STATISTICAL ASSESSMENT OF DEVELOPMENT IN RAJASTHAN - A SPATIAL AND INTER - TEMPORAL ANALYSIS

राजस्थान में विकास का सांख्यिकीय आकलन – एक स्थानिक एवं अन्तर्कालिक विश्लेषण

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Thesis

Doctor of Philosophy in Agriculture

(Agricultural Statistics)

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Statistical Assessment of Development in Rajasthan – A Spatial and Inter-temporal Analysis

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BY

Bhupendra Upadhyay

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CERTIFICATE – I

Date : 23/ 7 /2001

This is to certify that, this thesis entitled, **"Statistical Assessment of Development in Rajasthan – A Spatial and Inter-temporal Analysis"** submitted for the degree of **Doctor of Philosophy in Agriculture** in the subject of **Agricultural Statistics**, embodies bonafide research work carried out by **Mr. Bhupendra Upadhyay** under my guidance and supervision and that no part of this thesis has been submitted for any other degree. The assistance and help received during the course of investigation have been fully acknowledged. The draft of the thesis was also approved by the advisory committee in the pre-thesis submission seminar held on 09-07-2001.

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Place : Udaipur
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1. INTRODUCTION

Development is a multi-dimensional phenomenon and defined as a process which improves the quality of life. Development is both a cause and consequence of change. There is two way relationship between the development and the change, i.e. development influences and is influenced by change. Change implies physical, technological, economic, social, cultural, attitudinal, organisational and political change. A change may be either for good (development) or bad (retrogression).

Generally development is identified with the level of per capita real income. The UN experts, identify 'development' with the level of per capita income. Thus an under developed country is one "in which the per capita real income is low when compared with the per capita real income of the U.S.A., Canada, Australia and Western Europe".[1] Though, this definition focused attention on a very important characteristics of underdevelopment viz., poverty, can by no means be considered wholly adequate. A country may be poor and yet not underdeveloped in relation to its resources if the resources themselves are scanty and inadequate.

Realising this shortcoming, Indian Planning Commission defined underdeveloped country as one "which is characterised by the co-existence in greater or less degree of unutilised or underutilised manpower on the one hand and of unexploited natural resources on the other."[2] This definition stressed upon one of the characteristics of underdevelopment i.e. the existence of idle resources.

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[1] U.N.O., "Measures for the Economic Development of under developed countries", New York, 1951.
[2] Government of India, Planning Commission, "First Five Year Plan, 1952".

In some of the studies development level is assessed on the basis of stages of economic growth. One can observe that countries with modern technology, high industrialisation, having maximum availability of goods and services are highly developed countries. Thus, in essence the availability of infrastructure, industrialisation, modernisation and new technology determine the levels of development.

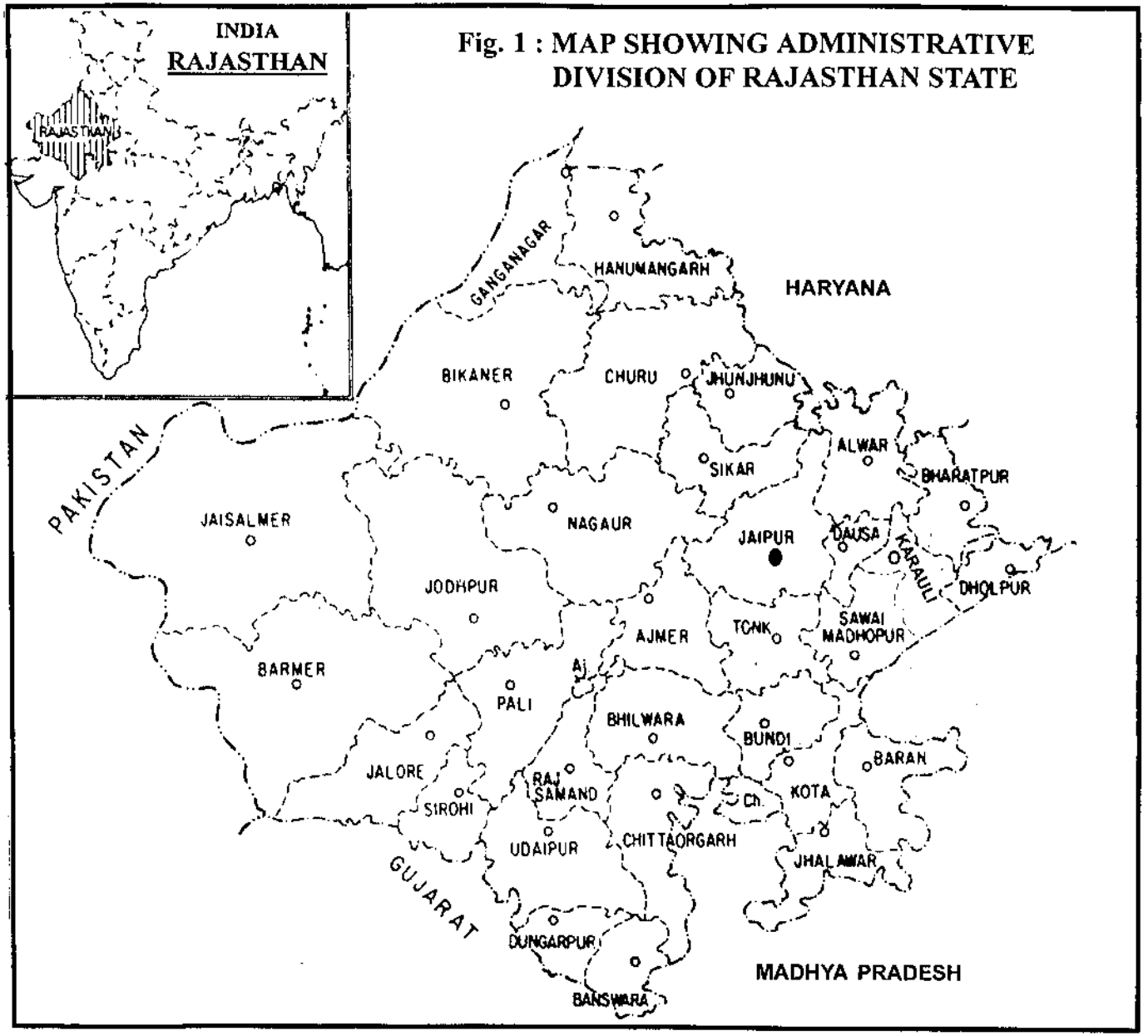
Development implies an "improvement" in the material well being of the people in a region. Material well-being of a country or a region or a state can be identified with the increase in the real production, amenities, practice and adoption of new and modern technology and increased rate of investment and consumption. Any change for betterment in these parameters indicate development.

