economic infrastructural development, Z_2, Z_5, Z_6, Z_8, Z_9 and Z_{10} are values of variables in standardized form and the figures in parentheses are factor scores with respect to the first factor.

Similarly, composite indices of second dimension of economic infrastructure have been calculated with the help of the following equation:

$$EI_9 = (0.6301)\ Z_1 + (0.9372)\ Z_3 + (0.8129)\ Z_4 \quad \text{..... (IX)}$$

Where EI_9 is the second dimension of economic infrastructural development, Z_1, Z_3 and Z_4 are values of variables in standardized form and the figures in parentheses are factor scores with respect to the second factor.

Table 5.18: Dimensions of Economic Infrastructural Development 2000-01

Sl. No.	*District*	*First Dimension Index*	*Rank*	*Second Dimension Index*	*Rank*
1	Burdwan	0.0354	16	0.9795	2
2	Birbhum	0.0649	13	0.5616	4
3	Bankura	0.1374	6	0.3887	8
4	Midnapore	0.2059	3	0.2766	11
5	Howrah	0.1316	7	0.7144	3
6	Hooghly	0.2144	2	1.0000	1
7	24 Parganas (N)	0.0977	10	0.5187	5
8	24 Parganas (S)	0.1002	11	0.2648	12
9	Nadia	0.1278	9	0.5040	6
10	Murshidabad	0.1311	8	0.4755	7
11	Malda	0.1775	5	0.3003	10
12	Uttar Dinajpur	0.1843	4	0.2475	13
13	Dakshin Dinajpur	0.0525	14	0.1849	15
14	Jalpaiguri	0.0939	12	0.2208	14
15	Darjeeling	0.0000	17	0.1811	16
16	Cooch Behar	0.0451	15	0.3532	9
17	Purulia	1.0000	1	0.1576	17
18	Kolkata	0.0000	18	0.0000	18
Mean		*0.1555*		*0.4072*	
C.V.		*154.69*		*78.60*	

The result giving district-wise index in terms of factor scores based on the first and second dimensions are given in Table 5.18. It is obvious from the table that five districts, namely Purulia, 24 Parganas (N), Midnapore, Uttar Dinajpur and Malda were positioned above the sate average (or nearer to the average) and hereafter termed as developed category districts in respect of first dimension

of infrastructural development, while remaining thirteen districts which were placed below the state average were designated as less developed districts.

Furthermore, seven districts, namely Hooghly, Burdwan, Howrah, Birbhum, 24 Parganas (N), Nadia and Murshidabad were positioned above the state average, and the remaining eleven districts were placed below the state average in respect of the second dimension of economic infrastructural development.

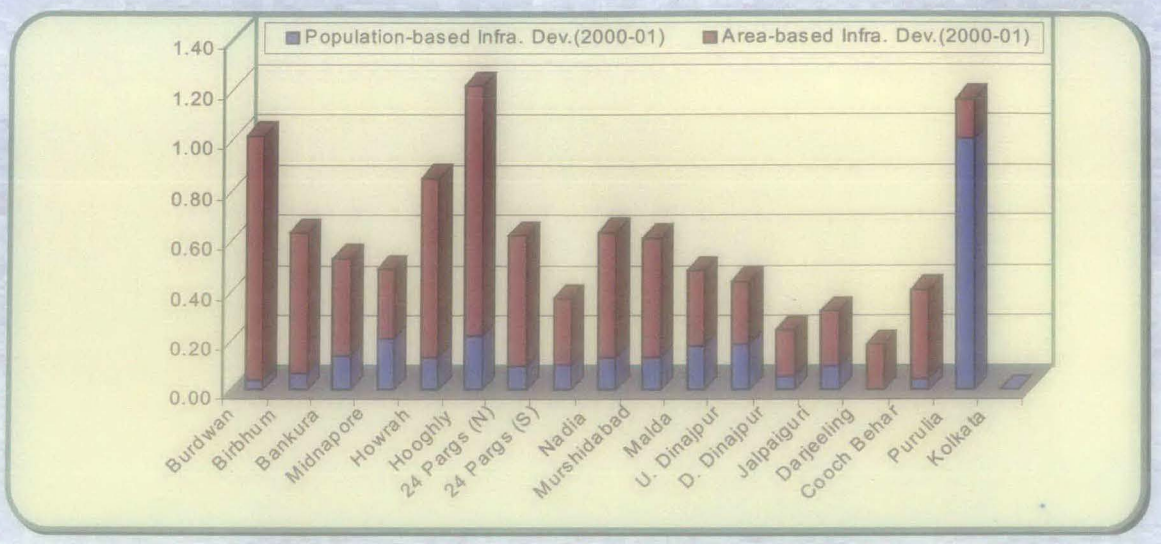


Figure 5.6: Dimensions of Infrastructural Development in 2000-01

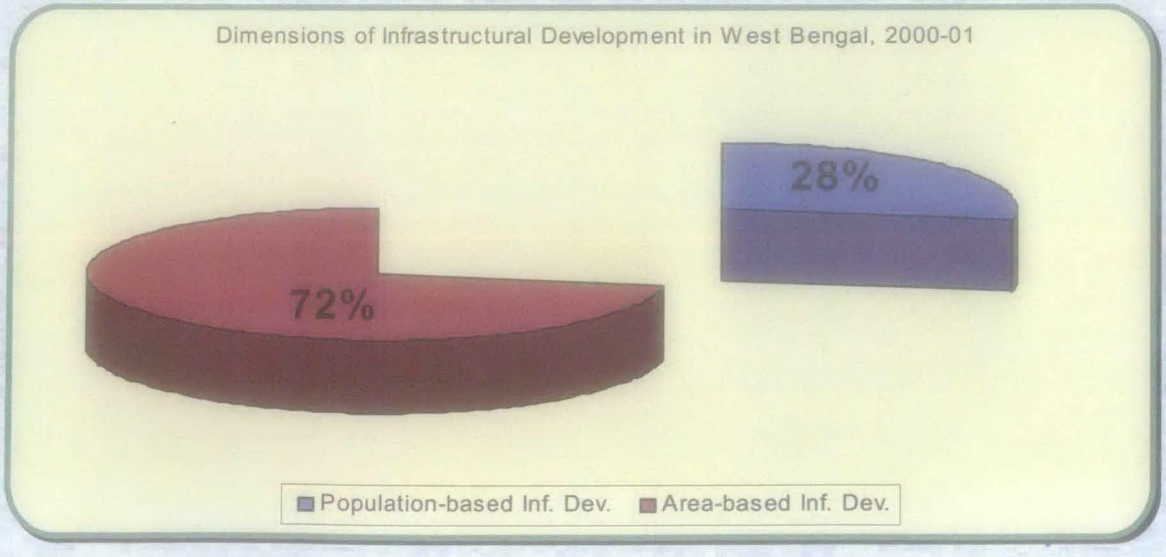


Figure 5.7

5.5 Summary

1. Inter-district disparities in the indicators of economic infrastructure development revealed that high inter-district disparities were found in the case of bank offices and post offices in relative to area, and population. On the other hand, disparities have slightly been reduced in case of remaining 8 indicators during 1980-81 periods. However, backward districts of Cooch Behar, Jalpaiguri, Uttar Dinajpur, Dakshin Dinajpur, Malda, Bankura, Purulia, Midnapore and Birbhum were rapidly developed in terms of majority of indicators of economic infrastructure sector due to implementation of various 'Area Development' and 'Target Group' programmes of economic planning.
2. Economic infrastructural development is a 'sine-qua-non' of rapid and sustainable economic development. Development of agriculture and industry generally depends on adequacy and efficiency of infrastructural facilities. The most important and complex is to provide efficient, cheap and basic infrastructural facilities. The state level arithmetic mean of its composite index for all the 18 districts has increased from 0.12 in 1980-81 to 0.15 in 1990-91 and further to 0.19 during 2000-01. It is important to mention at this point that increasing trend of state average can be translated as increasing of infrastructural development.
3. It may be observed from Tables 5.1, 5.2 and 5.3 that there has been increasing trend in the values of state average in respect of majority of indicators of economic infrastructure during the twenty years period from 1981 to 2001. Moreover, composite indices calculated with the help of Principal Component Analysis provide relative levels of development of districts at particular points of time as the main purpose of Principal Component Analysis is to derive weights for each indicator with the help of inter-correlation matrix of indicators.
4. It may be observed from Table 5.11 that in 1980-81 Kolkata achieved the top position, followed by Burdwan, Hooghly, Howrah and Nadia. On the other hand, the least developed district in respect of infrastructural facilities was Purulia preceded by Midnapore and Dakshin Dinajpur. In the year 1990-91, there has been significant change in the ranking, namely Kolkata, Hooghly, Howrah, Burdwan, 24 Parganas (N), Nadia and Murshidabad.

Similarly, in the year 2000-01, there has not been any changed in respect of ranking, but 24 Parganas (N) and Murshidabad are moved forward and got placed from developing to developed category with respect to 1980-81.

5. Inter-district disparities in the levels of economic infrastructural development have also been reduced evidently from 100.50 per cent in 1980-81 to 81.84 per cent in 1990-91 and further to 83.77 per cent during 2000-01. However, the ranking pattern of districts was different in inter-district diversities. The Rank Correlation Coefficient (R_{12}) for the year 1980-81 and 1990-91 was +0.96 and it was +0.72 for the second subsequent decade (R_{23}) i.e. 1990-91 to 2000-01.

6. Economic infrastructure sector reveals two-dimensional development during the period of study. First dimension points towards availability of infrastructure facilities relative to population, and second dimension specifies availability in terms of geographical area. It may be observed that during 1980-81, in the Table 5.14, Kolkata, Howrah, Darjeeling and 24 Parganas (N) appeared as developed districts in respect of the first dimension of infrastructure development whereas the remaining districts fell in the less developed category. On the other hand, in the matter of second dimension of infrastructure development, Burdwan, Hooghly, Birbhum, 24 Parganas (N) and Howrah districts are developed category in respect of second dimension index and remaining districts are lagged behind. It may be due to anomalous size of the geographical area of these districts with very low density of population.

7. During 1990-91 Kolkata district again emerged as developed district followed by Darjeeling and Howrah in respect of firs dimension of infrastructure development. Alternatively, Malda district was most backward in respect of first dimension, preceded by 24 Parganas (S) and Uttar Dinajpur. In the matter of second dimension of infrastructure development, Hooghly attained the first position, closely followed by Burdwan, Howrah, Birbhum, Nadia, Murshidabad and Cooch Behar. On the other hand, Kolkata was the least developed, preceded by Purulia in this dimension of infrastructure development.

8. It may observed from the Table 5.18, that Purulia, Hooghly, Midnapore, Uttar Dinajpur and Malda emerged as developed districts in 2000-01 in

respect of first dimension of infrastructure development while Hooghly, Burdwan, Howrah, Birbhum, 24 Parganas (N), Nadia and Murshidabad appeared as developed districts in respect of second dimension of infrastructure development. Therefore, eight districts — Bankura, 24 Parganas (S), Malda, Dakshin Dinajpur, Jalpaiguri, Darjeeling, Cooch Behar and Kolkata were not placed in the developed category in both the dimensions of infrastructure development.

Note: *Broadly, economic infrastructure presents two dimensions of infrastructure development. First dimension represents economic infrastructure facilities in terms of population. Second dimension represents economic infrastructure facilities in terms of geographical area.*

CHAPTER 6

INTER-DISTRICT DISPARITIES IN SOCIAL SECTOR DEVLOPMENT

6.1 Introduction

Social sector development acquires a very important role in developing economy as it performs the task of development of human resources through education and health. Social sector development is directly related with broader enhancement of human well-being and quality of life. This includes not only an adequate level of consumption of food and other consumer goods but also access to basic social services, especially education, health, drinking water facilities and basic sanitation. Social development programmes and their implementation fall largely under the jurisdiction of State Government. Nevertheless, Central Government supports the State Government efforts by making additional resources available for specific programmes through centrally sponsored schemes, additional central assistance and special central assistance.

In the development perspective, particularly in the context of sustainable development the strategic policy issues related to population is associated with the quantitative problems of population pressure as well as with the qualitative aspect of social development, i.e., improvement in the standard of living of the people in their aggregate socio-economic development.

Like industry, agriculture and infrastructure in the case of social sector also there are disparities in development among the districts in the case of development of the social sector. There are both developed and developing districts. We have chosen 12 indicators of development of social sector. By measuring the value of each indicator for each district and calculating the state average value we have categorized the districts into developed and developing categories. Here we have found out the level of disparity between the districts as well as whether the disparities are increasing or decreasing over time.

We have used the following indicators *(see in Appendix to chapter-6)* of social sector development in order to make a comparative study of social sector development in the 18 districts of West Bengal.

6.2 Indicators of Social Sector Development:

S-1: Number of primary schools per hundred sq. km. of area;

S-2: Number of primary schools per lakh of population;

S-3: Number of middle schools per lakh of population;

S-4: Number of high/higher secondary schools per lakh of population;

S-5: Percentage of literacy;

S-6: Percentage of female literacy to total literacy;

S-7: Number of medical institutions per hundred sq. km. of area;

S-8: Number of medical institutions per lakh of population;

S-9: Number of hospital beds per lakh of population;

S-10: Sex ratio (Number females per thousand of males);

S-11: Percentage of drinking water facilities to inhabited villages;

S-12: Percentage of urban population to total population.

6.2.1 Rationale for the Choice of Indicators of Social Sector Development:

The indicators S-1 and S-2 have been selected to assess the inter-districts variations in levels of primary education. Similarly, indicators S-3 and S-4 have been chosen to evaluate educational infrastructure. Literacy is considered as an index of educational development and female literacy is a major factor of social development. These aspects have been taken care of by selecting indicators S-5 and S-6. Levels of medical and health facilities at the district level are examined with the help of indicators S-7, S-8 and S-9. Recently, sudden decline in the sex ratio has created gender imbalance which is a sign of negative social development. This aspect has been studied with the help of indicator S-10. Provision of safe drinking water facilities is one of the most important characteristics of social development and this has been taken by choosing indicator S-11. Process of urbanization, a sign of modernization is examined with the help of indicator S-12.

6.2.2 Inter-District Disparities in Terms of the Indicator of Social Sector Development

The distribution of districts according to their respective level of development with respect to different indicators of social sector development is shown in Tables 6.1, 6.2 and 6.3 for the year 1980-81, 1990-91 and 2000-01 respectively.

Table 6.1: Distribution of Districts by Relative Levels of Social Sector Development in West Bengal 1980-81

Sl. No.	*Indicators*	*State Average*	*Developed Districts*	*Developing Districts*
1	Number of primary schools per 100 sq. kms Of area	81.49	Kolkata	Howrah, Hooghly, Midnapore, 24 Parganas (N), Nadia, Birbhum, Uttar Dinajpur, Dakshin Dinajpur, Bankura, Cooch Behar, Purulia, Malda, Murshidabad, Burdwan, 24 Parganas (S), Darjeeling, Jalpaiguri
2	Number of primary schools per lakh of population	69.93	Purulia, Bankura, Midnapore, Dakshin Dinajpur, Birbhum, Uttar Dinajpur, Cooch Behar	Darjeeling, Malda, Jalpaiguri, Nadia, Hooghly, Murshidabad, 24 Parganas (S), Burdwan, Kolkata, Howrah, 24 Parganas (N)
3	Number of middle schools per lakh of population	9.65	Midnapore, Bankura, Birbhum, 24 Parganas (S), Malda, Purulia, Dakshin Dinajpur, Hooghly	Burdwan, Uttar Dinajpur, Cooch Behar, Murshidabad, Darjeeling, Nadia, 24 Parganas (N), Jalpaiguri Howrah, Kolkata
4	Number of High/higher secondary schools per lakh of population	7.85	Kolkata, Bankura, Midnapore, Birbhum, 24 Parganas (S), Burdwan, Malda, Hooghly, Murshidabad	Purulia, Nadia, Cooch Behar, 24 Parganas (N), Howrah, Darjeeling, Jalpaiguri, Dakshin Dinajpur, Uttar Dinajpur
5	Percentage Of literacy rate 1981	34.17	Kolkata, Howrah, Hooghly, Burdwan, Midnapore, Darjeeling, Nadia, Bankura	Birbhum, Cooch Behar, Jalpaiguri, Purulia, 24 Parganas (N), Murshidabad, Malda, 24 Parganas (S), Dakshin Dinajpur, Uttar Dinajpur
6	Percentage of female literacy to Total literacy	34.54	Birbhum, Nadia, 24 Parganas (N), Kolkata, Hooghly, Howrah, Burdwan, Darjeeling, Murshidabad	Midnapore, Dakshin Dinajpur, 24 Parganas (S), Jalpaiguri, Cooch Behar, Bankura, Malda, Uttar Dinajpur, Purulia
7	Number of medical institutions per 100 Sq. Kms. of area	8.93	Kolkata, Howrah	Hooghly, 24 Parganas (N), Burdwan, Dakshin Dinajpur, Nadia, Darjeeling, Uttar Dinajpur, Murshidabad, Birbhum, Jalpaiguri, Cooch Behar, Malda, Bankura, 24 Parganas (S), Midnapore, Purulia

8	Number of medical institutions Per lakh of population	5.13	Darjeeling, Dakshin Dinajpur, Jalpaiguri, Uttar Dinajpur, Kolkata, Bankura, Birbhum	Burdwan, Hooghly, Nadia, Cooch Behar, Howrah, Malda, Purulia, Murshidabad, Midnapore, 24 Parganas (S), 24 Parganas (N)
9	Number of hospital beds per lakh of population	101.78	Kolkata, Darjeeling, Nadia, Bankura, Burdwan	Howrah, Jalpaiguri, Hooghly, Purulia, Murshidabad, Birbhum, 24 Parganas (S), Midnapore, 24 Parganas (N), Cooch Behar, Malda, Dakshin Dinajpur, Uttar Dinajpur
10	Sex Ratio (Number of females Per thousand of males)	916.79	Bankura, Birbhum, Murshidabad, Purulia, Dakshin Dinajpur, Midnapore, Malda, Nadia, Cooch Behar, Uttar Dinajpur	24 Parganas (S), Jalpaiguri, Hooghly, Burdwan, 24 Parganas (N), Darjeeling, Howrah, Kolkata
11	Percentage of drinking water facilities to inhabited villages	81.97	Howrah, Cooch Behar, Hooghly, Jalpaiguri, Burdwan, Nadia, Birbhum, Purulia, Malda, Murshidabad, Bankura, Darjeeling, Midnapore	Uttar Dinajpur, 24 Parganas (N), 24 Parganas (S), Dakshin Dinajpur, Kolkata
12	Percentage Of urban population To total population	21.99	Kolkata, 24 Parganas (N), Howrah, Hooghly, Burdwan, Darjeeling	Nadia, Jalpaiguri, 24 Parganas (S), Murshidabad, Purulia, Midnapore, Birbhum, Bankura, Cooch Behar, Dakshin Dinajpur, Uttar Dinajpur, Malda