Development in a country varies from place to place depending upon its geographical, ecological and climatic conditions. As a result, the level of development of different parts of the country may vary between the very high developed and extremely backward categories.

1.1 RAJASTHAN : AN OVERVIEW

The state of Rajasthan is situated in the northwestern part of the Indian Union (23° 30' and 30°11' North Latitude and 69° 29' and 78° 17' East Longitude). It came into being by the Union of 22 princely states and the integration of the former state of Ajmer and Merwara. Its total area is 3,42,239 square kilometers and ranks first in the country. Having only 5 per cent of the total population, it occupies 10.41 per cent of the country's total area. It is inhabited by 43,880,540 persons (Census of India, 1991).

The shape of Rajasthan is like an irregular rhomboid, covering a distance of 869 kilometers from west to east and 826 kilometers from north to south. It shares its geographical boundaries with the states of


INDIA
RAJASTHAN
RAJASTHAN
Fig. 1 : MAP SHOWING ADMINISTRATIVE DIVISION OF RAJASTHAN STATE
GANGANAGAR
HANUMANGARH
HARYANA
BIKANER
CHURU
JHUNJHUNU
ALWAR
SIKAR
BHARATPUR
PAKISTAN
JAISALMER
NAGAUR
JAIPUR
DAUSA
KARAULI
DHOLPUR
JODHPUR
AJMER
TONK
SAWAI MADHOPUR
BARMER
PALI
BHILWARA
BUNDI
BARAN
JALORE
RAJ SAMAND
SIROHI
KOTA
UDAIPUR
CHITTAORGARH
JHALAWAR
GUJARAT
DUNGARPUR
BANSWARA
MADHYA PRADESH

Punjab, Haryana, Uttar Pradesh, Madhya Pradesh and Gujarat. It also has a long international border with Pakistan.

It is a diverse state. The region to the west and north-west comprising of eleven districts spreading in 61.11 per cent of the total area is either desert or semi-desert which forms the Great Indian 'Thar' desert. The Aravali range of Hills-one of the oldest mountain ranges-runs through the heart of the state, extending to 69.2 kms and dividing into two portions. The north-western portion is almost entirely a vast expanse of desert. On the other side, the south-eastern region has a varied terrain of extensive hill ranges, fertile table-land and dense forest. Rajasthan is well connected by air, rail and road with all the major cities of the country.

At present, the state consists of 32 districts, which are further divided into sub-divisions and tehsils (Fig.1). The salient features of Rajasthan are given in Table 1.1.

Table 1.1: The salient features of Rajasthan

S.No.	Particulars	Year	No.	Unit
1	Area	1991	3.42	Lakh square kilometers
2	Districts	1997	32	(number)
3	Sub-divisions	1996	100	(number)
4	Tehsils	1996	229	(number)
5	Municipalities	1996	182	(number)
6	Panchayat Samities	1996	237	(number)
7	Village Panchatyats	1996	9185	(number)
8	Total Villages	1991	39810	(number)
9	Inhabited villages	1991	37889	(number)
10	Cities and Towns	1991	222	(number)

In total, 34528 villages in Rajasthan have been electrified which help in emerging 502310 wells which has helped in the increase of agricultural production of the state. Safe drinking water is being supplied to 37274 villages. The road network through the state is extensive and in parts extremely good. Road length network of 74947 kilometers has materialised in the state till 1996-97, on which 1985532 registered vehicles are plying. Postal services in the state are good which has been made possible by establishment of 10306 post offices.

The population of Rajasthan is 4.4 crores (Census of India, 1991) which is 5.20 per cent of the nation's population. Out of 44005990 persons, 23042780 are males and 20963210 females. The rural-urban division is 33938877 and 10067113, respectively. Seventy seven per cent of the population of Rajasthan lives in rural areas as compared to 74 per cent in India. The state is ranked ninth among the major Indian states in terms of its population size. The deccenial growth is high in Rajasthan (28.44) as compared to India (23.56). There are 910 females per 1000 males in Rajasthan, against the India's figure of 929 females per 1000 males. The density of population in the state is 129 persons per square kilometer compared to 273 for India. However, it varies from one region to another. It is 84 persons per square kilometer in the desert region as compared to 203 persons in other areas. Rajasthan is one of the most educationally backward states in the country. The literacy rate, according to 1991 census, was 38.55 per cent in the state compared to 52 per cent in the country. The literacy rates are 55 per cent for males and 20.44 per cent for females compared to 64 per cent and 34 per cent for males and females respectively, for India. (Source: Census of India 1991, Rajasthan).

Rajasthan is predominantly an agricultural state with a little more than 77 per cent of its population living in rural areas. Agricultural accounts from 42 to 48 per cent of Net State Domestic Production (Economic Review, 1995-96). Agriculture is the single largest sector of the economy, employing about 60 per cent of labour force (Office of the Registrar General and Census Commissioner, 1991a).

Agriculture and animal husbandry form the mainstay of the state's economy, representing 44.79 per cent of the state's revenue in 1994-95, as against only 31.74 per cent of the country as a whole. Irrigation is an essential input for agriculture production in the state. Surface water resources are scarce as there are no perennial rivers traversing the south eastern region of the state. Therefore to a great extent agriculture is dependent upon the vagaries of monsoon. (Centre for Monitoring Indian Economy, 1991). Agricultural production is inadequate to meet local needs, in three out of five years due to insufficient or untimely rainfall. Consequently there is a severe shortage of food, fodder, fuel and drinking water. Frequent droughts lead to temporary outmigration of human and cattle population.

Animal husbandry plays an important role in the state's rural economy. A large number of small and marginal farmers, agricultural labourers and other local poor depend upon livestock for gainful employment. The western districts of the state are famous for indigenous cattle breeds. Sheep husbandry is popular and it provides employment opportunities to weaker sections.

During the last 35 years, Rajasthan has become a major producer of synthetic yarns, cement, zinc, copper, trucks, tractors, scooters, tyres, cords and cables, railway wagons, ball-bearings, water and power metres, automobile parts, instrumentations, electrical

equipment and electronic goods like, copper foils, copper clad laminator, television sets, picture tubes, milk testers, wireless equipments, sugar, marble and sandstone and number of handicrafts.