Table 6.2: Distribution of Districts by Relative Levels of Social Sector Development in West Bengal 1990-91

Sl. No.	*Indicators*	*State Average*	*Developed Districts*	*Developing Districts*
1	Number of primary schools per 100 sq. kms of area	85.63	Kolkata, Howrah	Hooghly, Dakshin Dinajpur, 24 Parganas (N), Midnapore, Birbhum, Nadia, Murshidabad, Bankura, Malda, Purulia, Burdwan, Cooch Behar, Uttar Dinajpur, 24 Parganas (S), Darjeeling, Jalpaiguri
2	Number of primary schools per	61.74	Purulia, Bankura, Dakshin Dinajpur, Midnapore, Birbhum, Uttar Dinajpur,	Cooch Behar, Darjeeling, Jalpaiguri, Hooghly, Murshidabad, 24 Parganas (S),

	lakh of population		Malda	Nadia, Burdwan, Howrah, Kolkata, 24 Parganas (N)
3	Number of middle schools per lakh of population	5.16	Bankura, Midnapore, Uttar Dinajpur, Purulia, 24 Parganas (S), Malda, Jalpaiguri, Hooghly, Murshidabad	Cooch Behar, Darjeeling, Birbhum, Nadia, Burdwan, 24 Parganas (N), Howrah, Dakshin Dinajpur, Kolkata
4	Number of High/higher secondary schools per lakh of population	5.93	Kolkata, Bankura, Birbhum, Midnapore, Purulia, 24 Parganas (S), Hooghly, Malda	Burdwan, Murshidabad, Nadia, Cooch Behar, Uttar Dinajpur, Darjeeling, Dakshin Dinajpur, Howrah, 24 Parganas (N), Jalpaiguri
5	Percentage of literacy rate 1991	53.62	Kolkata, Midnapore, Howrah, 24 Parganas (N), Hooghly, Burdwan, Darjeeling, 24 Parganas (S)	Nadia, Bankura, Birbhum, Dakshin Dinajpur, Cooch Behar, Jalpaiguri, Purulia, Murshidabad, Malda, Uttar Dinajpur
6	Percentage of female literacy to Total literacy	36.83	24 Parganas (N), Kolkata, Nadia, Hooghly, Howrah, Midnapore, Darjeeling, Burdwan, Murshidabad, Birbhum	Dakshin Dinajpur, 24 Parganas (S), Jalpaiguri, Cooch Behar, Bankura, Malda, Uttar Dinajpur, Purulia
7	Number of medical institutions per 100 Sq. Kms. of area	13.28	Kolkata, Howrah Hooghly, 24 Parganas (N) Murshidabad	Burdwan, Nadia, Malda, Cooch Behar, Birbhum, Midnapore Dakshin Dinajpur, Bankura, Uttar Dinajpur, 24 Parganas (S), Purulia, Darjeeling, Jalpaiguri
8	Number of medical institutions Per lakh of population	14.61	Bankura, Purulia, Dakshin Dinajpur, Birbhum, Darjeeling, Midnapore, Cooch Behar, Malda, Hooghly, Murshidabad, Jalpaiguri	24 Parganas (S), Uttar Dinajpur, Burdwan, Nadia, Howrah, 24 Parganas (N), Kolkata
9	Number of hospital beds per lakh of population	96.50	Kolkata, Darjeeling, Nadia, Burdwan, Bankura	Purulia, Howrah, Jalpaiguri, Hooghly, Birbhum, Murshidabad, Midnapore, Cooch Behar, 24 Parganas (N), Malda, 24 Parganas (S), Dakshin Dinajpur, Uttar Dinajpur
10	Sex Ratio (Number of	921.03	Bankura, Purulia, Birbhum, Midnapore,	Hooghly, Darjeeling, 24 Parganas (N), Burdwan,

	females per thousand of males)		Dakshin Dinajpur, Murshidabad, Malda, Nadia, Cooch Behar, 24 Parganas (S), Jalpaiguri, Uttar Dinajpur	Howrah, Kolkata
11	Percentage of drinking water facilities to inhabited villages	87.59	Hooghly, Howrah, 24 Parganas (N), Nadia, Jalpaiguri, Burdwan, Cooch Behar, Birbhum, Bankura, Darjeeling, Malda, Murshidabad, Midnapore, 24 Parganas (S), Purulia	Uttar Dinajpur, Dakshin Dinajpur, Kolkata
12	Percentage Of urban population To total population	24.36	Kolkata, 24 Parganas (N), Howrah, Burdwan, Hooghly, Darjeeling	Nadia, Jalpaiguri, Dakshin Dinajpur, Uttar Dinajpur, 24 Parganas (S), Murshidabad, Midnapore, Purulia, Birbhum, Bankura, Cooch Behar, Malda

In absolute terms, it has been observed from the listings in Tables 6.1, 6.2 and 6.3, that there has been significant improvement in various components of the Social Sector Development. National policy regarding universalization of primary education, now falling under *Sarva Shiksha Mission* and universalization of elementary education, now falling under *Paschim Banga Sishu Shiksha Mission* established in 1997, has effectively been implemented in the state of West Bengal which can be noted from the fact that in 1980-81, availability of primary schools was comparatively low, thus percentage of total literates and percentage of female literates were 34.17 per cent and 34.54 per cent respectively. In the year 2000-01, a progressive change in literacy percentage and female literates are 66.07 per cent and 40.96 per cent and provision of primary schools has been observed. In the matter of health facilities, there has been significant increase in the social amenities due to soft plan allocation of Central Government and concerted efforts of the State Government.

Table 6.3: Distribution of Districts by Relative Levels of Social Sector Development in West Bengal 2000-01

Sl. No.	*Indicators*	*State Average*	*Developed Districts*	*Developing Districts*
1	Number of primary schools per 100 sq. kms of area	102.78	Kolkata, Howrah, 24 Parganas (N)	Hooghly, Midnapore, Nadia, Dakshin Dinajpur, Murshidabad, Burdwan, Birbhum, Cooch Behar, Malda, Bankura, Purulia, Uttar Dinajpur,

				Darjeeling, 24 Parganas (S), Jalpaiguri
2	Number of primary schools per lakh of population	68.14	Purulia, Bankura, Midnapore, Dakshin Dinajpur, Birbhum, Darjeeling, Cooch Behar	Malda, Hooghly, Jalpaiguri, Nadia, Uttar Dinajpur, Burdwan, 24 Parganas (S), Murshidabad, Howrah, 24 Parganas (N), Kolkata
3	Number of middle schools per lakh of population	3.54	Darjeeling, Cooch Behar, Purulia, Bankura, Midnapore	Uttar Dinajpur, Birbhum, Hooghly, Howrah, Nadia, 24 Parganas (N), Malda, Murshidabad, Burdwan, Jalpaiguri, Kolkata, 24 Parganas (S), Dakshin Dinajpur
4	Number of high/higher secondary schools per lakh of population	10.88	Kolkata, 24 Parganas (N), Birbhum, Burdwan, Bankura, Howrah, Hooghly, Midnapore, Dakshin Dinajpur, Darjeeling, Purulia	24 Parganas (S), Cooch Behar, Malda, Nadia, Jalpaiguri, Murshidabad, Uttar Dinajpur
5	Percentage Of literacy rate 2001	66.07	Kolkata, 24 Parganas (N), Howrah, Hooghly, Midnapore, Darjeeling, Burdwan, 24 Parganas (S), Cooch Behar, Nadia	Dakshin Dinajpur, Bankura, Jalpaiguri, Birbhum, Purulia, Murshidabad, Malda, Uttar Dinajpur
6	Percentage Of female literacy to total literacy	40.96	24 Parganas (N), Nadia, Hooghly, Howrah, Kolkata, Murshidabad, Darjeeling, Midnapore, Dakshin Dinajpur, Burdwan, Cooch Behar, 24 Parganas (S)	Birbhum, Jalpaiguri, Malda, Bankura, Uttar Dinajpur, Purulia
7	Number of medical institutions Per 100 Sq. Kms. of area	13.70	Kolkata, Howrah, Hooghly, 24 Parganas (N), Murshidabad	Burdwan, Nadia, Malda, Cooch Behar, Midnapore, Birbhum, Uttar Dinajpur, Dakshin Dinajpur, Bankura, 24 Parganas (S), Purulia, Darjeeling, Jalpaiguri
8	Number of medical institutions Per lakh of population	12.76	Bankura, Purulia, Birbhum, Midnapore, Cooch Behar, Darjeeling, Hooghly, Dakshin Dinajpur, Malda, Jalpaiguri	Murshidabad, 24 Parganas (S), Uttar Dinajpur, Burdwan, Howrah, Nadia, 24 Parganas (N), Kolkata
9	Number of hospital	91.39	Kolkata, Darjeeling, Nadia, Burdwan,	Howrah, Hooghly, Birbhum, Jalpaiguri,

	beds per lakh of population		Purulia, Bankura	Cooch Behar, Dakshin Dinajpur, Midnapore, Murshidabad, 24 Parganas (N), 24 Parganas (S), Malda, Uttar Dinajpur
10	Sex Ratio (Number of females per thousand Of males)	935.60	Midnapore, Purulia, Murshidabad, Bankura, Dakshin Dinajpur, Birbhum, Cooch Behar, Malda, Hooghly, Nadia, Jalpaiguri, Uttar Dinajpur, 24 Parganas (S), Darjeeling	24 Parganas (N), Burdwan, Howrah, Kolkata
11	Percentage Of drinking water facilities to inhabited villages	78.14	Howrah, Hooghly, Cooch Behar, Jalpaiguri, Nadia, Burdwan, Birbhum, Malda, Bankura, Murshidabad, Darjeeling, Purulia, Midnapore	24 Parganas (N), 24 Parganas (S), Uttar Dinajpur, Dakshin Dinajpur, Kolkata
12	Percentage of urban population to total population	25.14	Kolkata, 24 Parganas (N), Howrah, Burdwan, Hooghly, Darjeeling	Nadia, Jalpaiguri, 24 Parganas (S), Dakshin Dinajpur, Murshidabad, Uttar Dinajpur, Midnapore, Purulia, Cooch Behar, Birbhum, Bankura, Malda

Table 6.4: Indicator-wise Co-efficient of Variation in Social Sector Development

Sl.No.	Indicators	1980-81	1990-91	2000-01
1	Number of primary schools per hundred Sq. kms. of area	206.76	197.09	162.90
2	Number of primary schools per lakh of population	36.45	38.89	31.98
3	Number of middle schools per lakh of population	34.67	34.83	98.58
4	Number of high/higher secondary schools per lakh of population	37.72	44.85	22.49
5	Percentage of literacy	39.91	22.83	14.16
6	Percentage of female literacy to total literacy	15.88	10.30	6.98
7	Number of medical institutions per hundred Sq. kms. of area	268.67	62.20	60.57
8	Number of medical institutions per lakh of population	31.39	29.21	29.89
9	Number of hospital beds per lakh of population	74.82	87.69	90.02
10	Sex Ratio (Number of females per thousand of males)	6.20	3.77	3.06
11	Percentage of drinking water facilities to inhabited villages	34.69	30.03	40.64
12	Percentage of urban population to total population	105.75	93.85	91.84

Source: Author's Calculation

The values of coefficient of variation for selected indicators at three selected points of time as depicted in Table 6.4 shows that inter-district disparity has widened in case of indicators, such as number of middle schools, hospital beds and provision of safe drinking water, but has come down in case of indicators like primary schools, high/higher secondary schools, percentage of literacy, percentage female literacy, medical institutions, sex ratio (number of females per thousand of males) and urbanization process.

6.3 District-wise Composite Indices of Social Sector Development:

District-wise Analysis of Level of Social Sector Development

In the present study, social sector development has been studied with the help of twelve indicators. The district-wise social sector development has been analyzed with the help of composite indices of development. These indices have been calculated by taking first principal components from the principal component matrix.

The inter-correlation matrices of the selected 12 variables of social development separately for the years 1980-81, 1990-91 and 2000-01 are given in Tables 6.5, 6.6 and 6.7 respectively.

The data in Table 6.5, depicting inter-correlation matrix for the year 1980-81, bring out positive and significant correlation among the number of primary schools relative to area, high/higher secondary schools relative to population, overall literacy, number of medical institutions relative to area, number of hospital beds relative to population and urbanization. On the other hand, primary school relative to area is significant and negatively associated with the number middle schools relative to population, sex ratio i.e. number of females per thousand of males and provision of safe drinking water.

Table 6.5: Inter-Correlation Matrix of Social Sector Development (1980-81)

Variable	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10	S-11	S-12
S-1	1.000											
S-2	-0.268	1.000										
S-3	-0.483	0.668	1.000									
S-4	0.496	0.166	0.392	1.000								
S-5	0.647	-0.276	-0.225	0.494	1.000							
S-6	0.166	-0.467	0.019	0.225	0.354	1.000						
S-7	0.999	-0.294	-0.512	0.473	0.645	0.173	1.000					
S-8	0.105	0.147	-0.191	-0.287	0.040	0.033	0.134	1.000				
S-9	0.760	-0.290	-0.489	0.362	0.777	0.248	0.775	0.340	1.000			
S-10	-0.879	0.551	0.684	-0.234	-0.687	-0.207	-0.893	-0.179	-0.770	1.000		
S-11	-0.691	0.242	0.406	-0.161	-0.048	-0.047	-0.695	-0.144	-0.316	0.639	1.000	
S-12	0.832	-0.586	-0.650	0.270	0.737	0.333	0.841	0.018	0.757	-0.940	-0.577	1.000

Note: Critical value of r at 10 percent level = 0.497,
Critical value of r at 5 percent level = 0.576,
Critical value of r at 1 percent level = 0.714

Table 6.6: Inter-Correlation Matrix of Social Sector Development (1990-91)

Variable	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10	S-11	S-12
S-1	1.000											
S-2	-0.303	1.000										
S-3	-0.482	0.582	1.000									
S-4	0.745	0.147	-0.068	1.000								
S-5	0.509	-0.403	-0.439	0.407	1.000							
S-6	0.286	-0.654	-0.608	0.124	0.718	1.000						
S-7	0.816	-0.543	-0.650	0.496	0.662	0.516	1.000					
S-8	-0.749	0.808	0.628	-0.294	-0.554	-0.552	-0.796	1.000				
S-9	0.856	-0.281	-0.462	0.656	0.545	0.345	0.645	-0.613	1.000			
S-10	-0.864	0.617	0.616	-0.455	-0.649	-0.446	-0.867	0.883	-0.790	1.000		
S-11	-0.804	0.067	0.393	-0.500	-0.198	-0.073	-0.546	0.532	-0.554	0.639	1.000	
S-12	0.824	-0.618	-0.682	0.419	0.745	0.558	0.881	-0.881	0.783	-0.960	-0.577	1.000

Note: Critical value of r at 10 percent level = 0.497,
Critical value of r at 5 percent level = 0.576,
Critical value of r at 1 percent level = 0.714

Table 6.7: Inter-Correlation Matrix of Social Sector Development (2000-01)												
Variable	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10	S-11	S-12
S-1	1.000											
S-2	-0.442	1.000										
S-3	-0.137	0.192	1.000									
S-4	0.670	-0.026	0.025	1.000								
S-5	0.463	-0.278	0.157	0.732	1.000							
S-6	0.253	-0.616	0.034	0.294	0.649	1.000						
S-7	0.845	-0.577	-0.213	0.638	0.583	0.454	1.000					
S-8	-0.755	0.851	0.203	-0.357	-0.469	-0.581	-0.759	1.000				
S-9	0.901	-0.290	0.196	0.660	0.462	0.182	0.663	-0.597	1.000			
S-10	-0.931	0.599	0.077	-0.630	-0.534	-0.307	-0.851	0.836	-0.849	1.000		
S-11	-0.577	0.314	0.235	-0.273	-0.146	-0.061	-0.353	0.589	-0.403	0.551	1.000	
S-12	0.847	-0.623	0.019	0.696	0.703	0.466	0.873	-0.847	0.786	-0.932	-0.467	1.000
Note: Critical value of r at 10 percent level = 0.497 Critical value of r at 5 percent level = 0.576 Critical value of r at 1 percent level = 0.714												

The inter-correlation matrix has further been transformed into a principal component matrix, which is presented in Table 6.8. On the basis of principal component matrix for the year 1980-81, four Principal Components (PCs) have been retained which taken together explain 88.60 percent of total variance. It may be observed from the table that out of twelve indicators, nine indicators are significantly correlated with first factor. Among these nine indicators, five are positively and significantly correlated with the first factor; remaining four indicators are negatively correlated with this factor. The first factor explains 51.57 per cent of the total variance.

It is evident from the last column of Table 6.8 that all the communalities (h^2) are very high, ranging from + 0.6656 to + 0.9696, which indicates that each variable taken for analysis is significantly correlated with all the variables.

The inter-correlation matrix of social sector development for the year 1990-91 is given in Table 6.6. It may be observed from this table that a positive and significant correlation exists among the number of primary schools, number of high/higher secondary schools, percentage of literacy, number of medical institutions, number of hospital beds and urbanization. On the other hand, significantly and negatively among the number of middle schools, number of medical institutions relative to population, sex ratio, i.e., number of females per thousand of males and provision of drinking water.

Inter-correlation matrix has been transformed into a principal component matrix and is presented in Table 6.9. On the basis of the principal component matrix, two Principal Components (PCs) have been retained which taken together explain 78.30 per cent of total variance. It may be observed that out of twelve indicators, seven indicators are significantly and positively correlated with the first principal component. The first principal component explains 61.86 per cent of the total variance.

Also, all the communalities are very high, ranging from + 0.5643 to + 0.9744, which indicates that each variable taken for analysis is significantly correlated with all the variables.

Table 6.7 presents inter-correlation matrix of social sector development for the year 2000-01. It is observed from the table that a positive and significant correlation exists among the number of primary schools relative to area, number of high/higher secondary schools in relative to population, number of medical

institutions in relation to area, hospital beds relative to population and percentage of urban population to total population. On the other hand, significantly and negatively correlated among the indicators are number of medical institutions per lakh of population, sex ratio, i.e., number of females per thousand of males and provision of drinking water.

Inter-correlation matrix has been transformed into principal component matrix and presented in Table 6.10. On the basis of the principal component matrix, three Principal Component (PCs) have been retained which taken together explain 82.83 per cent of the total variance. The first principal component explains 57.49 per cent of the total variance. The communalities that have been given in the last column of the table are very high, ranging from + 0.5227 to + 0.9490, which reveals that each variable taken for analysis is significantly correlated with all the variables.