1.2 IMPORTANCE OF THE STUDY

Developmental programmes in various fields were taken up in the country in a planned way through various five year plans with the main objective of enhancing the quality of life of general masses by providing the basic necessities of life as well as effecting improvement in their social and economic well-being. The "green revolution" in agriculture sector and the commandable progress on industrial front have certainly increased the total production in agriculture and manufactured goods, but there is no indication that these have been able to reduce substantially the inequality and poverty. It has been observed that the proportion of landless, agricultural labourers and industrial workers have increased over the years but their wages have not kept pace with the rate of inflation. However, in a large sized country like India, there is likely to exist wide disparities in the levels of development and the rate of growth in different regions of the country.

In India, Rajasthan is considered as an economically backward state. However, all the districts of the state are not at the same level of underdevelopment. Some districts are more developed while other are less developed or underdeveloped. All the districts are not developed in all the sectors such as agriculture, industrial, infrastructural and socio-economic sector.

The task before the policy makers and planners is to attain alround development to ensure social justice. If the picture of a particular sector is clear, it becomes quite easy to make plans to bring lagging districts upto the required levels. It has been the continuous endeavour of scientists and planners to measure the level of development in different regions of the country in order to identify

where a given region stands in relation to others, but it is of interest to measure the levels of development at district level since there has been growing consensus about the need of district level planning. Development is a multi-dimensional continuous process. Multiplicity of development goals has confounded the problem of measurement of development. The impact of development in different dimension cannot be fully measured by any single indicator. Moreover, a number of indicators when analysed individually, do not provide an integrated and comprehensible picture of reality. Hence there is need for building up of a composite index of development based on various indicators combined in an optimum manner.

The present study attempts to investigate the nature and analyse the factors responsible for development in agricultural, industrial, infrastructural and socio-economic sectors in Rajasthan state. Review of related studies indicates that sporadic attempts have been made to measure the level of development in Rajasthan state. The information generated is not sufficient enough to enable us to plan district level strategy for each individual district of the state.

In the present study an attempt has been made to quantify the developmental efforts effected in various sectors by constructing composite index of development based on information of 47 important indicators for each district of Rajasthan state. The study was undertaken over three points of time i.e. 1980-81, 1990-91 and 1996-97 with the purpose of examining the significance of change and variability in development. The study also throws light on the relationship between the levels of development in different sectors. An effort has been made to estimate the distances based on different development indicators of various sectors and on the basis of distances and indices of development, model districts were identified. The findings of the study helps to isolate possible factors causing

regional imbalances and search a suitable strategy for the development.

1.3 SPECIFIC OBJECTIVES OF THE STUDY

(i) To identify the factors responsible for development in Agricultural, Industrial, Infrastructural and Socio-economic sectors.

(ii) To construct the various indices of development for each district of Rajasthan and classify the districts on the basis of their development.

(iii) To examine the significance of overall change in development indices over three points of time.

(iv) To study the relationship between the development of different sectors.

(v) To isolate possible factors causing regional imbalances and search a suitable strategy for the development.

1.4 LIMITATIONS OF THE STUDY

(i) The present study is based on the data collected from secondary sources.

(ii) The study is based on the data gathered for 26 districts of Rajasthan as existed in the year 1980-81 inspite of separate information for presently existing 32 districts (1997). The information of newly formed districts have been included in the original districts from which they have been bifurcated, since the data related to new districts are not available for all the three selected points of time.

1.5 OPERATIONAL DEFINITION

Development : Development in the present study implies improvement in the various indicators depicting progress in the agricultural, industrial, infrastructural and socio-economic sectors resulting in improved levels of living.

2. REVIEW OF LITERATURE

A comprehensive review of literature is must in any research endeavour as it provides a sound theoretical frame work for research. Apart from determining the previous work done (both theoretical and operational) the other main functions of citing review of literature is to provide insight into the method and procedure to be used to reach the objectives of research. It helps to work out a basis for interpretation of the findings.

Keeping in view the objectives of the study, the literature and researches found relevant and which provided adequate theoretical support to the purpose of the study are presented under the following heads :

2.1 Measurement of level of development

2.2 Classification of regions on the basis of their level of development

2.3 Inter-relationship among different sectors of development

2.1 MEASUREMENT OF LEVEL OF DEVELOPMENT

Several researchers have attempted empirical works measuring and analysing regional development. Earlier attempts to measure regional disparities used per capita income as the sole indicator of level of development. Later on, development was treated as broad-based concept that incorporated changes in all spheres of human life. This necessitated the use of a large number of indicators and the application of sophisticated techniques.

Hagood (1943) developed a composite index with the help of 'Principal Component Analysis' which is a method of factor analysis. He employed this technique in regional analysis to delineate major regions of relatively greater homogeneity. By classifying some 104

variables in 14 groups, Hagood applied principal component analysis to derive implicit weights (factor loadings) and subsequently worked out a combined index for each group. At the next step the combined indices of each group were pooled together with their respective implicit weight and composite index of development was thus constructed.

Drewnowski and Scot (1961) developed the level of living index which was defined as the level of satisfaction of the needs of the population as measured by the flow of goods and services enjoyed in a unit of time.

Beckerman and Bacon (1966) suggested a measure of economic welfare. They re-estimated the national accounts measure of per capita consumption, using non-monetary indicators. The procedure was to start with 'corrected' measures of consumption per head. These were then correlated with a large number of non-monetary indicators for the selected countries. By a process of trial and error a particular form of equation was found which combined a group of three indicators in such a way that they were closely correlated with the corrected values of per capita consumption. The final stage was to use the coefficient of these indicators to re-estimate the real level of per capita consumption of as many countries as have data on these non-monetary indicators.

Mc Granahan (1966) examined 73 indicators which covered economic and social characteristics and found that there was fairly high inter-correlation between the indicators. Through a process of elimination, they constructed a 'development index' based on 18 core indicators which included 9 social and 9 economic indicators. He also found that the resulting index was highly correlated with GNP per head.

An important study in the direction of constructing a weighted index was made by Drewnowski (1970) . His study related to the problem of measuring levels of living and welfare. He made use of the concept of sliding weights systems which consisted in making the weights depending on the value of the indicator indices in the computation of component indices and on the value of component indices in the computation of the overall index. The formula for weights is :

$$W = \frac{100}{I} \quad (I < 0)$$

Where W = weight, and I = the value of the index (indicator index or component index) to be weighted.

Mc Granahan (1970) in his study on 'Contents and Measurement of Socio-economic Development,' tried to develop a weighted composite index of development. The weights were supported to reflect the degree of importance that each indicator is considered to have in the measurement of the whole. The whole problem of giving weightage revolved around the concept of 'importance'. Importance of an indicator was assessed on the basis of its co-efficient of correlation with other indicators. The study indicated that use of correlation as a basis of weighting was that the more heavily weighted indicator was the one which was most closely associated with and would best predict the others. Conversely a general index constructed on such a weighting principle would best correlate with and best predict the scores on the individual indicators.

One important study using principal component was made by Pal (1975) at the district level in India. Pal initially chose 17 variables, classified them into four specific groups and again he sub-divided

them into agricultural and nonagricultural sector and finaly constructed a composite index by using the following formula

$$I = W_1 (1A) + W_2 (2N)$$

Where : I = Composite index, W_1 and W_2 = Weights = the variable weights in proportion of labour force engaged in agricultural sector (A) and non-agricultural sector (N). 1 and 2 are the constant ratio of agricultural and non-agricultural labour productivities to the general labour productivities of India in the respective sector.

Patnaik and Chattopadhyay (1975) made use of indicators and grouped them into four dimensions viz. agriculture, secondary activities, infrastructures and socio-cultural attributes. Principal component technique was used for synthetic picture.

Sharma (1975) made an attempt to examine the spatial inequality by various economic sectors in the state of Rajasthan by combining different indicators of economic sectors. In all, 22 variables divided into four economic sectors namely agricultural sector, manufacturing sectors, transport and communication sector and public services sector were taken. The overall development indices for 1961 and 1971 were constructed through three stages of composition. At the first stage, sectoral indices were worked out by method of maximising the sum of squared projections. At the second stage, excluding agricultural sector, an aggregate non-agricultural index was prepared. At the final stage agricultural and non-agricultural indices were combined by applying the method of simple weighted average. These exercises lead to the conclusion that the extent of regional disparities in each sector and in the economy as a whole had decreased significantly during the sixties. In sectors with greater spatial imbalances, there were significant tendencies of correcting them.

Iyengar *et al.* (1981) developed a composite index of development. They selected some 13 indicators for 19 districts of Kamataka over two time points – 1960 and 1978. The ratio of the value of the indicator in the year 1978 to the value in the year 1960 represented the growth factor (Y_{Jd}). The composite index then is :

$$\overline{Y}_d = \sum_{j=1}^{13} W_j Y_{jd}$$

Where W_j is the weight of the J^{th} indicator. The study revealed that these weights were arbitrary and often depend upon value judgment. These weights were assumed to be inversely proportional to the corresponding co-efficient of variation.

Srivastava (1982) has attempted to work out a composite index of development with the application of a taxonomic method and the 56 districts in the state of Uttar Pradesh have been ranked as based on 32 indicators of different characteristics of the economy.

Studies devoted to regional variations in the development of a particular sector as well as those focusing on identification of the problem areas use a smaller number of indicators. Srivastava (1983) used merely 8 indicators while determining levels of agricultural development in Madhya Pradesh. Sharma (1981) and Sharma and Bawa (1983) identified levels of industrial development with 6 and 10 indicators respectively. Sharma and Katiyar (1974) identified backward districts of Utter Pradesh with the help of 10 indicators. A smaller number of indicators permits the use of less sophisticated methods such as ranking but more sophisticated methods such as varimax rotation of factors were also used by Sharma and Bawa.

Rao (1984) in a study constructed sectoral indices for 175 talukas of Karnataka covering agriculture, industry, education, health, banking, cooperation, power, communication and transport sectors. The sectoral indices were treated as indicators for the final

construction of the composite index of the development. The technique of Factor Analysis was used to delineate structurally homogeneous regions and to identify typology of development and to construct a composite index of development – both at sectoral and at aggregate levels.

CMIE (Centre for Monitoring Indian Economy) publications provide a huge wealth of data about districts and states in India for various economic indicators. CMIE (1985) has also computed a composite index of infrastructural development by taking weighted average of several indicators. In all 16 indicators explaining infrastructural facilities were divided in 8 groups viz., power, irrigation, roads, railways, post offices, education, health and banking with respective total weights equal to 20, 20, 15, 20, 5, 10, 4 and 6. It was noted that the weights indicated were purely subjective and it was difficult to offer any universally acceptable basis in purely quantitative terms of weight. All that could be argued in its favour was that the weight seem to reflect, more or less adequately, the relative roles of different elements in the growth process.

Taxonomic method was applied to work out the basic village amenity index for 21 states by Rangacharyulu and Rao (1986). The basic amenity included 22 indicators covering different areas like agriculture, animal husbandry, communication, credit, drinking water, education, electricity, health and marketing. Study revealed that Kerala and Punjab occupied the first two respective positions while Nagaland and Meghalaya emerged as the last two states. Optimal graph was also drawn to identify the clusters comprising different states. The clusters were formed on the basis of composite distance computed for all indicators. In this exercise , four clusters were identified. The first cluster composed Assam, Bihar, West Bengal

and Uttar Pradesh while the states of Andhra Pradesh, Haryana, Karnataka, Punjab and Tamil Nadu were in the second cluster, the states of Gujarat and Maharashtra formed the third cluster. The fourth cluster included the nine states namely Himachal Pradesh, Madhya Pradesh, Manipur, Meghalaya, Nagaland, Orissa, Rajasthan, Sikkim and Tripura.

Bhargava (1987) conducted a study on inter-district disparities in levels of development in Rajasthan at two points of time i.e. 1971 and 1981. The study attempted to build a composite index of economic development using 19 indicators of economic development. First principal component method of factor analysis was used to compute the composite index of development in two stages. In the first stage index for the development of individual sector was computed. In the second stage these indices for the individual sector were used for computing the composite index.

Mehta and Dave (1987) in their study on disparities in regional development of Rajasthan used factor analysis approach to construct a composite index of development based on 44 indicators. These indicators were categorised under five blocks i.e. physical quality of life, agriculture development, industrial development , infrastructure and inputs and demographic profile. The first step in conducting factor analysis was the computation of the correlation matrix. The correlation matrix of each of the five blocks of variable had shown high inter correlation between many variable. Variable highly correlated with each other were then grouped in the initial clusters. Multiple-group method of factor analysis was then applied to extract factors and factor loadings of each of the variable considered. Using these weight or loads composite indicators were derived for each block for each of the 26 districts in the state in 1971 and 1981.