The composite index of social sector development for three selected points of time for each district has been constructed. These indices have been constructed by using the following equation:

Table 6.8: Principal Component Matrix of Social Sector Development (1980-81)

Variable	P_1	P_2	P_3	P_4	h^2
1	0.9317	0.1703	0.2289	-0.1319	0.9669
2	-0.5227	0.4810	0.6388	0.1368	0.9314
3	-0.6325	0.7101	0.0155	0.0575	0.9079
4	0.3585	0.8850	-0.0018	-0.1493	0.9339
5	0.7418	0.3770	-0.2182	0.3217	0.8436
6	0.3192	0.1549	-0.6709	0.2993	0.6656
7	0.9422	0.1365	0.2259	-0.1105	0.9696
8	0.1493	-0.3065	0.4871	0.7391	0.8998
9	0.8479	0.1133	0.0847	0.3700	0.8758
10	-0.9669	0.1258	-0.0430	0.0351	0.9539
11	-0.6261	0.1668	-0.3792	0.4271	0.7460
12	0.9539	-0.0601	-0.1355	-0.0718	0.9372
Eigenvalue	*6.188*	*1.8867*	*1.4179*	*1.139*	
Percentage Variance	*51.57*	*15.72*	*11.82*	*9.49*	
Cumulative Variance (%)	*51.57*	*67.29*	*79.11*	*88.60*	

For the year 1980-81—

$$SD_1 = (0.9317)\, Z_1 + (-0.5227)\, Z_2 + (-0.6325)\, Z_3 + (0.3585)\, Z_4 + (0.7418)\, Z_5 + (0.3192)\, Z_6 + (0.9422)\, Z_7 + (0.1493)\, Z_8 + (0.8479)\, Z_9 + (-0.9669)\, Z_{10} + (-0.6261)\, Z_{11} + (0.9539)\, Z_{12} \quad \text{..... (I)}$$

Where SD_1 stands for composite index of social sector development for a district, Z_1, Z_2, Z_3,..., Z_{12} are standardized values of variables and figures in parentheses are factor loadings or weights.

For the year 1990-91—

$$SD_2 = (0.8903)\ Z_1 + (-0.6194)\ Z_2 + (-0.7085)\ Z_3 + (0.5298)\ Z_4 + (0.7290)\ Z_5 + (0.6134)\ Z_6 + (0.9115)\ Z_7 + (-0.8983)\ Z_8 + (0.8134)\ Z_9 + (-0.9557)\ Z_{10} + (-0.6360)\ Z_{11} + (0.9689)\ Z_{12} \quad \text{..... (II)}$$

Where SD_2 stands for composite index of social sector development for a district, Z_1, Z_2, Z_3, ..., Z_{12} are standardized values of variables and figures in parentheses are factor loadings or weights

Table 6.9: Principal Component Matrix of Social Sector Development (1990-91)

Variable	P_1	P_2	h^2
1	0.8903	0.4263	0.9744
2	-0.6194	0.6723	0.8357
3	-0.7085	0.3511	0.6253
4	0.5298	0.6769	0.7389
5	0.7290	-0.1813	0.5643
6	0.6134	-0.5613	0.6913
7	0.9115	0.0026	0.8308
8	-0.8983	0.1974	0.8460
9	0.8134	0.3282	0.7694
10	-0.9557	-0.0405	0.9150
11	-0.6360	-0.5089	0.6636
12	0.9689	-0.0525	0.9415
Eigenvalue	*7.4228*	*1.9732*	
Percentage Variance	*61.86*	*16.44*	
Cumulative Variance (%)	*61.86*	*78.30*	

For the year 2000-01—

$$SD_3 = (0.9154)\ Z_1 + (-0.6460)\ Z_2 + (-0.0851)\ Z_3 + (0.7007)\ Z_4 + (0.6832)\ Z_5 + (0.5296)\ Z_6 + (0.9003)\ Z_7 + (-0.8886)\ Z_8 + (0.8113)\ Z_9 + (-0.9518)\ Z_{10} + (-0.5456)\ Z_{11} + (0.9677)\ Z_{12} \quad \text{..... (III)}$$

Where SD_3 stands for composite index of social sector development for a district, Z_1, Z_2, Z_3,..., Z_{12} are standardized values of variables and figures in parentheses are factor loadings or weights.

Table 6.10: Principal Component Matrix of Social Sector Development (2000-01)				
Variable	P_1	P_2	P_3	h^2
1	0.9154	0.0495	-0.3294	0.9490
2	-0.6460	0.5824	-0.3588	0.8853
3	-0.0851	0.6674	0.2645	0.5227
4	0.7007	0.5327	-0.0905	0.7829
5	0.6832	0.4015	0.4323	0.8150
6	0.5296	-0.1137	0.7682	0.8835
7	0.9003	-0.0413	0.0029	0.8122
8	-0.8886	0.3816	-0.1000	0.9452
9	0.8113	0.3349	-0.2859	0.8521
10	-0.9518	0.0062	0.1939	0.9436
11	-0.5456	0.3050	0.4624	0.6045
12	0.9677	0.0797	0.0318	0.9437
Eigenvalue	*6.8992*	*1.6039*	*1.4366*	
Percentage Variance	*57.49*	*13.37*	*11.97*	
Cumulative Variance (%)	*57.49*	*70.86*	*82.83*	

Table 6.11: District-wise Indices of Social Sector Development							
		1980-81		1990-91		2000-01	
Sl. No.	*Districts*	*Index*	*Rank*	*Index*	*Rank*	*Index*	*Rank*
1	Burdwan	0.2046	5	0.2991	4	0.2869	5
2	Birbhum	0.0815	11	0.1358	12	0.1369	13
3	Bankura	0.0429	14	0.0472	17	0.0715	17
4	Midnapore	0.0340	16	0.1445	10	0.1472	10
5	Howrah	0.2801	2	0.4228	2	0.4294	2
6	Hooghly	0.2028	6	0.2915	5	0.2933	4
7	24 Parganas (N)	0.2333	4	0.3597	3	0.4180	3
8	24 Parganas (S)	0.1229	9	0.1577	8	0.2117	8
9	Nadia	0.1752	7	0.2551	6	0.2357	6
10	Murshidabad	0.0838	10	0.1422	11	0.1466	11
11	Malda	0.0406	15	0.0943	16	0.1082	15
12	Uttar Dinajpur	0.0294	17	0.0962	15	0.1014	16
13	Dakshin Dinajpur	0.0515	13	0.1492	9	0.1841	9
14	Jalpaiguri	0.1302	8	0.1262	13	0.1449	12
15	Darjeeling	0.2454	3	0.2357	7	0.2220	7
16	Cooch Behar	0.0649	12	0.1181	14	0.1297	14
17	Purulia	0.0000	18	0.0000	18	0.0000	18
18	Kolkata	1.0000	1	1.0000	1	1.0000	1
Mean		*0.1680*		*0.2264*		*0.2371*	
S.D.		*0.2472*		*0.2614*		*0.2633*	
C.V.		*147.16*		*115.47*		*111.07*	
Rank Correlation Coefficient: R_{12} = + 0.8782, R_{13} = + 0.8865, R_{23} = + 0.9938							

All the eighteen districts of the state have been ranked according to their levels of social sector development as per the indices of social development during the three selected years, i.e. 1980-81, 1990-91 and 2000-01 (Table 6.11). The level of social development in 1980-81 indicated as the table 6.11, district Kolkata was at the top, followed by Howrah, Darjeeling, 24 Parganas (N), Burdwan, Hooghly and Nadia. On the other hand, district Purulia was at the bottom, preceded immediately by Uttar Dinajpur and Midnapore.

In the year 1990-91, the ranking of the districts has been changed with passage of time which is evident from the fact that, district Kolkata was at top, followed by Howrah, 24 Parganas (N), Burdwan, Hooghly, Nadia and Darjeeling. After a decade, in 2000-01, the comparative levels of social development as reflected in the ranking of the districts did not show any significant change.

Table 6.11 reveals that the absolute average index for the state as a whole changed considerably as it increased by 0.0584 points during the first decade in 1981-91 and 0.0107 points during the next decade, 1990-91, 2000-01. The value of coefficient of variation decreased from 147.16 per cent in 1980-81 to 111.07 per cent in the year 2000-01. This decrease indicates that the disparities in the level of social development have decreased during 1981-2001.

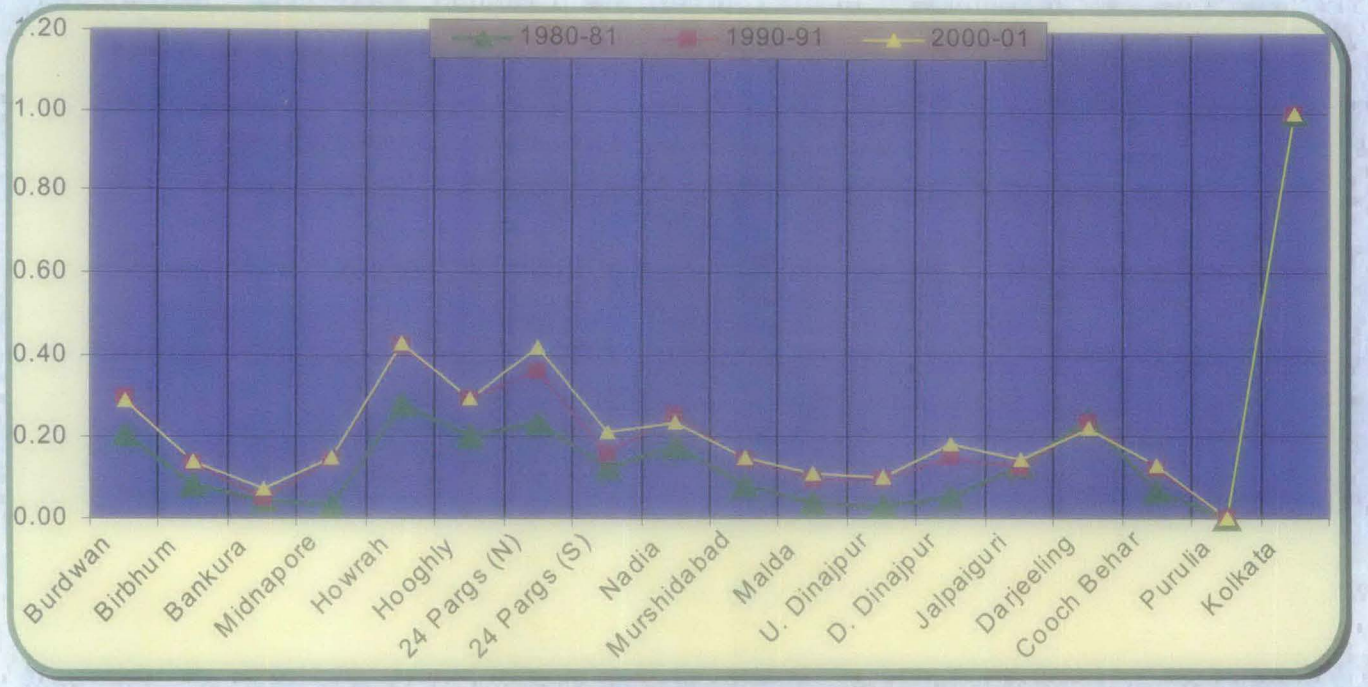


Figure 6.1: Patterns of Social Sector Development

Table 6.12: Classification of Districts According to Level of Social Sector Development					
1980-81		1990-91		2000-01	
Districts	*Index*	*Districts*	*Index*	*Districts*	*Index*
Developed Districts					
Kolkata	1.0000	Kolkata	1.0000	Kolkata	1.0000
Howrah	0.2801	Howrah	0.4228	Howrah	0.4294
Darjeeling	0.2454	24 Parganas (N)	0.3597	24 Parganas (N)	0.4180
24 Parganas (N)	0.2333	Burdwan	0.2991	Hooghly	0.2933
Burdwan	0.2046	Hooghly	0.2915	Burdwan	0.2869
Hooghly	0.2028	Nadia	0.2551	Nadia	0.2357
Nadia	0.1752	Darjeeling	0.2357		
Mean	*0.3345*		*0.4091*		*0.4439*
C.V.	*95.72*		*76.06*		*71.33*
Developing Districts					
Jalpaiguri	0.1302	24 Parganas (S)	0.1577	Darjeeling	0.2220
24 Parganas (S)	0.1229	Dakshin Dinajpur	0.1492	24 Parganas (S)	0.2117
Murshidabad	0.0838	Midnapore	0.1445	Dakshin Dinajpur	0.1841
Birbhum	0.0815	Murshidabad	0.1422	Midnapore	0.1472
Cooch Behar	0.0649	Birbhum	0.1358	Murshidabad	0.1466
Dakshin Dinajpur	0.0515	Jalpaiguri	0.1262	Jalpaiguri	0.1449
Bankura	0.0429	Cooch Behar	0.1181	Birbhum	0.1369
Malda	0.0406	Uttar Dinajpur	0.0962	Cooch Behar	0.1297
Midnapore	0.0340	Malda	0.0943	Malda	0.1082
Uttar Dinajpur	0.0294	Bankura	0.0472	Uttar Dinajpur	0.1014
Purulia	0.0000	Purulia	0.0000	Bankura	0.0715
				Purulia	0.0000
Mean	*0.0620*		*0.1101*		*0.1337*
C.V.	*111.07*		*97.44*		*95.63*

The classification of districts according to composite index of social development for the years 1980-81, 1990-91 and 2000-01 is given in Table 6.12.

Inter-temporal data in Table 6.12 reveals that in 1980-81, seven districts, namely Kolkata, Howrah, Darjeeling, 24 Parganas (N), Burdwan Hooghly and Nadia were in the category of developed districts. In the year 1990-91 and 2000-01 did not show any significant change. It can clearly be observed from the table that in 1980-81 and 1990-91, the comparative level of social development shifted against hill districts. This is probably due to the concerted efforts made through area specific programmes. It also emerges from the above table that all the developed category districts retained their position but minor changes occurred in their ranking within this category in the reference years.

6.4 Dimensions of Social Sector Development

Social sector development acquires a very important role in a developing economy as it executes the task of development of human resources through education, skill generation, training, awareness creation and health care as well as research and development, to augment the efficiency of the production mechanism. Accepting this as basis of evaluation, endeavour has been made here to gauge the dimensional development *(see note end of the chapter-6)* within social sector with the help of the selected indicators mentioned earlier in this chapter:

6.4.1 (A) Dimensions of Social Sector Development, 1980-81:

Social development reveals a four-dimensional development though only two dimensions come out to be meaningful. The Factor Matrix after Varimax Rotation is presented in Table 6.13. It is evident from the table that four rotated factors taken together explain 88.60 per cent of the total variance, whereas first and second factors explain 44.65 per cent and 26.69 per cent of the total variance respectively. Further, each variable is significantly correlated with at least one factor.

The first dimension of social development (Table 6.13) which is a cluster of six indicators, namely number of primary schools, number of medical institutions relative to geographical area, number of hospital beds relative to population and percentage of urban population to total population are significantly and positively correlated with the first factor, number of females per thousand of males or sex ratio and percentage of drinking water facilities to inhabited villages, which has significant but negative association with this factor. Thus, this first dimension may be referred to as *Quantitative Social Development.*

The second factor or second dimension of social development is a cluster of two indicators, namely overall literacy percentage and percentage of female literacy to total literacy are positively and significantly correlated with the second factor. The second dimension of social development may be termed as *Qualitative Social Development.*

The factor scores with respect to the first factor have been calculated with the help of the following equation and presented in Table 6.14.

$$SD_4 = (0.9709)\, Z_1 + (0.9708)\, Z_7 + (0.7219)\, Z_9 + (-0.8892)\, Z_{10} + (-0.7768)\, Z_{11} + (0.8357)\, Z_{12} \quad \text{..... (IV)}$$

Where SD_4 is the first dimension of social development, Z_1, Z_7, Z_9, Z_{10}, Z_{11} and Z_{12} denote values of selected variables in the standardized form and figures in parentheses are factor loadings.

The factor scores with respect to second factor have been calculated with the help of the following equation and presented in Table 6.14.

$$SD_5 = (0.6911)\, Z_5 + (0.8041)\, Z_6 \quad \text{..... (V)}$$

Where SD_5 is the second dimension of social development, Z_5 and Z_6 denote values of selected variables in the standardized form and figures in parentheses are factor loadings.

Table 6.13: Rotated Factor Matrix (Varimax Method) 1980-81

Variable	*Factor-1*	*Factor-2*	*Factor-3*	*Factor-4*	h^2
1	0.9709	0.1477	0.0380	0.0315	0.9669
2	-0.2534	-0.4618	0.7651	0.2617	0.9314
3	-0.5106	-0.0077	0.7862	-0.1702	0.9079
4	0.4536	0.3106	0.7291	-0.3163	0.9339
5	0.5670	0.6911	0.1661	0.1298	0.8436
6	0.0193	0.8041	-0.1063	-0.0855	0.6656
7	0.9708	0.1543	0.0060	0.0572	0.9696
8	0.0828	-0.0431	-0.0763	0.9409	0.8998
9	0.7219	0.4504	0.0065	0.3897	0.8758
10	-0.8892	-0.2613	0.2917	-0.0992	0.9539
11	-0.7768	0.3123	0.1948	0.0840	0.7460
12	0.8357	0.3913	-0.2907	-0.0349	0.9372
Eigenvalue	*5.3583*	*2.0033*	*1.9890*	*1.2811*	
Percentage Variance	*44.65*	*16.69*	*16.57*	*10.68*	
Cumulative Variance (%)	*44.65*	*61.35*	*77.92*	*88.60*	

Note: Critical value of a_i at 5 per cent level = 0.576
Critical value of a_i at 1 per cent level = 0.714

Table 6.14 reveals that four districts, namely Kolkata, 24 Parganas (N), Howrah and Darjeeling ranked above the state average in the year 1980-81 and remaining fourteen districts were placed below the state average in respect of first dimension of social development. On the basis of the placement of the districts above and below the state average, districts above the state average are designated as developed districts. On the other hand, districts placed below the state average are categorized as backward districts in respect of first dimension of social development. In the matter of second dimension of social development, nine districts, namely Kolkata, Birbhum, Howrah, Hooghly, Nadia, Burdwan, Darjeeling, Midnapore and 24 Parganas (N) are categorized as developed

category districts and remaining nine districts fell in the developing (or backward) category of districts.