A study on "Measuring Rural Development in Orissa" was undertaken by Parida (1987) which included these districts of Orissa viz. Cuttack, Balasor and Mayurbhanja. The block wise data for two points of time i.e. 1971 and 1981 were obtained from official records. A composite index was prepared on the basis of the five selected indicators which represented the level of development in the rural region under study. To determine the level of rural development, the selected indicators were combined into a single representative unit through the first principal components method of Factor Analysis. The study reflected the existence of wide disparity in the level of development among different regions in a district.

Shastri (1988) used 32 indicators of 6 different sectors namely agricultural sector, Industrial sector, educational development, banking sector, transport, communication and power and medical services. Principal component analysis was employed to prepare composite indices for 1961 and 1984.

Srivastava and Mehrotra (1991) in their study on spatial variations in levels of living in Eastern regions of Uttar Pradesh also used principal component method of factor analytic technique. The technique was used for reduction of data, to assign regression weights to different indicators for purpose of combining them and to prepare district-wise indices for the purpose of delineating homogenous districts. Twenty indicators to represent the components and sub-components were selected. For the purpose of preparing composite indices, they used variance rotated factor matrix and multiplied it with the standardised data matrix.

Narain *et al.* (1991) in their study on statistical evaluation of development on socio-economic front dealt with the quantification of development efforts effected in various socio-economic field by

constructing composite index of development based on information of fourteen important indicators in seventeen major states of the country. This study was undertaken over two periods of time i.e. 1971-72 and 1981-82. The development indices were computed on the basis of 14 indicators regarding agricultural, industrial, social and banking development for both the periods for each state. For obtaining proper number of factors, the technique of principal component was used. The findings of the study revealed that there were three independent factors identified crucial during period 1 and four factors during period 2. The first factor had significantly high loading in average daily employment for factory workers, per capita gross industrial outputs and per capita industrial consumption of electricity during both the periods. This factor was taken as indicator of 'industrial development'. The second factor common to both the periods was identified as 'social development' as it loaded very heavy on variables like students in primary and secondary schools, literacy percentage and total road length. The third factor "agricultural development' loads very high during period 1 on the proportion of gross irrigated area, per capita average food grain production and fertilizer consumption while during period 2, it loaded high on proportion of irrigated area only. During period 2, the fourth additional factor identified was the 'banking development'. The study concluded that a broad and fair representation of the whole spectrum of inter-state disparities for the fourteen variables was made in a simple structure of three or four orthogonal factors which accounted for about 80 per cent of the total variance.

Rangacharyulu (1993) developed composite indices for 17 major states and for three points of time i.e. 1971, 1981 and 1987. Five indicators i.e. ratio of population dependent on non-agriculture to population dependent on agriculture, female literacy rate, infant

mortality rate, per capita value of agricultural production at constant prices and percentage of expenditure on food to total household expenditure were adopted for the purpose of the study. These indicators were identified in the 'National Seminar on Indicators of Rural Development' organised at the National Institute of Rural Development during April 11-12, 1991. The methodology adopted for constructing the indices involved principal components analysis. The major assumption made while applying this analysis was that indicators selected were linearly related. The principal components analysis, besides providing factor weights which reflect the extent of correlation of the individual indicators with the principal component, gave the percentage of variation explained by the individual principal component. Thus, in addition to measuring development, caused by the selected indicators, it was also possible to quantify the contribution of each principal component consisting of a group of indicators, to development. The conclusions drawn based on principal component analysis would be more realistic (as the factor weights are uniquely determined) than those drawn based on either simple rank aggregation method or Taxonomic method.

The level of socio-economic development of different districts of Kerala was estimated by Narain *et al.* (1994) with the help of composite index of development based on forty two socio-economic variables combined in an optimum manner. The study utilised data for the year 1991-92 on forty two socio-economic indicators out of which seventeen indicators were directly concerned with agricultural development, five indicators depicted the progress of development in the industrial sector and the rest twenty indicators presented the level of development in infrastructural service sector. Variables in respect of various indicators were standardised and values were used to construct the composite index of development. The best district for

each indicator (with maximum/ minimum standardised value depending upon the direction of the indicator) was identified and the deviations of the standardised values from the best value of the indicator were obtained for each district. The statistical techniques presented by Narain *et al.*(1991) were used to build up the composite index of development for agricultural, industrial, infrastructural service and overall socio-economic sectors for each district. The value of the composite index thus obtained was non-negative and lied between 0 and 1. A value close to zero, indicated higher level of development whereas the value close to one indicated lower level of development.

Naithani and Pokhriyal (1995) examined the shift in the levels of development with respect to six basic infrastructural facilities available in the region. Tehri district of Uttar Pradesh was taken as the macro-region and its 10 blocks were taken as micro-regions. Secondary data were collected on number of villages having six basic amenities viz., drinking water, medical facilities, educational institutions electricity, pucca road approach and post and telegraph. Weighted composite indices (WCIs) provided information as regards the shift in the levels of development. The authors observed that the weightage criterion for six basic amenities given in Census of India, occasional paper-I of 1986 appeared good to check the shift in levels of development of micro-regions.

Pokhriyal and Naithani (1996) in a study on identification of levels of Agricultural development in Uttar Pradesh analysed 16 independent variable relating to agriculture and rural sector using multiple regression technique for computing a composite development index. With the help of multiple regression technique many of the possible errors and biases being committed in the conventional

methods were largely removed. Out of 16 variables, more significant variables were selected and other non-significant variables were rejected. Only three variables viz., chemical fertilizers, size of holdings and rainfall were found more significant. Accordingly, weighted standard scores (WSS) for different districts were calculated and on the basis of variation in the WSS, seven major development levels were delineated, namely, "very high", "high", "upper medium", "lower medium", "low", "very low", and "extremely low".

In a study by Institute for Research and Medical Statistics, New Delhi, Singh and Pandey (1996) constructed a index of development. The information was collected on availability of infrastructure facilities, health, manpower and development variables for all the districts of four major states viz. Uttar Pradesh, Bihar, Rajasthan and Madhya Pradesh. In each district a sample of 20 villages was taken. For each selected village data were collected for 48 variables relating to transport, drinking water, health and development. Making use of the information the overall indices under the above four heads were worked out.

Srivastava (1998) in his study on "Development and disparity : Agriculture in North East India" covered sixty out of sixty six districts from Assam, Manipur, Tripura, Arunachal Pradesh, Mizoram and Meghalaya. Based on available data uniformly for all sixty districts, 19 indicators were selected for the study. As standard methodology of regional studies principal component analysis of factor analysis family was used for assigning regression weights to diverse partial indicators and delineation of homogeneous regions. The number of factors to be retained were decided on the basis of eigen value.