Table 6.14: Dimensions of Social Development in 1980-81					
Sl. No.	*Districts*	*First Dimension Index*	*Rank*	*Second Dimension Index*	*Rank*
1	Burdwan	0.1068	5	0.6395	6
2	Birbhum	0.0085	17	0.9856	2
3	Bankura	0.0223	12	0.3891	10
4	Midnapore	0.0154	13	0.5405	8
5	Howrah	0.1681	3	0.7602	3
6	Hooghly	0.1015	7	0.7576	4
7	24 Parganas (N)	0.1909	2	0.5118	9
8	24 Parganas (S)	0.1037	6	0.2765	14
9	Nadia	0.0853	8	0.6535	5
10	Murshidabad	0.0145	15	0.3849	11
11	Malda	0.0000	18	0.1986	16
12	Uttar Dinajpur	0.0543	11	0.0110	17
13	Dakshin Dinajpur	0.0663	9	0.2188	15
14	Jalpaiguri	0.0599	10	0.3808	12
15	Darjeeling	0.1653	4	0.6016	7
16	Cooch Behar	0.0143	16	0.3225	13
17	Purulia	0.0146	14	0.0000	18
18	Kolkata	1.0000	1	1.0000	1
Mean		*0.1218*		*0.4796*	
C.V.		*194.87*		*68.22*	

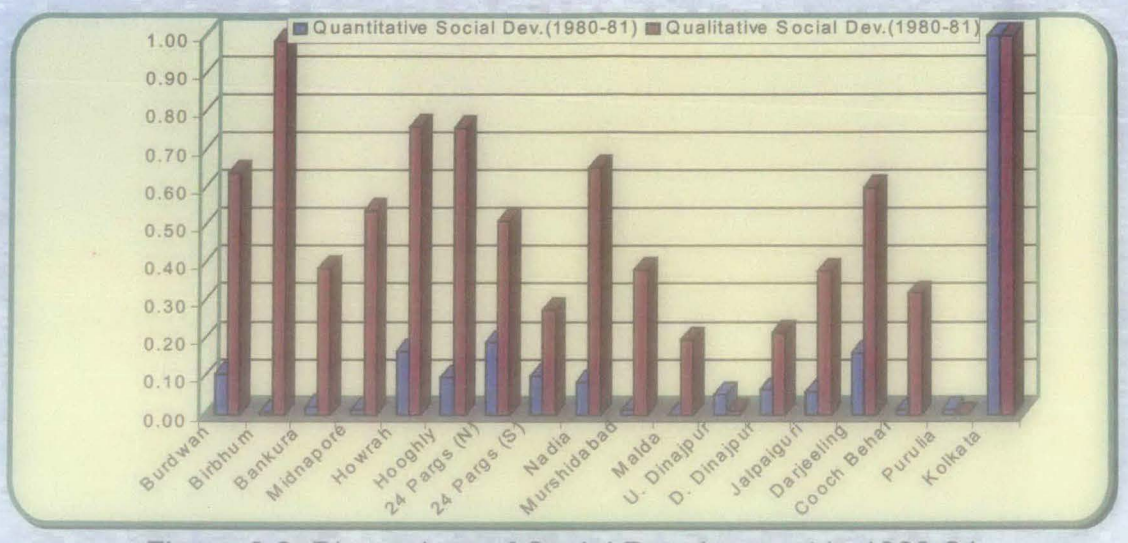


Figure 6.2: Dimensions of Social Development in 1980-81

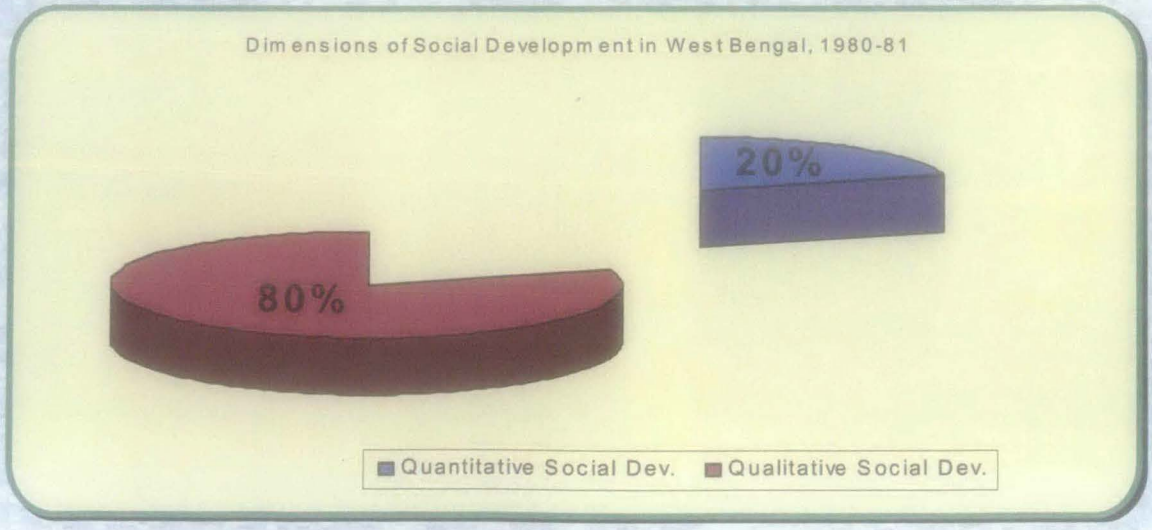


Figure 6.3

6.4.2 (B) Dimensions of Social Development, 1990-91:

The first factor, which tantamount to first dimension of social sector development, explains 40.21 per cent of the total variance for the year 1990-91 and four indicators are positively and significantly correlated with this factor in Table 6.15. These indicators, namely overall literacy rate, percentage of female literacy to total literacy, medical institutions relative to geographical area and percentage of urban population to rural population but number of primary schools, high/higher secondary schools, medical institutions relative to population and sex ratio, i.e., number of females per thousand of males are negatively and significantly correlated with this factor. Thus, this first dimension may be referred to as *Qualitative Social Development.*

On the other hand, second factor, which represents second dimension of social development, explains 38.09 per cent of the total variance for the year 1990-91 and five indicators are positively and significantly correlated with this factor.

Table 6.15: Rotated Factor Matrix (Varimax Method) 1990-91

Variable	*Factor-1*	*Factor-2*	h^2
1	0.3498	0.9231	0.9744
2	-0.9123	0.0588	0.8357
3	-0.7550	-0.2351	0.6253
4	-0.0840	0.8555	0.7389
5	0.6526	0.3721	0.5643
6	0.8313	0.0174	0.6913
7	0.6577	0.6311	0.8308
8	-0.7862	-0.4773	0.8460
9	0.3619	0.7990	0.7694
10	-0.6635	-0.6890	0.9150
11	-0.1088	-0.8073	0.6636
12	0.7372	0.6308	0.9415
Eigenvalue	*4.8258*	*4.5703*	
Percentage Variance	*40.21*	*38.09*	
Cumulative Variance (%)	*40.21*	*78.30*	

Note: Critical value of a_i at 5 per cent level = 0.576
Critical value of a_i at 1 per cent level = 0.714

These indicators are number of primary schools, medical institutions relative to geographical area, high/higher secondary schools and number of hospital beds relative to population and percentage of urban population to total population but in the matter of second dimension indicators, viz., sex ratio, i.e., number of females per thousand of males and provision of drinking water are

negatively and significantly correlated with this factor. The second dimension of social development may be termed as *Quantitative Social Development.*

Table 6.16: Dimensions of Social Development in 1990-91

Sl. No.	*Districts*	*First Dimension Index*	*Rank*	*Second Dimension Index*	*Rank*
1	Burdwan	0.5066	4	0.1201	4
2	Birbhum	0.2451	14	0.0762	8
3	Bankura	0.0730	17	0.0784	7
4	Midnapore	0.2678	12	0.0569	11
5	Howrah	0.6810	2	0.1950	2
6	Hooghly	0.4850	5	0.1430	3
7	24 Parganas (N)	0.6392	3	0.0997	6
8	24 Parganas (S)	0.3145	8	0.0406	14
9	Nadia	0.4580	6	0.0669	10
10	Murshidabad	0.3050	9	0.0309	15
11	Malda	0.2151	15	0.0301	16
12	Uttar Dinajpur	0.1929	16	0.0558	12
13	Dakshin Dinajpur	0.2616	13	0.0709	9
14	Jalpaiguri	0.2862	10	0.0000	18
15	Darjeeling	0.3894	7	0.1043	5
16	Cooch Behar	0.2709	11	0.0038	17
17	Purulia	0.0000	18	0.0422	13
18	Kolkata	1.0000	1	1.0000	1
Mean		*0.3662*		*0.1230*	
C.V.		*81.40*		*191.06*	

The factor scores with respect to the first factor have been calculated with the help of the following equation and presented in Table 6.15.

$$SD_6 = (-0.9123)\, Z_2 + (-0.7550)\, Z_3 + (0.6526)\, Z_5 + (0.8313)\, Z_6 + (0.6577)\, Z_7 + (-0.7862)\, Z_8 + (-0.6635)\, Z_{10} + (0.7372)\, Z_{12} \quad \text{..... (VI)}$$

Where SD_6 is the first dimension of social development, Z_2, Z_3, Z_5, Z_6, Z_7, Z_8, Z_{10} and Z_{12} denote values of selected variables in the standardized form and figures in parentheses are factor loadings.

The factor scores with respect to second factor have been calculated with the help of the following equation and presented in Table 6.15.

$$SD_7 = (0.9231)\, Z_1 + (0.8555)\, Z_4 + (0.6311)\, Z_7 + (0.7990)\, Z_9 + (-0.6890)\, Z_{10} + (-0.8073)\, Z_{11} + (0.6308)\, Z_{12} \quad \text{..... (VII)}$$

Where SD_7 is the second dimension of social development, Z_1, Z_4, Z_7, Z_9, Z_{10}, Z_{11} and Z_{12} denote values of selected variables in the standardized form and figures in parentheses are factor loadings.

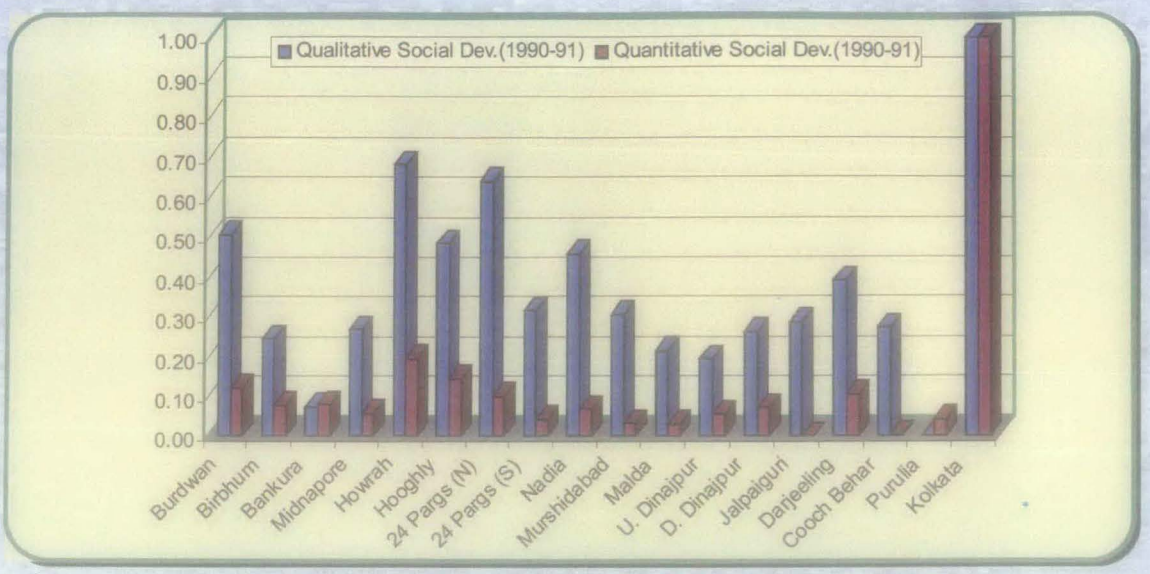


Figure 6.4: Dimensions of Social Development in 1990-91

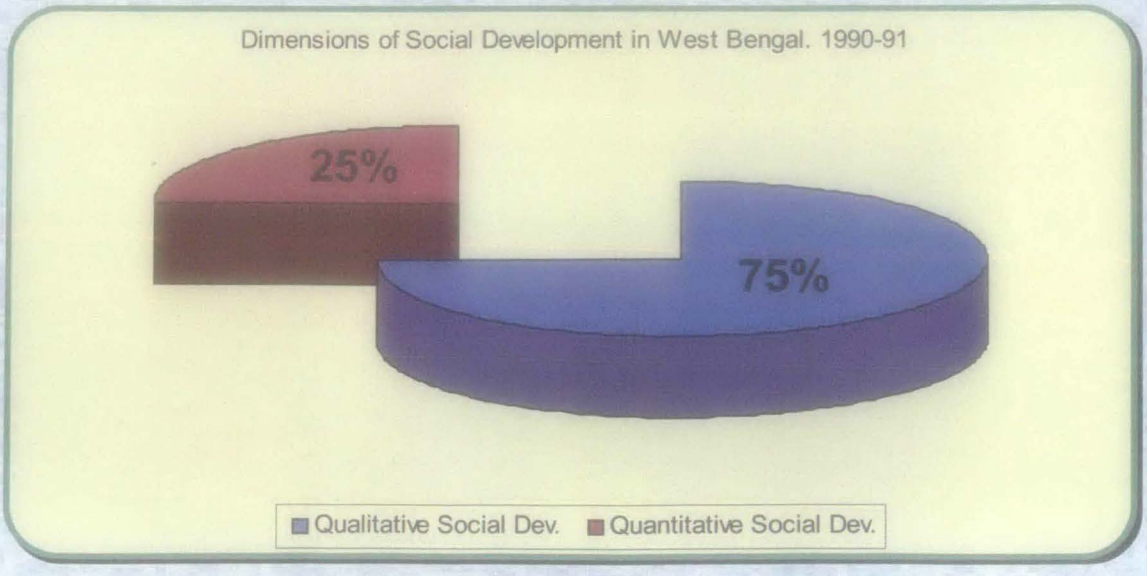


Figure 6.5

6.4.3 (C) Dimensions of Social Development, 2000-01:

Various dimensions of social sector development for the year 2000-01 have been identified by rotating the Principal Component Matrix with Varimax Rotation as presented in Table 6.17 so as to get a Rotated Factor Matrix. The first factor explains 45.25 per cent of the total variance, where as second and third factors explain 23.92 per cent and 13.66 per cent respectively. All the three factors taken together explain 82.83 per cent of the total variance.

Analysis of the factor loadings for the year 2000-01 facilitates to identify the factors. Each variable has been assigned to the factor with which it has the highest loading. The second factor, third factor highest loadings, if significant, has also been considered. It is also evident from Table 6.17 that each variable is significantly correlated with at least one factor. Social development exhibits three-dimensional development though two dimensions are meaningful in the present case.

The first factor is a cluster of seven indicators, which are significantly correlated with this factor. Out of seven, five indicators, namely number of primary schools, medical institutions relative to geographical area, high/higher secondary schools, hospital beds relative to population and percentage of urban population to total population. Only two indicators, namely, medical institutions and sex ratio, i.e., number of females per thousand of males is negatively and significantly associated with this factor. Thus, this first dimension may be referred to as *Quantitative Social Development*.

In the same way, the second factor is a cluster of four indicators, namely, number of primary schools, medical institutions relative to population are significantly and negatively correlated with this factor. On the other hand, percentage of female literacy to total literacy and overall literacy percentage are positively and significantly correlated with this factor. It would be better to mention that, the indicator, overall literacy percentage has also been taken into account as significantly and positively associated with this second dimension relating to nearer the value of significant level. Therefore, the second dimension of social development may be termed as *Qualitative Social Development.*

The factor scores with respect to the first factor have been calculated with the help of the following equation and presented in Table 6.17.

$$SD_8 = (0.9321)\ Z_1 + (0.8067)\ Z_4 + (0.7536)\ Z_7 + (-0.5941)\ Z_8$$

$$+ (0.9174)\ Z_9 + (-0.8896)\ Z_{10} + (0.8383)\ Z_{12} \quad \text{..... (VIII)}$$

Where SD_8 is the first dimension of social development, Z_1, Z_4, Z_7, Z_8, Z_9, Z_{10}, and Z_{12} denote values of selected variables in the standardized form and figures in parentheses are factor loadings.

Table 6.17: Rotated Factor Matrix (Varimax Method) 2000-01

Variable	*Factor-1*	*Factor-2*	*Factor-3*	h^2
1	0.9321	0.1884	-0.2114	0.9490
2	-0.2163	-0.8109	0.4253	0.8853
3	0.0341	-0.0620	0.7195	0.5227
4	0.8067	0.1033	0.3486	0.7829
5	0.5351	0.5524	0.4727	0.8150
6	0.1003	0.9154	0.1883	0.8835
7	0.7536	0.4744	-0.1387	0.8122
8	-0.5941	-0.6613	0.3936	0.9452
9	0.9174	0.0725	0.0724	0.8521
10	-0.8896	-0.3331	0.2031	0.9436
11	-0.5568	-0.0161	0.5424	0.6045
12	0.8383	0.4902	-0.0263	0.9437
Eigenvalue	*5.4306*	*2.8699*	*1.6392*	
Percentage Variance	*45.25*	*23.92*	*13.66*	
Cumulative Variance (%)	*45.25*	*69.17*	*82.83*	

Note: Critical value of a_i at 5 per cent level = 0.576
Critical value of a_i at 1 per cent level = 0.714

The factor scores with respect to second factor have been calculated with the help of the following equation and presented in Table 6.17.

$$SD_9 = (-0.8109)\ Z_2 + (0.5524)\ Z_5 + (0.9154)\ Z_6$$
$$+ (-0.6613)\ Z_8 \quad \text{..... (IX)}$$

Where SD_9 is the second dimension of social development, Z_2, Z_5, Z_6 and Z_8 denote values of selected variables in the standardized form and figures in parentheses are factor loadings.

It may be observed from Table 6.18 that in 2000-01, six districts, viz. Kolkata, Howrah, 24 Parganas (N), Burdwan, Hooghly and Darjeeling were placed above the state average and thus categorized as developed districts. Remaining twelve districts, because of their placement below the state average, are included in the list of developing category districts in respect of fist dimension of social development. In case of second dimension of social development, ten districts, Kolkata, 24 Parganas (N), Howrah, Nadia, Murshidabad, Hooghly, Burdwan, 24 Parganas (S), Jalpaiguri and Darjeeling are classified as developed districts and remaining eight districts fall in the category of developing districts.

Table 6.18: Dimensions of Social Development in 2000-01					
Sl. No.	*Districts*	*First Dimension Index*	*Rank*	*Second Dimension Index*	*Rank*
1	Burdwan	0.2021	4	0.6626	7
2	Birbhum	0.0823	8	0.4680	15
3	Bankura	0.0513	12	0.2223	17
4	Midnapore	0.0588	11	0.4482	16
5	Howrah	0.3367	2	0.7729	3
6	Hooghly	0.1838	5	0.6891	6
7	24 Parganas (N)	0.2701	3	0.8565	2
8	24 Parganas (S)	0.0627	10	0.6512	8
9	Nadia	0.1213	7	0.7689	4
10	Murshidabad	0.0380	14	0.7045	5
11	Malda	0.0357	15	0.5756	11
12	Uttar Dinajpur	0.0000	18	0.4979	14
13	Dakshin Dinajpur	0.0658	9	0.5266	13
14	Jalpaiguri	0.0427	13	0.5987	9
15	Darjeeling	0.1510	6	0.5834	10
16	Cooch Behar	0.0312	16	0.5407	12
17	Purulia	0.0294	17	0.0000	18
18	Kolkata	1.0000	1	1.0000	1
Mean		*0.1535*		*0.5871*	
C.V.		*161.46*		*48.08*	

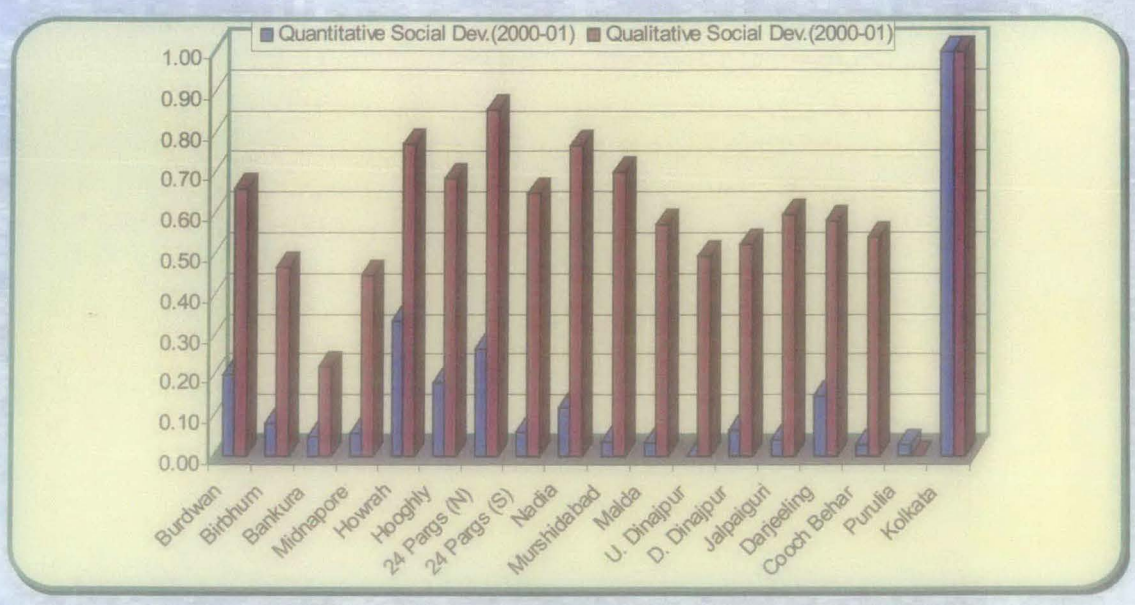


Figure 6.6: Dimensions of Social Development in 2000-01

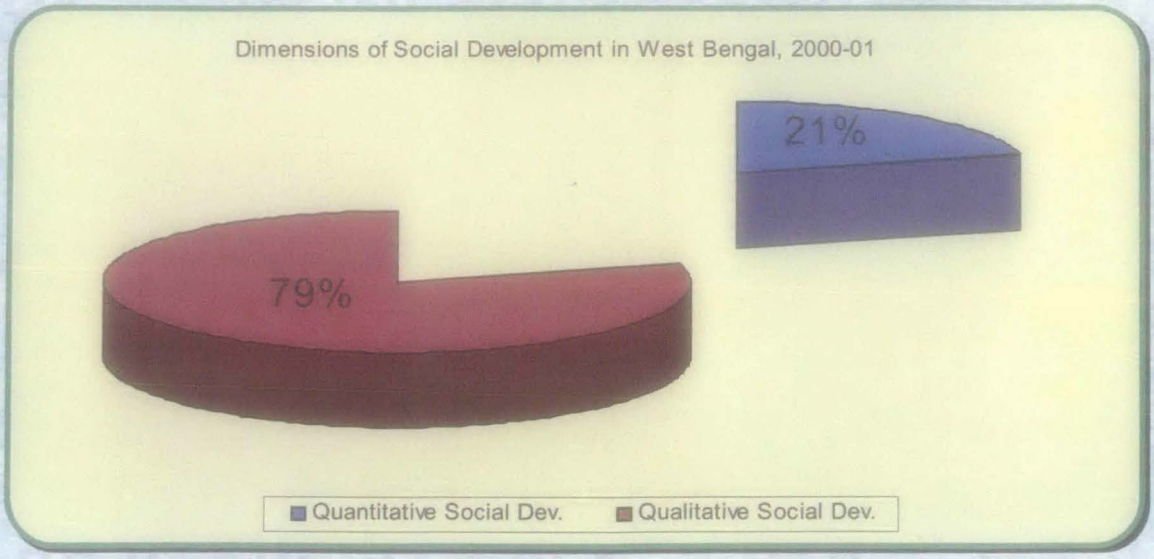


Figure 6.7

6.5 Summary

1. In case of social sector development, it is observed that there has been marginal decrease in inter-district disparities in the indicators pertaining to availability of educational institutions. On the other hand, disparities in respect of percentage of literacy, along with female literacy, availability of medical institutions, sex ratio and percentage of urban population to total population have considerably fallen during the reference point of time. Similarly, in respect of hospital beds and provision of drinking water, disparities have increased in the three points of time. Hence, it is observed that despite existence of disparities in social amenities at district level, all-round development of social sector can be realized in the shape of appreciable increase in literacy, female literacy, and improvement in life expectancy of both males and females, and fall in Infant Mortality Rate (IMR).
2. Out of eighteen districts of the state according to the value of composite indices, Kolkata comes out to be the most developed one while Purulia was the least developed in the year 2000-01. Inter-district variation in the levels of social development was very high as is evident from the value of coefficient of variation (Table 6.11). The extent of disparities with respect to social development has slightly decreased in the year 2000-01. This is evident from the value of coefficient of variation for the year 1980-81 (147.16%), 1990-91 (115.47%) and 2000-01 (111.07%).
3. After comparing the value of composite indices of different districts with the arithmetic mean or the state average, it is observed (in Table 6.12) that in 1980-81 and 1990-91, seven districts, namely Kolkata, Howrah, Darjeeling, 24 Parganas (N), Burdwan, Hooghly and Nadia were in the category of developed districts. The year 2000-01 did not show any significant change. It also emerges from the Table 6.12 that all the developed category districts retained their position but minor changes occurred in their ranking within this category in the reference years. It can clearly be observed from the Table 6.12 that in 1990-91, the comparative level of social development moved in favour of agglomeration in Kolkata district rather than backward districts. This is probably due to concerted efforts through area specific programmes.

4. Social sector development has been divided into two dimensions. In the year 1980-81, *first dimension* represents *quantitative* expansion of social sector whereas *second dimension* exhibits *qualitative* expansion of the social sector. During 1980-81, Kolkata, 24 Parganas (N), Howrah, and Darjeeling were developed category districts in the matter of quantitative social development. Conversely, nine districts, namely Kolkata, Birbhum, Howrah, Hooghly, Nadia, Burdwan, Darjeeling, Midnapore and 24 Parganas (N) are categorized as developed districts in respect of qualitative social development.
5. Dimension of social development, during 1990-91 reveals that Kolkata, Howrah, 24 Parganas (N), Burdwan, Hooghly, Nadia and Darjeeling were fairly developed in quantitative social development. On the other hand, four districts, namely Kolkata, Howrah, Hooghly and Burdwan emerged as developed districts in the matter of qualitative social development.
6. During 2000-01, six districts, viz. Kolkata, Howrah, 24 Parganas (N), Burdwan, Hooghly and Darjeeling emerged as developed districts in respect of quantitative social development whereas ten districts, Kolkata, 24 Parganas (N), Howrah, Nadia, Murshidabad, Hooghly, Burdwan, 24 Parganas (S), Jalpaiguri and Darjeeling emerged as developed districts in respect of qualitative social development. Therefore, Birbhum, Bankura, Midnapore, Malda, Uttar Dinajpur, Dakshin Dinajpur, Cooch Behar and Purulia districts can be considered as socially backward as these districts are less developed in respect of both the dimensions of social development.

Note: *Social development recognized two dimensions, viz., quantitative and qualitative social development according to formation of cluster in the reference years.*

CHAPTER 7

REGIONAL DISPARITIES IN OVERALL SOCIO-ECONOMIC DEVELOPMENT

7.1 District-wise Composite Indices of Overall Socio-Economic Development

An endeavour is made in the present chapter to study the changes in district-wise patterns of development that occurred during 2000-01 as a result of the planned development efforts made in the 1980s and 1990s due mainly to the adoption of new development strategy, emphasizing maximum possible use of local resources through implementation of various development programmes based on "Area Development" and "Target Group" approaches. In this regard, efforts have been made here to measure overall development along with upward or downward movements of districts in the levels of development, besides assessing the magnitude of inter-district disparities having taken place at three points of time i.e. 1980-81, 1990-91 and 2000-01.

Although district-wise composite indices of development have been constructed for each of the key sectors of the economy, i.e. agriculture, industry, economic infrastructure and social development, yet these indices by themselves are not sufficient to indicate the overall development for different districts. It is presumed that some of the districts are developed with respect to agriculture and horticulture but they might be underdeveloped with respect to some other dimensions of development. Therefore, when these indices are treated separately for analytical purposes, it would be very difficult to get overall view of development for different districts. In order to analyze this strategic issue in an aggregative form, the four composite indices of agriculture sector, industrial sector, economic infrastructure sector and social sector are treated as raw data to arrive at a new principal component. The factor loading of these four indices corresponding to the latter have been used to construct the composite index of overall development.

The correlation matrices of these four indices for the year 1980-81, 1990-91 and 2000-01 are given in Tables 7.1, 7.3, and 7.5 respectively. Principal Component Matrix is presented in Tables 7.2, 7.4 and 7.6 separately for each reference year.

Table 7.1: Inter-correlation Matrix of Overall Development (1980-81)				
	Agriculture	Industry	Infrastructure	Social
Agriculture	1.000			
Industry	-0.061	1.000		
Infrastructure	-0.068	0.623	1.000	
Social	0.101	0.671	0.803	1.000
Number of observations = 12				

Table 7.2: Principal Component Matrix (1980-81)			
Indicator	P_1	P_2	h^2
Agriculture	-0.0135	0.9969	0.9940
Industry	0.8481	-0.0761	0.7250
Infrastructure	0.9082	-0.0583	0.8283
Social	0.9257	0.1415	0.8770
Eigenvalue	*2.4013*	*1.0230*	
Percentage Variance	*60.03*	*25.57*	
Cumulative Variance (%)	*60.03*	*85.61*	

Table 7.1 reveals that one index is positively associated with each other in the year 1980-81. The first principal component explains 60.03 per cent of the total variance and both the first and second principal components explains 85.61per cent of the total variance. The equation for the composite index (D) is:

$$D = (-0.0135)\ Z_1 + (0.8481)\ Z_2 + (0.9082)\ Z_3 + (0.9257)\ Z_4 \quad \ldots\ldots\ldots\ldots\ (I)$$

Where, D is composite index of overall development of a district, Z_1, Z_2, Z_3 and Z_4 are standardized values of the variables and figure given in parentheses are *'factor loadings' or 'weights'*.

The coefficient of correlation of composite index (D) with each of the four indices except agriculture is positive and a high as 0.85, 0.91 and 0.93 respectively. Further, all the communalities (h^2) are very high, as is evident from Table 7.2, which indicates that each sector taken for analysis was significantly correlated with all other sectors (except agriculture sector).

Table 7.3: Inter-correlation Matrix of Overall Development (1990-91)				
	Agriculture	Industry	Infrastructure	Social
Agriculture	1.000			
Industry	-0.474	1.000		
Infrastructure	-0.180	0.653	1.000	
Social	-0.668	0.741	0.784	1.000
Number of observations = 12				

Table 7.4: Principal Component Matrix (1990-91)		
Indicator	P_1	h^2
Agriculture	-0.6711	0.4503
Industry	0.8710	0.7587
Infrastructure	0.8075	0.6521
Social	0.9643	0.9298
Eigenvalue	*2.7909*	
Percentage Variance	*69.77*	

Similarly for the year 1990-91 as is evident from the above Table 7.3 these four indices are significantly associated with each other. The first principal component explains 69.77 per cent of the total variance. The equation for the composite index (D) is:

$$D = (-0.6711)\, Z_1 + (0.8710)\, Z_2 + (0.8075)\, Z_3 + (0.9643)\, Z_4 \quad \text{..... (II)}$$

Where, D is composite index of overall development of a district, Z_1, Z_2, Z_3 and Z_4 are standardized values of the variables and figure given in parentheses are *'factor loadings' or 'weights'*.

It may be seen from the Table 7.4 that all the communalities (h^2) are very high, ranging from +0.4503 to +0.9298, which indicates that each sector taken for evaluating overall socio-economic development was significantly correlated with all other sectors.

Table 7.5: Inter-correlation Matrix of Overall Development (2000-01)				
	Agriculture	Industry	Infrastructure	Social
Agriculture	1.000			
Industry	-0.444	1.000		
Infrastructure	-0.101	0.792	1.000	
Social	-0.665	0.775	0.708	1.000
Number of observations = 12				

Table 7.6: Principal Component Matrix (2000-01)		
Indicator	*P1*	h^2
Agriculture	-0.6240	0.3894
Industry	0.9209	0.8480
Infrastructure	0.8137	0.6620
Social	0.9480	0.8987
Eigenvalue	*2.7981*	
Percentage Variance	*69.95*	

During 2000-01, Table 7.5 reveals that these four indices were significantly associated with each other. The principal component matrix has retained only one Principal Component which taken together explain 69.95 per cent of the total variance.

The coefficient of correlation of composite index (D) with the indices of industry, economic infrastructure and social sector is positive (except agriculture) and as high as -0.62, +0.92, +0.81 and +0.95 respectively. Also all the communalities (h^2) are very high, ranging from +0.39 to +0.89, which indicates that each sector taken for studying overall socio-economic development is significantly correlated with all other sectors.

The equation for the composite index (D) is:

$$D = (-0.6240)\, Z_1 + (0.9209)\, Z_2 + (0.8137)\, Z_3 + (0.9480)\, Z_4 \quad \text{..... (III)}$$

Where, D is composite index of overall development of a district, Z_1, Z_2, Z_3 and Z_4 are standardized values of the variables and figures given in parentheses are *'factor loadings' or 'weights'*.

All the eighteen districts of the state have been ranked according to their levels of overall development as per the indices of development during the three selected year, i.e., 1980-81, 1990-91 and 2000-01 (Table 7.7).

It may be observed from Table 7.7 (and figure 8.1) that significant changes have been taken place in the ranking patterns of the districts during the period of analysis. Such changes are due to implementation of various Area Specific Development Programmes. The impact of major programmes, such as Backward Area Development Programme under which a lot of planned resources have been diverted for the socio-economic development of Backward Areas, can be seen from the ranking of Backward districts (Birbhum, Midnapore, 24 Parganas (S), Nadia, Murshidabad and Malda), which were at the bottom in the initial reference year (1980-81), but have shifted upwards and registered above ranking position during 1990-91 and 2000-01.

But socio-economic development of remaining districts shows a mixed picture. Burdwan district, which was placed in the backward category during 1980-81 and 1990-91 shifted to the developed category during 2000-01. Similarly, Nadia district, which was placed in the backward category district during 1980-81 shifted to the developed category during 1990-91 and retained its position in 2000-01. Darjeeling district, which was initially in the developed

category 1980-81 but could not retain its position and slipped to the backward category during 1990-91 and 2000-01.

Table 7.7: District-wise Indices of Overall Socio-Economic Development

Sl. No.	*Districts*	1980-81		1990-91		2000-01	
		Index	*Rank*	*Index*	*Rank*	*Index*	*Rank*
1	Burdwan	0.4336	4	0.2612	5	0.2950	6
2	Birbhum	0.1479	10	0.0974	10	0.0842	11
3	Bankura	0.0492	14	0.0266	15	0.0288	17
4	Midnapore	0.0387	16	0.0734	12	0.0644	13
5	Howrah	0.6332	2	0.6404	2	0.7545	2
6	Hooghly	0.4298	5	0.3588	4	0.3767	4
7	24 Parganas (N)	0.4550	3	0.4620	3	0.5254	3
8	24 Parganas (S)	0.2444	6	0.2610	6	0.3238	5
9	Nadia	0.2337	7	0.1687	7	0.1449	7
10	Murshidabad	0.1162	11	0.1042	9	0.1147	10
11	Malda	0.0905	13	0.0653	13	0.0705	12
12	Uttar Dinajpur	0.0425	15	0.0159	17	0.0351	16
13	Dakshin Dinajpur	0.0350	17	0.0226	16	0.0408	15
14	Jalpaiguri	0.1554	9	0.0940	11	0.1160	8
15	Darjeeling	0.2004	8	0.1474	8	0.1152	9
16	Cooch Behar	0.1139	12	0.0565	14	0.0481	14
17	Purulia	0.0000	18	0.0000	18	0.0000	18
18	Kolkata	1.0000	1	1.0000	1	1.0000	1
	Mean	*0.2455*		*0.2142*		*0.2299*	
	S.D.	*0.2911*		*0.2860*		*0.3017*	
	C.V.	*118.58*		*133.52*		*131.22*	
Rank Correlation Coefficient: $R_{12} = +0.96$, $R_{13} = +0.96$, $R_{23} = +0.98$							

It is a matter of grave concern that districts Kolkata, Howrah and 24 Parganas (N), which retained their position in developed category districts during 1980-81, 1990-91 and 2000-01, but remaining districts retained their position in developing category and no improvements in their socio-economic conditions have been realized during 2000-01.