Considering district as a region, the levels of development of various districts of Haryana were estimated by Hooda and Tonk (1998)

using forty two economic indicators related to agriculture, industries, infrastructure and socio-economic sectors. Using the concept of distances, composite indices of development were constructed for the individual sectors. The study utilized data for the year 1995-96. Further a linear combination of these indices were used to represent the overall development of each district. Different districts were classified as highly developed, developed, developing, poorly developed and very poorly developed on the basis of quantiles classification from an assumed Beta distribution of the mean of the composite indices for all the sectors.

2.2 CLASSIFICATION OF REGIONS ON THE BASIS OF THEIR LEVEL OF DEVELOPMENT

India suffers from vast regional imbalances, some of the states are highly developed and some other are backward. Systematic identification of backward regions in a developing country like India could be helpful in formulating plans to avoid regional imbalances from becoming acute in future.

Berry (1960) in a comprehensive study covering 95 countries each characterised by 43 proposed indices, employed a direct factor analysis, where the first and the second factors were derived to identify less developed regions.

Taking into account physical endowments and the present utilization of resources, agricultural, infrastructure, participation rates in traditional sectors, potential human resources (quantitative as well as qualitative), distributive trades, manufacturing and infrastructure and organised industrial activity in the modern sector, Mitra (1961) has classified the districts of India into four levels of development. Although, the methodology used in the classification in rather simplistic, the final results were perhaps as good as any

obtainable from more sophisticated techniques. The results indicated that development is clustered around a few nuclei and that there were no visible signs of effects spread around them. They also revealed that the benefits of development were not spread equitably over each state of region. In certain states, the whole population was classified as backward, while in others, like Punjab, over 78 per cent of the population was found in districts whose level of development was high.

Dasgupta (1971) examined the classification of districts according to their degree of development given in the 1961 census. The study covered 15 major states and considered 24 indicators. The correlation matrix of the socio-economic variables was first examined to weed out the less significant ones and to find a smaller set of variables which move together and which approximately stand for economic and social development. Secondly, a principal component analysis was carried out on the basis of both this smaller set as also the original set of variables and the districts were classified into four development categories according to the values of the principal component. Thirdly, discriminant analysis method was applied in order to subject this classification to a more rigorous test. The results from these two analysis were then compared with each other. On the basis of the new classification Bihar and Orissa were found the least developed states, with no district in the most developed category and Punjab, Kerala, Madras, West Bengal, Gujarat and Haryana with no district in the least developed category were established as the most developed states, more or less in the above order. Maharashtra, Mysore, Assam and Andhra were seen to hold intermediate positions, with no more than one district in the least developed category and with a good proportion of the districts in the two most developed categories, to be followed by Rajasthan, Uttar Pradesh and Madhya

Pradesh. This indicates that there are regional disparities between different states and different districts within the state.

Rao (1973) constructed a composite index of development based on co-variation in various indicators of development for each state. Six variables were considered in constructing an index of underdevelopment of a region in India for the early fifties. Based on this index the states were grouped into three categories - the most developed, not so developed and the least developed. The states namely West Bengal, Maharasthra and Gujarat were categorised as most developed group while Madras, Mysore and Punjab were found to be not so developed whereas Kerala, AP, Rajasthan, Bihar, Assam, Orissa, MP and UP were categorised as the least developed states. This indicates the regional disparities between the states.

Mehta and Hatharia (1975), and Mehta (1978) taking into consideration the geo-physical classification, divided Rajasthan into three regions – dry region, plain region and hilly region. The composite index of socio economic development was computed for the year 1961, which revealed that hilly region was the least developed and plain region was the most developed region of the state. By using the method of clustering, the socio-economic distance between different districts of the state was established. It leads to the conclusion that development is isolated while under-development is in clusters.

Iyengar and Sudershan (1982) classified the districts of Andhra Pradesh and Karnataka into five stages of development. Spatial aspects of development were emphasized by using a method involving Beta distribution for measuring the stage or level of development of districts. Classification of Andhra Pradesh (1978-79) indicated that Hyderabad, West Godavari and Krishna districts were categorised as highly developed while districts namely Guntur, Chittur, East

Godavari, Vishakapatnam and Nellore were in the developed category whereas Kurnool, Anantapur, Cuddapah and Nizamabad were found to be developing districts. The study revealed that Prakasham, Nalgonda, Karimnagar, Warengal, Khammam districts were found to be backward while Medak, Srikakulam, Mahboobnagar and Adilabad districts were at the very backward stage of development. Classification of Karnataka state (1980-81) indicated the districts like Bangalore and Dakshna Kannada to be highly developed while Kadagu, Shimoga, Dharwad and Belgaum districts were classified as developed whereas Bellary, Mandya, Chickmagular, Mysore, Chitradurga, Uttara Kannada and Kolar were categorised as developing districts. It was reported that Hassan, Tumkur, Bijapur districts were backward and Raichur, Bidar and Gulbarga districts were found to be at very backward stage of development.

Bhargava (1987) in her study on Inter-district disparities in Rajasthan at two points of time revealed that Jaipur district was at the top position in economic development both in 1971 and 1981. For the year 1971, Jaipur was followed by Ajmer, Kota, Sirohi, Bikaner, Jodhpur, Ganganagar, whereas districts like Nagaur, Churu, Dungarpur, Jalore, Banswara, Jaisalmer and Barmer occupied the last few ranks. In the year 1981, Jaipur was followed by Kota, Ajmer, Bhilwara, Sirohi, Jodhpur and Pali whereas districts namely Sawai Madhopur, Nagaur, Banswara, Tonk, Churu, Jaisalmer and Barmer were placed at the bottom in ranking on the basis of economic development. It was observed that in the ten year period only a few districts had shown change in their relative positions.

Mehta and Dave (1987) in their study on "Disparities in Regional Development in Rajasthan" over two points of time i.e. 1970-71 and 1980-81 classified the districts in three development groups.