Table 7.8: Classification of Districts According to Levels of Overall Socio-Economic Development					
1980-81		1990-91		2000-01	
Districts	*Index*	*Districts*	*Index*	*Districts*	*Index*
Developed Districts					
Kolkata	1.0000	Kolkata	1.0000	Kolkata	1.0000
Howrah	0.6332	Howrah	0.6404	Howrah	0.7545
24 Parganas (N)	0.4550	24 Parganas (N)	0.4620	24 Parganas (N)	0.5254
Burdwan	0.4336	Hooghly	0.3588	Hooghly	0.3767
Hooghly	0.4298	Burdwan	0.2612	24 Parganas (S)	0.3238
		24 Parganas (S)	0.2610	Burdwan	0.2950
Mean	*0.5903*		*0.4972*		*0.5459*
C.V.	*47.59*		*63.11*		*55.81*
Developing Districts					
24 Parganas (S)	0.2444	Nadia	0.1687	Nadia	0.1449
Nadia	0.2337	Darjeeling	0.1474	Jalpaiguri	0.1160
Darjeeling	0.2004	Murshidabad	0.1042	Darjeeling	0.1152
Jalpaiguri	0.1554	Birbhum	0.0974	Murshidabad	0.1147
Birbhum	0.1479	Jalpaiguri	0.0940	Birbhum	0.0842
Murshidabad	0.1162	Midnapore	0.0734	Malda	0.0705
Cooch Behar	0.1139	Malda	0.0653	Midnapore	0.0644
Malda	0.0905	Cooch Behar	0.0565	Cooch Behar	0.0481
Bankura	0.0492	Bankura	0.0266	Dakshin Dinajpur	0.0408
Uttar Dinajpur	0.0425	Dakshin Dinajpur	0.0226	Uttar Dinajpur	0.0351
Midnapore	0.0387	Uttar Dinajpur	0.0159	Bankura	0.0288
Dakshin Dinajpur	0.0350	Purulia	0.0000	Purulia	0.0000
Purulia	0.0000				
Mean	*0.1129*		*0.0727*		*0.0719*
C.V.	*109.58*		*114.33*		*108.57*

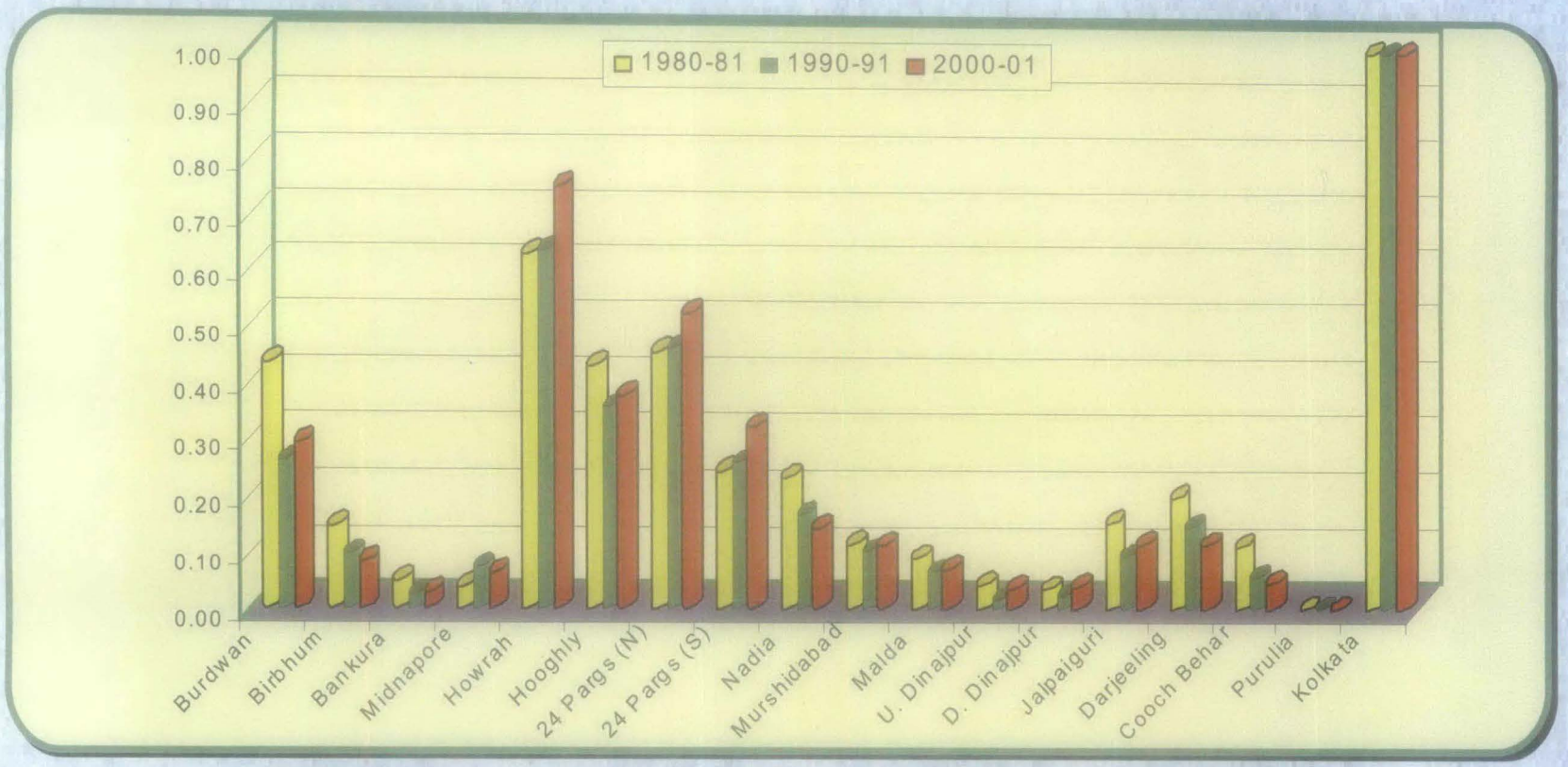


Figure 7.1: Patterns of Overall Socio-Economic Development in West Bengal

7.2 Relationship between Sectoral Development and Overall Level of Socio Economic Development

Having analyzed the patterns of development of districts, it is imperative to evaluate relationship between sectoral development and overall level of socio-economic development. It is firmly believed that there are symbiotic relations among economic infrastructure, agricultural and industrial sectors. With a view to analyze inter-relationship between each sector and overall socio-economic development, an appropriate statistical method of Rank Difference has been applied and presented in Tables 7.9, 7.10 and 7.11 for the reference years 1980-81, 1990-91 and 2000-01 respectively.

Table 7.9: Ranking of Districts According to Level of Development in 1980-81

Districts	Agricultural Development	Industrial Development	Economic Infrastructural Development	Social Sector Development	Overall Socio-Economic Development
	(R-1)	*(R-2)*	*(R-3)*	*(R-4)*	*(R-5)*
Burdwan	9	6	2	5	4
Birbhum	16	10	6	11	10
Bankura	12	13	15	14	14
Midnapore	15	11	17	16	16
Howrah	11	1	4	2	2
Hooghly	6	5	3	6	5
24 Parganas (N)	10	3	7	4	3
24 Parganas (S)	14	4	13	9	6
Nadia	3	9	5	7	7
Murshidabad	7	18	8	10	11
Malda	13	15	10	15	13
Uttar Dinajpur	17	16	14	17	15
Dakshin Dinajpur	18	17	16	13	17
Jalpaiguri	2	8	11	8	9
Darjeeling	1	7	12	3	8
Cooch Behar	4	14	9	12	12
Purulia	5	12	18	18	18
Kolkata	8	2	1	1	1

Rank Correlation Coefficient: (1) R_1 & R_5, p = + 0.30
(2) R_2 & R_5, p = + 0.86
(3) R_3 & R_5, p = + 0.85
(4) R_4 & R_5, p = + 0.93

It is evident from the value of rank correlation shown in Table 7.9 that during 1980-81, all the key sectors, i.e. agriculture, industry, economic infrastructure and social services were positively and significantly correlated with overall socio-economic development.

The ranking patterns of districts in Table 7.10 during1990-91, in respect of agricultural sector have shown significant reshuffle these leading to a negative correlation with overall socio-economic development. But, industrial, economic infrastructure as well as social sectors has a positive and significant correlation with overall socio-economic development during the same year. Due to concentration of agricultural activity in specific districts, there is a significant and negative correlation between agriculture and overall socio-economic development.

During 2000-01, agriculture, industry, economic infrastructure and social sectors have positive and significant correlation with overall socio-economic development, shown in Table 7.11.

Table 7.10: Ranking of Districts According to Level of Development in 1990-91

Districts	Agricultural Development	Industrial Development	Economic Infrastructural Development	Social Sector Development	Overall Socio-Economic Development
	(R-1)	*(R-2)*	*(R-3)*	*(R-4)*	*(R-5)*
Burdwan	5	9	4	4	5
Birbhum	6	11	8	12	10
Bankura	11	14	14	17	15
Midnapore	14	10	16	10	12
Howrah	13	1	3	2	2
Hooghly	1	5	2	5	4
24 Parganas (N)	10	3	5	3	3
24 Parganas (S)	17	4	11	8	6
Nadia	2	8	6	6	7
Murshidabad	4	16	7	11	9
Malda	8	12	9	16	13
Uttar Dinajpur	3	17	13	15	17
Dakshin Dinajpur	7	18	17	9	16
Jalpaiguri	12	7	12	13	11
Darjeeling	15	6	15	7	8
Cooch Behar	9	13	10	14	14
Purulia	16	15	18	18	18
Kolkata	18	2	1	1	1

Rank Correlation Coefficient: (1) R_1 & R_5, p = - 0.089
(2) R_2 & R_5, p = + 0.88
(3) R_3 & R_5, p = + 0.83
(4) R_4 & R_5, p = + 0.92

Table 7.11: Ranking of Districts According to Level of Development in 2000-01					
Districts	Agricultural Development	Industrial Development	Economic Infrastructural Development	Social Sector Development	Overall Socio-Economic Development
	(R-1)	*(R-2)*	*(R-3)*	*(R-4)*	*(R-5)*
Burdwan	5	6	4	5	6
Birbhum	8	11	10	13	11
Bankura	15	12	16	17	17
Midnapore	12	10	15	10	13
Howrah	14	1	1	2	2
Hooghly	2	5	2	4	4
24 Parganas (N)	9	3	5	3	3
24 Parganas (S)	16	4	9	8	5
Nadia	1	9	6	6	7
Murshidabad	6	15	7	11	10
Malda	4	18	8	15	12
Uttar Dinajpur	10	14	14	16	16
Dakshin Dinajpur	13	16	17	9	15
Jalpaiguri	11	7	12	12	8
Darjeeling	7	8	13	7	9
Cooch Behar	3	17	11	14	14
Purulia	17	13	18	18	18
Kolkata	18	2	3	1	1
Rank Correlation Coefficient: (1) R_1 & R_5, p = + 0.071 (2) R_2 & R_5, p = + 0.85 (3) R_3 & R_5, p = + 0.88 (4) R_4 & R_5, p = + 0.91					

On the basis of the above analysis, it may be inferred that industrial, economic infrastructure and social sectors have improved significantly in backward districts (in respect of developing districts i.e., mean value) viz., Nadia, Jalpaiguri, Darjeeling, Murshidabad and Birbhum due to orientation of various area development programmes such as, Area Development Programme, Border Area Development Programme, Tribal Area Development Programme etc. The planned resources allocated for these specific areas, e.g. border area and tribal areas incidentally accrued to the above mentioned districts. Consequently, these districts have developed rapidly in economic infrastructure, industrial and social services simultaneously.

CHAPTER 8

SUMMARY OF FINDINGS, CONCLUSIONS AND SUGGESTIONS

8.1 SUMMARY OF FINDINGS

We have summarized below from chapters 3 to 7 of the present study.

8.1.1 Economic Development in West Bengal since the British Period to the Late 1970s

1. In 1971 West Bengal comprised only 2.67 per cent of India's land area (12th among the states and territories), however, it ranked fourth in population size. The aggregate growth of population was high in the districts of 24 - Parganas and Kolkata as well as in Jalpaiguri, Darjeeling, Nadia and Howrah districts *(Appendix A 2.2)*. Although there was a trend of positive growth, the percentage increase for the decade 1961-71 was lower than that of 1951-61. This was due to a lower birth rate and improvement in family planning, as well as the decreasing influx of refugees.
2. The rate of urbanization for West Bengal was only 28.4 per cent in 1971 (Table 2.2), whereas the national rate was 37.83 per cent. In 1961 and 1971 the proportion of urban population was above average only in the districts of 24 Parganas, Howrah, Kolkata and Hooghly. There was a decline of urbanization in the districts of Darjeeling, Cooch Behar, Midnapore and Murshidabad during the decade of 1961-71.
3. The percentage of literate people was more than average only in the districts of Kolkata, Howrah, Hooghly, 24 Parganas and Burdwan. Kolkata's literacy rate was over 60 per cent while the others ranged from 33% to 40% (Table 2.4).
4. There is a great disparity in the supply of surplus labor. In West Bengal 26.74 per cent of the entire labor force comprise surplus labor. In the districts of Hooghly, Jalpaiguri, 24 Parganas, Howrah, and Kolkata the surplus labor supply was above average. The proportion of male working

population in West Bengal is high while that of female is very low. Distribution of male workers was above average in the northern (except Darjeeling and Jalpaiguri), central and southeastern districts. On the other hand, the distribution of female workers was above average in Darjeeling and Jalpaiguri and all of the south western districts (Table 2.5).

5. In 1971 per capita income of West Bengal was Rs. 524.00 in West Bengal out of the 16 districts, 6 districts had per capita income greater than the average of the state. These are Kolkata, Burdwan, Hooghly, Jalpaiguri and Cooch Behar. Per capita income was highest (Rs. 1,011.00) in Kolkata. The hill districts and the south – eastern districts are next to Kolkata in per capita income.
6. At the time of independence West Bengal was the most industrially developed State in India. But today, West Bengal is said to be one of the backward States in India. The Bengal Chambers of Commerce have also pinpointed some causes for the present situation of the economy of West Bengal.
7. In 1951, West Bengal had the highest number of registered factories— 1493. She was followed by the composite state of Madras with 1473 factories and Bombay with 1426 factories. The number of persons employed in factories in that year was 475084 in West Bengal, 537969 in Bombay and 180629 in Madras.
8. The per capita income in West Bengal fell from Rs. 390 in 1960-61 (at 60-61 prices) to Rs. 385 in 1978-79. But the national average increased from Rs. 353 to Rs. 365 during that period. The index number of per capita net output (1970-71 base = 100) in West Bengal increased to 118 whereas all India figure was 126 in 1985-86.
9. The number of industries and value of output in West Bengal is relegated to the fifth and fourth position respectively. The number of industries in West Bengal is 6173 and the value of output is Rs. 2721.34 crores. Though West Bengal's position is second to Maharashtra in terms of the

value of output; the difference between the two State is wide — Maharashtra 24.3 per cent and West Bengal 10.9 per cent.

8.1.2 Disparities in Agricultural Development:

1. The average level of agricultural development of West Bengal shows, an increasing trend of agricultural development during 1980-81 to 2000-01. The ranking pattern of districts is similar in inter-district diversifications, the rank correlation coefficient being R_{12}= -0.084 to R_{13}=+0.33 for the period 1980-81 to 2000-01. This shows that the level of agricultural development is associated with resources endowment of the districts of the state and inter-district variations in levels of agricultural development demonstrate a declining trend in the reference years.
2. During 1980-81, the modernized agricultural development shows that in the beginning, Hooghly, Howrah, Burdwan, 24 Parganas (N), Birbhum and Nadia were the developed districts and remaining twelve districts are lagging behind. On the other hand, traditional agricultural development shows that, Dakshin Dinajpur, Jalpaiguri, Burdwan, Hooghly, Birbhum, Bankura, Darjeeling, Cooch Behar, Purulia and 24 Parganas (N) emerged as developed districts and the remaining eight districts remained in the backward category.
3. In the matter of first dimension, i.e., traditional agricultural development in 1990-91, Uttar Dinajpur, Dakshin Dinajpur, Birbhum, Malda, Nadia, Murshidabad, Hooghly, Burdwan, Midnapore, Cooch Behar and Bankura districts emerged as developed districts and the remaining seven districts were less developed. Alternatively, nine districts, namely Hooghly, Howrah, Nadia, 24 Parganas (N), Malda, Murshidabad, Cooch Behar, Burdwan and Birbhum were identified as developed districts in respect of modernized agricultural development and the remaining nine districts were backward.
4. Two dimensions namely overall agricultural development and modernized agricultural development were recognized during 2000-01. In respect of overall agricultural development, twelve districts namely Nadia, Howrah,

Murshidabad, Cooch Behar, 24 Parganas (N), Malda, Uttar Dinajpur, Dakshin Dinajpur, Jalpaiguri, Howrah, Burdwan and Darjeeling emerged as developed districts and remaining six districts lagged behind. On the other hand, in the case of modernized agricultural development, seven districts, namely Howrah, Hooghly, Darjeeling, 24 Parganas (N), Burdwan, Malda and Nadia emerged as developed districts and remaining eleven districts were less developed.

8.1.3 Disparities in Industrial Development:

1. From industrial sector, it may be observed that state level arithmetical mean of its composite indices for all the 18 districts has declined from 0.2349 in 1980-81 to 0.2285 in 1990-91 and has marginally decreased to 0.2258 during 2000-01. Therefore, inter-district variations of industrial development have shown rising trend in the consecutive reference years.
2. Because of agglomerative tendencies of industries, Howrah, Kolkata, 24 Parganas (N), 24 Parganas (S), Hooghly and Burdwan districts emerged as developed category districts in respect of industrial sector whereas remaining twelve districts were classified as backward districts during the reference years. It is noticed that concentration of all factories per thousand of Sq. Kms. of area is very high in Howrah followed by Kolkata, 24 Parganas (N) and Hooghly districts. Whereas, Cooch Behar, Malda, Bankura, Murshidabad, Uttar Dinajpur, Dakshin Dinajpur and Purulia districts have almost trifling possibility of modern industrial development. Thus these districts are placed in backward category. Nevertheless, there is enough possibility for traditional artisan-based industries in the backward districts.
3. In 1980-81, six districts namely Howrah, 24 Parganas (N), 24 Parganas (S), Hooghly, Kolkata and Burdwan emerged as developed districts in respect of modern industrial development and remaining twelve districts were categorized as backward due to their placement below the state average. On the other hand, in respect of overall industrial development, three districts, namely Kolkata, Howrah and 24 Parganas (N) districts fall

in the developed category and fifteen districts belonged to less developed category in industrial development. After one decade, in 1990-91, Howrah, 24 Parganas (N), 24 Parganas (S), Hooghly and Kolkata districts are developed districts in respect of first dimension index. On the other hand, Kolkata, Howrah, 24 Parganas (N), and Hooghly districts are developed category in respect of second dimension index and others belong to backward category in respect of industrial development.

4. In the matter of overall industrial development in 2000-01, Howrah, 24 Parganas (N), 24 Parganas (S), Hooghly, Kolkata and Burdwan appeared clearly as developed districts and two more districts, namely 24 Parganas (S) and Burdwan also came to be included in the developed category, as composite factor scores of these districts are nearer to the value of the state average and remaining twelve districts are identified as backward districts. In terms of small-scale industrial development, Kolkata achieved the top position, followed by Howrah, 24 Parganas (N) and Nadia. On the other hand, the least developed districts in this respect were Purulia preceded by Birbhum and Cooch Behar.

8.1.4 Disparities in Economic Infrastructure Development

1. In the above analysis it may be observed that, the state level arithmetic mean of its composite index for all the 18 districts has increased from 0.12 in 1980-81 to 0.15 in 1990-91 and further to 0.19 during 2000-01. It is important to mention at this point that increasing trend of state average can be translated as increasing of infrastructural development.
2. In 1980-81, it is noted that Kolkata achieved the top position, followed by Burdwan, Hooghly, Howrah and Nadia. On the other hand, the least developed district in respect of infrastructural facilities was Purulia preceded by Midnapore and Dakshin Dinajpur. In the year 1990-91, there has been significant change in the ranking of the districts of Kolkata, Hooghly, Howrah, Burdwan, 24 Parganas (N), Nadia and Murshidabad. Similarly, in the year 2000-01, there has not been any change in respect of ranking, but 24 Parganas (N) and Murshidabad are moved forward and

got placed from developing to developed category with respect to 1980-81.

3. Inter-district disparities in the levels of economic infrastructural development have also been reduced evidently from 100.50 per cent in 1980-81 to 81.84 per cent in 1990-91 and further to 83.77 per cent during 2000-01. However, the ranking pattern of districts was different in inter-district diversities. The Rank Correlation Coefficient (R_{12}) for the year 1980-81 and 1990-91 was +0.96 and it was +0.72 for the second subsequent decade (R_{23}) i.e. 1990-91 to 2000-01.
4. It may be observed that during 1980-81, Kolkata, Howrah, Darjeeling and 24 Parganas (N) appeared as developed districts in respect of the first dimension of infrastructure development whereas the remaining districts fell in the less developed category. On the other hand, in the matter of second dimension of infrastructure development, Burdwan, Hooghly, Birbhum, 24 Parganas (N) and Howrah districts are developed category in respect of second dimension index and remaining districts are less developed, perhaps, due to anomalous size of the geographical area of these districts with very low density of population.
5. During 1990-91 Kolkata district again emerged as developed district followed by Darjeeling and Howrah in respect of first dimension of infrastructure development. Alternatively, Malda district was most backward in respect of first dimension, preceded by 24 Parganas (S) and Uttar Dinajpur. In the matter of second dimension of infrastructure development, Hooghly attained the first position, closely followed by Burdwan, Howrah, Birbhum, Nadia, Murshidabad and Cooch Behar. On the other hand, Kolkata was the least developed, preceded by Purulia in this dimension of infrastructure development.
6. It would be found that, Purulia, Hooghly, Midnapore, Uttar Dinajpur and Malda emerged as developed districts in 2000-01 in respect of first dimension of infrastructure development while Hooghly, Burdwan, Howrah, Birbhum, 24 Parganas (N), Nadia and Murshidabad appeared as

developed districts in respect of second dimension of infrastructure development. Therefore, eight districts — Bankura, 24 Parganas (S), Malda, Dakshin Dinajpur, Jalpaiguri, Darjeeling, Cooch Behar and Kolkata were not placed in the developed category in both the dimensions of infrastructure development.

8.1.5 Disparities in Social Sector Development

1. On the basis of the above analysis, it is observed that there has been marginal decrease in inter-district disparities in the indicators pertaining to availability of educational institutions. On the other hand, disparities in respect of percentage of literacy, along with female literacy, availability of medical institutions, sex ratio and percentage of urban population to total population have considerably fallen during the reference point of time. Similarly, in respect of hospital beds and provision of drinking water, disparities have increased in the three points of time.
2. After comparing the value of composite indices of different districts with the arithmetic mean or the state average, it is observed (in Table 6.12) that in 1980-81 and 1990-91, seven districts, namely Kolkata, Howrah, Darjeeling, 24 Parganas (N), Burdwan, Hooghly and Nadia were in the category of developed districts. In the year 2000-01 did not show any significant change. It could also be found that all the developed category districts retained their position but minor changes occurred in their ranking within this category in the reference years. It could clearly be observed that in 1990-91, the comparative level of social development moved in favour of agglomeration in Kolkata district rather than backward districts. This is probably due to concerted efforts through area specific programmes.
3. Social sector development has been divided into two dimensions. In the year 1980-81, *first dimension* represents *quantitative* expansion of social sector whereas *second dimension* exhibits *qualitative* expansion of the social sector. During 1980-81, Kolkata, 24 Parganas (N), Howrah, and Darjeeling were developed category districts in the matter of quantitative

social development. Conversely, nine districts, namely Kolkata, Birbhum, Howrah, Hooghly, Nadia, Burdwan, Darjeeling, Midnapore and 24 Parganas (N) are categorized as developed districts in respect of qualitative social development.

4. Dimension of social development, during 1990-91 reveals that Kolkata, Howrah, 24 Parganas (N), Burdwan, Hooghly, Nadia and Darjeeling were fairly developed in quantitative social development. On the other hand, four districts, namely Kolkata, Howrah, Hooghly and Burdwan emerged as developed districts in the matter of qualitative social development.
5. During 2000-01, six districts, viz. Kolkata, Howrah, 24 Parganas (N), Burdwan, Hooghly and Darjeeling emerged as developed districts in respect of quantitative social development whereas ten districts, Kolkata, 24 Parganas (N), Howrah, Nadia, Murshidabad, Hooghly, Burdwan, 24 Parganas (S), Jalpaiguri and Darjeeling emerged as developed districts in respect of qualitative social development. Therefore, Birbhum, Bankura, Midnapore, Malda, Uttar Dinajpur, Dakshin Dinajpur, Cooch Behar and Purulia districts can be considered as socially backward as these districts are less developed in respect of both the dimensions of social development.

8.1.6 Regional Disparities in Overall Development

1. From the above analyses, it can be seen from the ranking of Backward districts (Birbhum, Midnapore, 24 Parganas (S), Nadia, Murshidabad and Malda), which were at the bottom in the initial reference year (1980-81), but have shifted upwards and registered above ranking position during 1990-91 and 2000-01.
2. Socio-economic development of remaining districts shows a mixed picture. Burdwan district, which was placed in the backward category during 1980-81 and 1990-91 shifted to the developed category during 2000-01. Similarly, Nadia district, which was placed in the backward category district during 1980-81 shifted to the developed category during 1990-91 and retained its position in 2000-01. Darjeeling district, which was

initially in the developed category 1980-81 but could not retain its position and slipped to the backward category during 1990-91 and 2000-01.

3. It is a matter of grave concern that districts Kolkata, Howrah and 24 Parganas (N), which retained their position in developed category districts during 1980-81, 1990-91 and 2000-01, but remaining districts retained their position in developing category and no improvements in their socio-economic conditions have been realized during 2000-01.

8.2 CONCLUSIONS

In the present study we analyzed district-wise spatial dimensions of socio-economic development in West Bengal for the selected points of time i.e. 1980-81, 1990-91 and 2000-01. The main objective of the study was to examine as to what extent the revised strategy of development of *Bottom-up Approach* adopted during eighties and nineties has gone in favour of bringing about improvement in balanced district-wise pattern of socio-economic development as against the previous development strategy based on *Top-Down Approach*. Impact of various Area Specific Development Programmes, which were initiated especially after Third Five Year Plan under revised strategy of *Bottom-up Approach*, has shown positive results on the economy as a whole. Correspondingly, it is realized that West Bengal benefited most in various fronts of socio-economic development at macro level. Even so, it is crucial to understand whether the fruits of the various development programmes are being distributed equitably and objectively among districts. Balanced Regional Development being one of the major objectives of planning in India, thereby to achieve this avowed goal, a variety of developmental programmes were implemented after exploring the nature and extent of backwardness of districts of West Bengal.

According to findings of present study, the following conclusions may be drawn:

A statistical procedure has been used to identify some of the characteristics and causes of disparities. In addition, this study examined the causal relationship between economic development and certain explanatory demographic and socioeconomic factors. The indicators of economic development have been selected after reviewing past research efforts,

availability of data, and their relevance in regional development planning. In short, both economic and non-economic factors appear to be important in our analysis of regional disparities.

The problems of regional disparities and economic development are so complex that it is difficult to suggest what combination of techniques can best be used to analyze certain problems. Therefore, an integration of the results of the various analyses can only serve as a guideline for development of the backward regions. The resulting recommendations must be supplemented with first hand knowledge of political, institutional and cultural factors.

Urbanization, labour force participation and in the long-run agricultural productivity affect the level of economic development. Labor force participation becomes highly significant in the absence of urbanization and it becomes less significant when considered in conjunction with urbanization. Three major factors of economic development were identified in this study: demographic and socio-cultural changes, extent of industrialization and modernization.

Two types of regions were delineated based on the degree of factor scores: developed and developing (or backward) districts. Developed regions include Kolkata, Howrah, 24 Parganas (N), Hooghly, 24 Parganas (S) and Burdwan, while Nadia, Jalpaiguri, Darjeeling, Murshidabad, Birbhum, Malda, Midnapore, Cooch Behar, Dakshin Dinajpur, Uttar Dinajpur, Bankura and Purulia are identified as backward regions. Thus, our finding indicates that the regional pattern of development in West Bengal is in line with the popular perception in this regard.

8.3 SUGGESTIONS

On the basis of above analysis, the following policy prescriptions we can suggested to reducing regional disparities in West Bengal development:

Twenty years of planned development in India have not yet been able to reduce regional disparities to an appreciable extent. How to devise regional policies which will maximize the growth in real gross regional product and how to improve the well-being of the backward districts are important questions. It is to be expected that policy tools which are effective in one region may not be

appropriate in another. A deliberate measure is needed for the removal of disabilities from which the backward regions suffer.

8.3.1 Socio-Economic Policies

The preceding analysis points to a number of directions which might be taken to improve the level of development and to decrease sub-regional disparities in West Bengal. In our findings we have indicated that the labor force participation has a direct influence on economic development. The proportion of surplus labor supply is high in almost all the districts. Investment must be based on this surplus labor force. It has been claimed that regional economic planners will tend to stress investment in human resources. It would be reasonable to use a labor cost subsidy to encourage hiring of more workers or the location of new labor intensive firms. Reserves of labor which exist in the peripheral regions represent a valuable resource which it drawn into employment could mark a substantial contribution to regional employment and regional out put.

Results from the composite index model shows that the lesser the number of dependent population the higher will be the level of development in the region. Therefore it is necessary to reduce the size of the non-earning dependent population, by drawing part of that group into gainful employment. This also points out that emphasis should be given to labor intensive programs in to agro-based sector. In addition to small scale irrigation, land reclamation, reforestation and other local projects with immediate effects on the local economy, investments must be made on human resources. Therefore, maximum gainful employment opportunities in all possible activities should be created for solving the unemployment problem of the area. The surplus labor should be diverted from agriculture to other agro-based activities like livestock and weaving for diversifying the economy. In the long run, another important means for reducing the size of dependent population is through birth control, improvement in medical care and social services.

Since agriculture supports the majority (62.5 percent) of the population of the region it should be given a high priority from the point of view of investment efforts and endeavor. Agricultural operation in India is still by and large

dependent on the vagaries of nature. Development objectives should be to: (i) increase the productivity, (ii) expand and diversify the employment opportunities, (iii) maintain a smooth flow of credit and other inputs, such as, improved seeds, fertilizers and pesticides. A greater effort must be made by way of developing agricultural infrastructure like irrigation and application of modern technology to farming. The land and water resources should be utilized more efficiently to maximize production in the agricultural sector. The existing socio-economic institutions should be modified so that the small and marginal farmers are able to adopt modernized agricultural practices. Therefore, a package programmme of improved agricultural practices like the use of improved seeds, fertilizers, implements, etc., and a provision of package of services consisting of competent technical advice, availability of credit and production supplies and storage should be adopted in the backward districts.

From our study we find that developed regions are related with the level of literacy: the higher the literacy, the greater the degree of development. Thus expansion of education facilities should be done at a faster rate in the backward regions. Now vocational schools and technical training facilities should be opened. Higher literacy and increased skills will have a positive effect on productivity and consumption.

In the principal component analysis model it was shown that the industrially developed districts are Howrah, Kolkata, 24-Parganas (N), 24 Parganas (S) Hooghly, and Burdwan. Local or regional industries (small scale and agro-based) instead of large projects have to be developed in northern regions (Darjeeling, Cooch Behar and Jalpaiguri) north-central regions (Nadia, Murshidabad, Malda and West Dinajpur) and south-western regions (Midnapore, Purulia, Bankura and Birbhum) of the state. Handloom weaving, carpentry, shoe making, tanning, pottery, bricks, wheat grinding and oil ghani (factories) should be developed in the backward areas. Such activities will not require massive capital investments but yet will provide numerous employment opportunities for the existing labor supply. Such enterprises should receive public support to assist

in setting them up in these regions which are underdeveloped and where local resources are not adequate.

In this study it has been shown that the disadvantaged population has a negative impact on economic development. The disadvantaged people of India, especially the tribal people are significantly backward economically and the terms of modernization. They do not have any medical facilities. Social restructuring must be done slowly through persuasion and education. The following policies for the disadvantaged groups may help to address some of the problems highlighted in the analysis. :

(1) Develop effective adult education and vocational training.
(2) Create incentives for education through gainful employment.
(3) Equip the workers properly through extension of health facilities.
(4) Establish community development programs within the townships.
(5) Encourage higher agricultural productivity through improved methods of cultivation.
(6) Reduce the dependent population by introducing gainful employment opportunities.

8.3.2 Regional Development Policies

The principal component analysis model as well as the composite index models shows that urbanization is an important factor for economic development. Development of small towns is less expensive, especially for infrastructure, and their growth will be more benefit to those in the surrounding country side. If growth centers are identified for each economic region they can act as "counter-weights" to urban centers of more developed regions. These now growth centers should take up investments in small and agro-based industries and use local labor and available raw materials as much as possible. Provision of requisite socio-economic infrastructure (viz., credit facilities, market network, bus service, communication system, health and education facilities) is considered crucial for the development of those centers.

The research has shown that the rural areas are backward socially and economically, and as a result there is a rural urban disequilibrium. The country

side and urban areas should be brought into closer socio-economic integration, and the unstable economic condition in villages might be improved through a regional planning approach. There should be a coordinated regional development in which both the rural and urban, local bodies through panchayet system, approach the problems from a common perspective. Every effort should be made to prepare comprehensive and integrated development plans.

Detailed district area development must be done since the districts are considered as planning unit. In other words, planning at the sub-regional level is essential. The area unit might vary from a single village or a group of villages to an entire district. Scio-economic overhead will be an important issue. Important development which has taken place in India during the Fifth plan is the preparation of sub-plans for selected areas, namely, hill areas, drought prone areas and the areas where the disadvantaged population dominates. Similar approaches to planning should be done in the sub-regions. The focus of attention in the sub-plans should be done in to sub-regions. The focus of attention in the sub-plans should be to minimize the gap between the developed regions by optimum utilization of human resources. Hill area development programs should emphasize exploitation of the resources of the whole areas (Jalpaiguri and Darjeeling districts). Objectives of development programs of the areas where the disadvantaged population dominates should be:

(1) To narrow the gap between the levels of development of these areas and the other areas and

(2) To improve the quality of life of the tribal communities.

In the drought prone areas employment to the rural people should be provided. Special projects or pilot projects for particular problems in a backward region should be taken up immediately. A comprehensive area development program has been advocated by the West Bengal state planning board. Agricultural modernization, economic infrastructure, rapid industrialization and organization and provision of educational and medical facilities are all integral part of the required overall development. It is expected that proper regional development will create scope for the development of all regions. This will stop the one directional

flow of men material and money to the large urban areas. This will also enable the regions to develop as partners of progress.

The North Bengal Development Council, Paschimanchal Development Council and Sunderbans Development Council are to be revitalized so that they can perform its catalytic role in socio-economic development for which they have been constituted. More funds need to be allocated to these Councils both by the State and the Centre to enable it to undertake and implement special plans and programmes of development for the region. The *Panchayati Raj* institutions and municipal bodies at the grassroots level are to be effectively involved in the implementation of various projects undertaken by the Councils. These efforts are to be combined with the provision of adequate resources for the Development Councils to perform developmental activities properly and to attract outside investments.

Despite all these handicaps there is still much prospects of industrial development in the State. The future is not bleak. Inspite of various problems, West Bengal continues to enjoy easy access to ready and adequate supply of skilled labour and cheap unskilled workers. Proximity to sources of supply of raw materials as well as coal and nearness to organized market for intermediate and finished goods are other advantages. The State has within its territory roughly 25 per cent of industrial assets of the whole of the country and about 15 per cent of the total number of registered factories. Kolkata still serves a large hinterland and this city continues to be the nerve-centre of the Eastern Region. With the completion of Metro-Rail project and the Second Hooghly Bridge and other developmental works undertaken by the KMDA, Kolkata will be attractive to all again. Haldia port with its modern equipment and latest handling devices would provide unique opportunities for intensification of commercial relations with countries in South West Asia and Australia. With the existing infrastructural facilities, Kolkata and its suburbs, Durgapur, Asansol and Haldia are more attractive than other parts of the country for setting up industries.

In the present context of high and rising prices of petroleum, there is enormous scope for development of coal-based industries like chemicals,

fertilizers, extraction of petroleum from coal and so on in the coal-bearing areas in the State.

The jute industry can regain its earlier position and compete with Bangladesh, Sri Lanka if the obsolete machineries are replaced and modernized. There is ample scope to revitalize jute industry.

The engineering industry can be rejuvenated if this industry is supplied with steel, credit and power. West Bengal still is more advanced in technical know-how especially in this sector. The activities of the West Bengal Industrial Development Corporation, West Bengal Infrastructure Development Corporation, State Finance Corporation be geared up to develop the growth centers and industrial estates. In every district there should be a growth centre.

In our view, there is no reason for despair. West Bengal has a strong industrial base. It is not very difficult to revitalize the economy of the State if the problems standing in the way of rapid industrial development are removed. If we know the nature of the disease, it is not very difficult to cure it.

APPENDICES

Appendix to Chapter-2:

A 2.1: History of Formation and Reorganization of West Bengal Districts

The main sources of the population data is the decennial census of the population. The first regular census in West Bengal was taken in 1872 though it was scheduled to be taken in 1871. Since 1881, census was held regularly at the interval of ten years. The latest census was the fourteenth one, which was held in 2001.

It may be mentioned that the present state of West Bengal came into existence as a result of the partition of Bengal in 1947. The eastern part was included in Pakistan and emerged as the state of Bangladesh in 1971. There were fourteen districts in West Bengal including Kolkata at the time of partition. On the 1st January 1950, the state of Cooch Behar was merged with West Bengal and was constituted as an additional district.

Chandannagar, formerly a French possession, merged in the state of West Bengal on the 2nd October 1954 as a part of the district of Hooghly.

As a result of reorganization of the state boundaries, certain territories of Bihar were transferred to West Bengal on the 1st November, 1956. The added area formed the new district of Purulia and the sub-division of Islampur in the district of West Dinajpur.

Later, in 1st March 1986, the district of 24 Parganas was divided into South and North 24 Parganas and in 1st April 1992, the district of West Dinajpur was splited into Uttar and Dakshin Dinajpur and the number of districts in West Bengal reached to eighteen (18) and it remains the same up to December 2001 as no other administrative reorganizations took place within this period. Finally, on 1st January 2002, Midnapore was divided into East and West Midnapore and the number of districts in this state became nineteen (19).