They mentioned that Jaisalmer, Jalore, Churu, Barmer and Nagaur were the districts which were at very low level of development with respect to nearly all the indicators and their relative position had not improved during the decade under study. It was noted that all these districts were in the arid region of Western and Northern Rajasthan. Tonk and Dungarpur also exhibited quite low development status . Kota was found to be highly developed district followed by Jaipur. Other districts to show relatively high development were Sirohi, Ajmer, Alwar, Ganganagar, Bhilwara, Chittorgarh and Udaipur. It was clear from this list that the developed districts were situated in the eastern and southern parts of the state. District like Bhilwara was quite highly developed with respect to agriculture but not so well placed in industrial development and quality of life. Study further concluded that some of the districts Jodhpur, Bikaner, Sikar and Jhunjhunu, all in the arid and semi-arid region, had relatively high level of quality of life but quite low agricultural development. Among these districts, Bikaner and Jodhpur had shown significant industrial development. It was reported that Bundi and Bharatpur had relatively high agricultural development and moderate level of industrial development in 1980-81, but the quality of life enjoyed by their people was not so high, though in 1970-71 Bundi was relatively highly developed in industrial sector also. The remaining districts were in the moderate development category, though their profiles were dissimilar in many respects. In this group were Sawai Madhopur, Jhalawar and Banswara. These were moderate or high in agriculture and industrial sector but the quality of life enjoyed by the people was moderate in Sawai Madhopur and Jhalawar and very low in Banswara.

On the basis of values of Rural Development Infrastructure Index, Dadibhavi and Vaikunthe (1990) categorised 17 major states of India into four groups. For construction of the Index First Principal

component of selected variables was used. The study utilized data for the year 1983-84. For this purpose all the states were first divided into two groups on the basis of all India average value, one above the all India average and the other below the all India average. Then two more averages were worked out. One for the group of states whose values were above the all India average and another for the group of states whose values were below the all India average. The states whose values were above and below the former average were classified as group I – Advanced and group II- Semi Advanced states respectively. The states whose values were above and below the later average were classified as group III – partially advanced and group IV – Underdeveloped states respectively. The states namely Haryana, Punjab and Tamil Nadu were classified as advanced while states like Andhra Pradesh, Gujarat, Himachal Pradesh, Jammu and Kashmir, Kerala and Maharashtra were found to be semi-advanced. Further Karnataka, Uttar Pradesh and West Bengal states fell in the category of partially advanced states whereas states like Assam, Bihar, Madhya Pradesh, Orissa and Rajasthan were classified as underdeveloped states.

A study entitled 'Regional variations with respect to infrastructural and crop production efficiency factors in India – A cluster analysis of Indian States' was undertaken by Goel and Haque (1990). For objective assessment of differences among states and also to evaluate the feasibilities of regrouping the states as per the similarities or otherwise among them with respect to several important resource inputs, numerical taxonomy techniques were applied which took into consideration inter and intra state/zone variations. The analysis provided numerical indices to compare 22 Indian States categorised into 18 states' groups with respect to 26 infrastructural and 13 other related production efficiency factors forming two

different sets of parameters. The resemblance indices (used as numerical indices) among different states provided valuable information about the difference existing in different states belonging to same or different zone, and these indices were then used to regroup the states into regions (of 2 or more states each) through cluster analysis. This provided the extent of changes in resemblance indices for the resultant clusters at successive stages of clustering as additional state joined respective clusters/regions. The secondary data were first converted into comparable indices with reference to a state or all India figures in respective cases for the two sets of parameters. These indices were than standardised by transforming parameter values for different states in each parameter – row to a standard deviate by dividing its deviation from its row mean by the standard deviation for the corresponding row. The standard values, so obtained were than utilized for calculation of correlation coefficients for all the ${}^{18}C_2$ i.e., 153 pairs of states which were used as resemblances indices (coefficients), 2 values for the corresponding correlation coefficients were obtained from Fisher and Yates (1963) tables, which were, then used for subsequent cluster analysis using weighted pair group method as given by Sneath and Sokal (1973) and used earlier by Gaikwad *et al.* (1977) and Goel, *et al.* (1983) in Indian situations.

Srivastava and Mehrotra (1991) in their study on spatial variations in levels of living reported that the pattern of levels of living in Eastern Uttar Pradesh had been largely bipolar. Whereas few districts had shown a rather high level of living in terms of higher social consumption items like "infrastructural facilities, health facilities, educational facilities, power consumption etc. and were growing towards modernized urbanization, most of the other districts exhibit low levels of living in terms of soil consumption. In fact these districts appeared to be in some kind of low income equilibrium trap

where higher investment in social consumption items was only leading to increased population density and not to overall improved levels of living. Five such districts needed special care, where not only public investment in social consumption item was low, but also whatever investments were made, were nullified by increased population density. Hence, Faizabad, Baharaich, Basti, Deoria and Gonda exhibited extremely poor state of well-being in general.

Narain et al. (1991) in their study on statistical evaluation of development on socio-economic front classified the 17 states for two time periods on the basis of composite index. The values of composite index varied from 0.37 to 0.89 during 1971-72. Composite index upto 0.60 was considered as high level development, index from 0.61 to 0.75 as middle level development and index greater than 0.75 was considered as low level development. Punjab, Harayana, Tamil Nadu, Gujarat, Kerala and Maharashtra were observed as highly developed states, West Bengal, Karnataka and Andhra Pradesh were observed as middle level developed states and states of Uttar Pradesh, Himachal Prades, Jammu and Kashmir, Assam, Orrissa, Rajasthan, Madhya Pradesh and Bihar were found low developed states during 1971-72. The study further analysed the relative level of development in three states during the period 1981-82. The values of composite indices varied from 0.49 to 0.92 during this period. The classification of states into the three groups of development indicated that only Haryana and Punjab were in the category of highly developed states, the states of Kerala, Maharashtra, Tamil Nadu, Gujarat, Karnataka, Jammu and Kashmir and Himachal Pradesh were in the category of middle level development and the states of West Bengal, Andhra Pradesh, Uttar Pradesh, Madhya Pradesh, Orrissa, Rajasthan, Assam and Bihar were in the low developed category. It was also observed that the level of development in 14 states, out of 17 considered, had gone down during

1981-82 over their development index of 1971-72. The overall level of development was found to be significantly different between the two time periods.

Study by Shastri (1991) examined imbalances in industrial development of Rajasthan at macro, regional and sub regional levels by employing balance ratio, coefficient of imbalance, index of regional imbalance and index of intra-regional imbalance as the tools of analysis. Using six indicators the study ascertains the degree and extent of regional imbalances between the two points of time 1969-70 and 1984-85. The study suggested that regions in Rajasthan were coming closer to one another faster than districts. Different districts of western region were poorly developed in respect of most of the indicators. Hilly region had also shown moderate to balanced developed. Districts of Eastern plains were, in general, comparatively much better placed. Districts of plateau region had shown quite balanced and high level of development.