Source: Statistical Abstract, Bureau of Applied Economics & Statistics, 2005, GoWB, p. 01.

A 2.2: Percentage Variation in Population of West Bengal by Districts, 1901-1971									
Sl. No.	District	1900-11	1911-21	1921-31	1931-41	1941-51	1951-61	1961-71	1901-71
1	Darjeeling	+ 5.31	+ 5.12	+ 12.85	+ 17.72	+ 17.50	+ 35.90	+ 25.16	+ 194.14
2	Jalpaiguri	+ 21.30	+ 4.93	+ 6.47	+ 14.42	+ 8.13	+ 48.27	+ 28.76	+ 220.09
3	Cooch Behar	+ 4.58	- 0.07	- 0.26	+ 8.43	+ 4.74	+ 52.45	+ 38.67	+ 150.25
4	West Dinajpur	+ 6.78	- 12.13	+ 7.23	+ 11.92	+ 17.03	+ 35.51	+ 40.50	+ 150.90
5	Malda	+ 15.72	- 1.17	+ 4.99	+ 17.19	+ 11.05	+ 30.33	+ 31.48	+ 167.15
6	Murshidabad	+ 1.71	- 8.99	+ 11.97	+ 16.69	+ 4.59	+ 33.47	+ 28.39	+ 122.32
7	Nadia	+ 0.36	- 8.28	+ 1.43	+ 16.40	+ 36.25	+ 49.65	+ 30.14	+ 188.65
8	24 Parganas	+ 14.78	+ 6.31	+ 9.53	+ 26.07	+ 23.50	+ 40.84	+ 34.53	+ 294.25
9	Howrah	+ 10.93	+ 5.71	+ 10.17	+ 35.62	+ 8.12	+ 26.51	+ 18.50	+ 184.21
10	Kolkata	+ 8.86	+ 3.63	+ 10.63	+ 86.00	+ 24.50	+ 8.84	+ 7.57	+ 237.21
11	Hooghly	+ 3.67	- 0.90	+ 3.22	+ 24.04	+ 13.35	+ 39.02	+ 28.72	+ 166.82
12	Burdwan	+ 0.37	- 6.46	+ 9.82	+ 19.99	+ 15.92	+ 40.66	+ 27.04	+ 156.25
13	Birbhum	+ 3.67	- 9.41	+ 11.25	+ 10.63	+ 1.77	+ 35.55	+ 22.80	+ 95.82
14	Bankura	+ 1.99	- 10.43	+ 9.00	+ 16.00	+ 2.30	+ 26.17	+ 22.02	+ 81.92
15	Midnapore	+ 1.15	- 5.48	+ 4.97	+ 13.99	+ 5.28	+ 29.26	+ 26.09	+ 97.53
16	Purulia	+ 12.70	- 5.98	+ 16.91	+ 11.95	+ 7.48	+ 16.33	+ 17.06	+ 106.08
	West Bengal	+ 6.25	- 2.91	+ 0.14	+ 22.93	+ 13.22	+ 32.80	+ 26.87	+ 161.58
Source: (i) Census of India, 1961, Volume XVL, Part II-A. (ii) Census of India, 1971, Part II-A (i).									

A 2.3: Per Capita Income of West Districts			
District	1980-81	1990-91	2000-2001
	Per Capita Income (Rs.) Base Year (1980-81) Constant Price	Per Capita Income (Rs.) Base Year (1980-81) Constant Price	Per Capita Income (Rs.) Base Year (1993-94) Constant Price
Burdwan	2114.00	2571.89	11601.85
Birbhum	1456.00	1944.43	7717.91
Bankura	1322.00	2164.38	9297.73
Midnapore	1093.00	2028.71	9914.96
Howrah	2219.00	2380.55	10722.03
Hooghly	1988.00	2448.81	10885.23
24 Parganas (N)	1049.71	2068.55	8352.75
24 Parganas (S)	739.29	1456.82	8284.39
Nadia	1111.00	1808.04	9843.32
Murshidabad	983.00	1853.07	8065.26
Malda	986.00	1667.13	8088.70
Uttar Dinajpur	638.74	1627.89	6827.48
Dakshin Dinajpur	451.26	1150.08	8900.49
Jalpaiguri	1197.00	2120.39	8821.97
Darjeeling	2235.00	2410.69	11097.93
Cooch Behar	1000.00	1886.62	7567.34
Purulia	1363.00	1633.17	7981.56
Kolkata	3156.00	4026.47	19143.30
West Bengal	1612.00	2144.69	9764.75
Source: Statistical Abstract (Various Issues), The Bureau of Applied Economics and Statistics, GoWB.			

A 2.4: DDP Index (Per Capita Income) and Ranks of West Bengal Districts						
District	1980-81		1990-91		2000-2001	
	DDP Index Per-Capita	Rank	DDP Index Per- Capita	Rank	DDP Index Per- Capita	Rank
Burdwan	0.7940	4	0.6423	2	0.5143	2
Birbhum	0.6023	6	0.4191	10	0.1189	16
Bankura	0.5526	8	0.5046	6	0.2995	8
Midnapore	0.4548	11	0.4529	9	0.3619	6
Howrah	0.8189	3	0.5806	5	0.4378	5
Hooghly	0.7624	5	0.6031	3	0.4524	4
24 Parganas (N)	0.4340	12	0.4685	8	0.1956	11
24 Parganas (S)	0.2538	16	0.1887	17	0.1876	12
Nadia	0.4632	10	0.3610	13	0.3548	7
Murshidabad	0.4003	15	0.3807	12	0.1616	14
Malda	0.4019	14	0.2963	14	0.1644	13
Uttar Dinajpur	0.1786	17	0.2773	16	0.0000	18
Dakshin Dinajpur	0.0000	18	0.0000	18	0.2572	9
Jalpaiguri	0.5016	9	0.4882	7	0.2486	10
Darjeeling	0.8226	2	0.5906	4	0.4712	3
Cooch Behar	0.4091	13	0.3950	11	0.0998	17
Purulia	0.5683	7	0.2799	15	0.1515	15
Kolkata	1.0000	1	1.0000	1	1.0000	1
Source: Author's Calculation						

A 2.5: Geographical Area and Density of Population in West Bengal District						
District	Geographical Area in Sq. Kms., 2001			Density of population (Per Sq. Km.)		
	Total	Rural	Urban	1981	1991	2001
Burdwan	7024.00	6223.82	800.18	688	861	982
Birbhum	4545.00	4495.02	49.98	461	562	663
Bankura	6882.00	6820.51	61.49	345	408	464
Midnapore	14081.00	13695.78	385.22	479	592	683
Howrah	1467.00	1247.76	219.24	2022	2542	2913
Hooghly	3149.00	2950.15	198.81	1130	1383	1601
24 Parganas (N)	4094.00	3594.44	499.56	1351	1779	2182
24 Parganas (S)	9960.00	9783.24	176.76	441	574	693
Nadia	3927.00	3716.83	210.17	755	981	1173
Murshidabad	5324.00	5195.11	128.89	695	890	1102
Malda	3733.00	3707.63	25.37	544	706	881
Uttar Dinajpur	3140.00	3095.64	44.36	461	604	778
Dakshin Dinajpur	2219.00	2196.30	22.70	448	555	677
Jalpaiguri	6227.00	6105.93	121.07	356	450	546
Darjeeling	3149.00	3073.77	75.23	325	413	511
Cooch Behar	3387.00	3345.66	41.34	523	641	732
Purulia	6259.00	6179.63	79.37	296	355	405
Kolkata	185.00	..	185.00	22260	23783	24718
West Bengal	88752.00	85427.26	3324.74	615	767	903
Source: Statistical Abstract, The Bureau of Applied Economics and Statistics, GoWB, 2005, p.2, p.4						

Appendix to Chapter-3:

Regional Disparities in Agricultural Development		
Sl. No.	Name of Variables	Data Sources of variables
1	Gross value of agricultural produce per hectare of net area sown	Source: Statistical Abstract (various issues), The Bureau of Applied Economics and Statistics, GoWB.
2	Gross value of agricultural produce per capita of rural population	Source: Statistical Abstract (various issues), The Bureau of Applied Economics and Statistics, GoWB. Census of India, Population (1981, 1991 and 2001).
3	Gross value of agricultural produce per agricultural worker	Source: Statistical Abstract (1978-89, 1997-98 and 2001), Census of India, 1981, series-23; general economic tables part-III, A &B (i). 1991, series-26; West Bengal Part-II, B (i), pp. 24-36/ Census Abstract and 2001 from Census CD (soft copy).
4	Percentage of area under commercial crops to gross cropped area	Source: Statistical Abstract (various issues), The Bureau of Applied Economics and Statistics, GoWB.
5	Percentage of net area sown to total geographical area	Source: Statistical Abstract (various issues) and Economic Review (various issues), The Bureau of Applied Economics and Statistics, GoWB.
6	Cropping intensity	Source: Directorate of Agriculture, Evaluation wing, GoWB. Statistical Abstract (1992-1994), (2002-2003). The Bureau of Applied Economics and Statistics, GoWB.
7	Percentage of agricultural workers to total (main) workers	Source: Census of India, 1981, series-23; general economic tables part-III, A &B (i). 1991, series-26; West Bengal Part-II, B (i), pp. 24-36/ Census Abstract and 2001 from Census CD (soft copy).
8	Credit to Agriculture (Rs. Per Capita)	Source: CMIE, District Profiles, October (2000) and Economic Review (various issues). The Bureau of Applied Economics and Statistics, GoWB.
9	Consumption of fertilizer per hectare of gross cropped area	Source: Statistical Abstract (various issues), The Bureau of Applied Economics and Statistics, GoWB.
10	Average size of holdings	Source: Statistical Abstract (various issues), The Bureau of Applied Economics and Statistics, GoWB.

Appendix to Chapter – 4:

Regional Disparities in Industrial Development		
Sl. No.	Name of Variables	Data Sources of variables
1	Number of registered factories per 1000 sq. kms. of area	Source: Statistical Abstract (1978-1989), p.452, Economic Review, (1997-98), Statistical Appendix, p. 114. Statistical Abstract (2002-2003), p. 310, The Bureau of Applied Economics and Statistics, GoWB.
2	Number of registered factories per 100000 (lakh) of population	
3	Number of workers engaged in registered factories per 1000 sq. kms of area	Source: Statistical abstract (1978-89), p.516. Economic Review (1997-98), Statistical Appendix, p.114. Statistical Abstract (2002-2003), p. 383. Statistical Abstract (2005), p. 401, The Bureau of Applied Economics and Statistics, GoWB.
4	Number of workers engaged in registered factories per 100000 (lakh) of population	
5	Number of industrial units (small Scale) per 1000 sq. kms. of area	Source: Statistical Abstract (2002-2003), The Bureau of Applied Economics and Statistics, GoWB. Directorate of Cottage and Small-Scale Industries, GoWB.
6	Number of industrial units (small Scale) per 100000 (lakh) of population	
7	Percentage of workers in manufacturing to total workers	Source: Statistical Abstract (1978-1989) combined, p. 516. Statistical Abstract (2005), p.401, The Bureau of Applied Economics and Statistics, GoWB.

Appendix to Chapter-5:

Regional Variation in Economic Infrastructural Development		
Sl. No.	Name of Variables	Data Sources of variables
1	Length of roads per 100 Sq. kms. of area	Source: Statistical Abstract (various issues), the Bureau of Applied Economics and Statistics, GoWB, 2005, pp. 519. Note: Surface: A road coated with materials like cement concrete, bituminous, stone chipps etc. over the earth base. Unsurface: Earthen road without any layer of road materials.
2	Length of roads per lakh of population	Source: Census of India, Population (1981, 1991 and 2001.)
3	Gross irrigated area as percentage of gross cropped area	Source: CMIE, District Profiles, October (2000), Economic Review (various issues). Statistical Abstract (various issues) GoWB.
4	Number of tractors per ten thousand hectare of net sown area	Source: Statistical Abstract, 2005, p.259 and 2002-2003, p.92-94, The Bureau of Applied Economics and Statistics, GoWB. 17th All India Livestock Census, agriculture implements & Machinery, Fishery statistics, West Bengal, State Report, Volume-I, directorate of Animal Resources and Animal Health, GoWB, pp.245-247.
5	Number of bank offices per hundred Sq. kms. of area	Source: Economic Review (2002-2003) Statistical Appendix, pp.148. Note: [Scheduled Commercial Bank offices, as at the end of June], census population, 1981, 1991and 2001, GoI.
6	Number of bank offices per lakh of population	
7	Number of veterinary institutions per lakh of livestock population	Source: Statistical Abstract (various issues), the Bureau of Applied Economics and Statistics, GoWB.
8	Number of post offices per hundred Sq. kms. of area	Source: Economic Review, Statistical Appendix, (various issues) GoWB.
9	Number post offices per lakh of population	Source: District Statistical Hand Book, GoWB (various year) (as on 31st March)
10	Percentage of villages electrified	Source: CMIE, District Profiles, October (2000). Statistical Abstract (various issues) GoWB.

Appendix to Chapter-6:

Inter-District Disparities in Social Sector Development		
Sl. No.	Name of Variables	Data Sources of variables
1	Number of primary schools per 100 Sq. Kms. of area	Source: District Census Hand Book, Village & Town Directory Part-XIII, A, Series-23, West Bengal, 1981. District Census Hand Book, Village & Town Directory Part-XII, A, Series-26, West Bengal, 1991 and 2001, Statistical Abstract (Various issues), The Bureau of Applied Economics and Statistics, GoWB. Populations are taken from census year 1981, 1991 and 2001.
2	Number of primary schools per lakh of population	
3	Number of middle schools per lakh of population	
4	Number of high/higher secondary schools per lakh of population	
5	Percentage of literacy	Source: Census of India, 1981, 1991 and 2001.for 1981 literates excluding children in the age group (0-4) and for 1991 and 2001 literates exclude children in the age group (0-6). Statistical Abstract, The Bureau of Applied Economics and Statistics, GoWB.
6	Percentage of female literacy to total literacy	
7	Number of medical institutions per 100 Sq. Kms. of area	Source: Economic Review, Statistical Appendix (1980-81), p. 205, Statistical Abstract (2003-2003), p. 60, the Bureau of Applied Economics & Statistics, GoWB. East India Human Development Report (2004), NCEAR, pp. 278-279.
8	Number of medical institutions per lakh of population	
9	Number of hospital beds per lakh of population,	Source: Census of India (Census Atlas, 1991), West Bengal, part XI; series-26, p.246. Statistical Appendix, Economic Review, 2001-2002; Bureau of Applied Economics and Statistics, GoWB, p.206.
10	Sex Ratio (Number of females per thousand of males)	Source: Statistical Abstract (Various years), The Bureau of Applied Economics and Statistics, GoWB.
11	Percentage of drinking water facilities to inhabited villages	Source: Census of India 1981, series-23, West Bengal, District census Hand Book, part-XIII-A, Village and Town Directory, (various issues)
12	Percentage of urban population to total population	Source: Statistical Abstract (1997-98), p.13. Statistical Abstract (2005), p. 6. The Bureau of Applied Economics and Statistics, GoWB.

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Addendum / Corrigendum

Addendum related to point No. 1

1A.

From our review of literature we see that only a few studies on regional disparities in socio-economic development in West Bengal have been undertaken by scholars. The studies done by Bose (1969), Sarkar (1973), Banerjee and Ray (1969), and Bhattacharjee (1998) have thrown light only on a few selected aspects of regional disparities in socio-economic development in West Bengal. None of the studies has looked into the problem taking into consideration of all economic and social sectors. Therefore, there is a huge gap in knowledge and research in the area of study. The present study has been undertaken to fulfill this gap by taking into consideration all economic and social sectors.

1B.

The Conceptual Framework:

Regional disparity in economic and social development has been a major problem in the post-independence India. This is also true at sub-national level. Not only there are disparities in development among the states of India, but also there are inter-district disparities within a state. There are many causes of these disparities; some of which are within the control of state authorities and some are beyond their control. Economic development is said to be primarily a function of the social process of growth in material production (Misra, 1985). But this process of growth is not spatially uniform in a developing country like India. It varies from one region to another and from one area to another within a given region. It varies spatially because neither the level of development in productive forces nor the social intercourses of these forces in the process of production (i.e., relations of production) are uniform over space. The spatial variations in the development of productive forces and in the social intercourse of these forces in the production process lead to spatial variations in the rate of growth and also in the level of development.

The existence and persistence of spatial variations in the level of development at national or sub-national level is one of the basic structural

characteristics of a developing country like India. The spatial variations in development in a country or in a state within a country indicate that a few regions have experienced a high rate of growth over a time and so they have acquired relatively high level of development in comparison to those which have experienced a slow rate of growth and exhibit a low level of development. The characteristics of high growth rate and high development level as found in developed and developing regions are essentially on account of the existence of a high level of development in the productive forces and favourable social conditions to use them in the process of production. But the prevalence of slow growth rate and low development level in a region refers to the existence of low level of development in the productive forces and unfavourable socio-economic condition to use the new productive forces there and the region is categorized as backward. The larger the number of regions having the low level of development in productive forces and the unfavourable socio-economic conditions to introduce and use these forces in the process of production, the greater the regional disparities in the level of development in a country and vice versa.

With the above conceptual framework of spatial variations in development, the regional structure of a developing country may be decomposed as follows:

a) The regions having a high level of development in productive forces and favourable social conditions to use them in the process of production,
b) The regions where new productive forces are introduced but are slowly adopted in socio-economic life due to lack of progressiveness on the part of people,
c) The regions with low levels of development in productive forces and with unfavourable socio-economic conditions to use them in the process of production.

The first one characterizes developed region; the second one is the region in transition for development and the last, the backward region. Both (b) and (c) dominate in a developing country like India which causes underdevelopment alongside development and gives rise to the phenomenon of regional disparities either in the national or sub-national levels. Thus the

question of overcoming underdevelopment and regional disparities in development is in fact a question of how to develop the new productive forces and to create favourable climate to use them in the process of production. It is the process of national and regional planning which conceives the idea of and aims at reducing regional disparities in development. In other words, balanced regional development is urgently necessary. Any planning process has a time frame to achieve the desired goal of balanced regional development. Therefore, regional planning policies and strategies need to be formulated to bring about deliberately a balanced regional development within a given time frame. Spatial equity in development should be the goal of development decision-making process.

The review of literature that we have done indicates that so far no studies have been undertaken to investigate on the problems of regional disparities in West Bengal in its totality, taking into consideration all economic and social sectors which is required accordingly to the conceptual framework developed above.

Thus, we felt the necessity of making a holistic study of the problem of regional disparities in socio-economic development of West Bengal.

Corrigendum related to point No.2

As per the observation of the honourable examiner research hypothesis numbered 1 (one) is deleted.

Addendum / Corrigendum related to point No. 3

As noted in chapter 1 of the thesis the study is based on secondary data. Hence, there is no scope and necessity of a chapter based on micro-level investigation.

29-08-11

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