Goel and Vasisht (1992) carried out discriminant analysis of agro-economic development indicators for tribal areas in hills and plains. The region were north east hilly region of the country namely Meghalaya, Nagaland, Mizoram and Arunachal Pradesh. The plain regions were Koraput and Mayurbhanj districts in Orissa and Bastar and Bilaspur districts in Madhya Pradesh. The study used seven indices which were calculated on the basis of the data pertaining to agro-economic development indicators for each of the eight centres for time periods 1978-79 to 1986-87. The data were later subjected to multivariate statistical analysis using generalised Mahalanobis D^2 statistics (1936). It represented the distances between mean discriminant values in a generalised discriminant function and provided the maximum differences between any two centres (forming a

pair) with respect to the differences in their mean values for various factors in the respective cases. The distance D^2 was computed by maximising the differences between pairs of means (of respective centres) for those linear combinations of factors that had maximum variance between pairs of centres relative to the pooled variance within centres for the same linear combinations. D^2 values for each factor for each of the 28 ($^8C_2$) comparisons were calculated and tested for their statistical significance. Additional contribution to discriminant value (D^2) of the respective factors at successive stages was also calculated and tested for their significance. Lower values of D^2 represented smaller distance (difference) which meant larger similarity among the respective centres being compared, while a non-significant D^2 indicated that there were no significant differences among the centres with respect to the factors involved. Methods given by Mahalanobis (1936) and Rao (1952) were used for statistical analysis. The analysis brought to focus the differences within and between the two types of tribal areas, provided the relative importance of different parameters in order of merit and sorted out the dominant and unimportant or irrelevant factors of discrimination in the respective situations. The results were found to be useful in fixing priorities in tackling the imbalances in development activities and their adoption affecting the economy of the tribal areas included in the study.

Narain *et al* (1993) studied the economic development of different districts of Orissa state. The study utilised data at the district level for the year 1990-91 on forty six different indicators depicting various facets of development of different sectors of economy. The composite indices of development were worked out for different districts separately for agricultural, industrial, infrastructural and

service and overall economic sectors. The districts were ranked on the basis of development indices. The study revealed that out of 13 districts of the state the district of Cuttack was ranked first and the district of Phulbani was ranked last in the overall economic development. The values of composite indices varied from 0.62 to 0.94. For relative comparison, the districts with composite index upto 0.70 were taken as developed districts and put under category 1, districts with composite index from 0.71 to 0.80 as developing districts in category 2 and districts having composite index greater than 0.80 as poorly developed districts in category 3. It was observed that the districts of Cuttak, Sambalpur, Puri and Ganjam were placed in category 1 districts in overall economic development and their levels of overall development were better than other districts of the state. The districts of Balangir Balasore and Mayurbhanj were put in the second category of districts and the remaining districts namely Koraput, Dhenkanal, Sundargarh, Kalahandi, Keonjhar and Phulbani were placed in category 3 districts whose levels of development were poor. The findings of the study further examined the level of development separately in agricultural, industrial and infrastructural and service sector. The composite indices of development varied from 0.58 to 0.91 in agricultural sector, from 0.42 to 0.91 in industrial sector and from 0.66 to 0.99 in infrastructural and service sector. This indicated greater variability in level of development in industrial sector as compared to agricultural and infrastructural service sectors. The situation regarding the agricultural development was found to be of similar order as for overall economic development. The districts of Puri, Cuttak, Sambalpur, Ganjam and Balsore were observed to be better industrially developed as compared to other districts of the state. The infrastructural service facilities were very poor in most of the districts and the level of development in infrastructural sector was

very low. The districts of Puri, Mayurbhanj and Cuttak were found to be better developed than the remaining districts. The districts of Kalahandi, Phulbani and Keonjhor were found to be the lowest developed districts in the state in respect of agricultural, industrial as well as overall economic developments.

Rangacharyulu (1993) classified the 17 states in three categories of development on the basis of rankings in the composite index for three points of time. The state of Punjab, Haryana, Kerala, Gujarat and West Bengal had fallen in High group in 1971 while the moderate group included the states of Assam, Rajasthan, Karnataka, Himachal Pradesh, Orissa, Tamil Nadu and Jammu and Kashmir in the same year. The states of the Uttar Pradesh, Maharashtra, Andhra Pradesh, Madhya Pradesh and Bihar constituted the low group. The study revealed that there were no changes in the positions of these states in respect of the other two time points (1981 and 1987) with an exception to the states of Gujarat, West Bengal, Assam, Rajasthan and Maharashtra. On the development scale, the state of Gujarat which was in high group both in 1971 and 1981 had fallen into the moderate category in 1987. The state of Bengal depicted a different characteristic. Though this state slided from high category (1971) to moderate category (1981) , it regained its position (high) in 1987. The state of Assam belonged to the moderate category in 1971 improved its position in 1981 and retained its position in 1987. Rajasthan appeared to loose on the development dimension whereas Maharashtra improved its position from low (1971) to moderate (1981 and 1987).

The socio-economic status of various districts of Andhra Pradesh was evaluated by Narain *et al.* (1994) with the help of a composite index of development based on 30 socio-economic variables

combined in an optimum manner. Twenty two districts of the state covering more than 99 per cent of the area and about 95 per cent population were included in the analysis. The study utilised data for the year 1991-92. The study concluded that with respect to overall socio-economic development, the districts of East Godavari, West Godavari, Guntur, Krishna, Nellore, Nizamabad, Visakhapatnam, Vizianagaram and Prakasam were found to be better developed as compared to the remaining districts of the state. The situation regarding agricultural development was slightly different from the socio-economic development and the districts of Guntur, Krishna, Kurnool, Ranga Reddy, East Godavari, West Godavari, Cuddaph and Anantpur were observed to be better developed in comparison with the other districts of the state. Regional disparities were observed in the overall socio-economic development of the state and the better developed districts covered about 35 per cent area and 43 per cent population where as poorly developed districts covered about 48 per cent area and 37 per cent population. The overall socio-economic development was greatly influenced by agricultural development in most of the districts. The infrastructural facilities also influenced the socio-economic development in the positive direction in almost all the districts of the state.

A study on inter-district disparities in socio-economic development in Kerala was undertaken by Narain *et al.* (1994) in which the composite indices of development were worked out for different districts separately for agricultural, industrial, infrastructural and overall socio-economic sectors. The districts were ranked on the basis of development indices. The study revealed that out of 14 districts of the state, the district of Thrissur was ranked first and the district of Wayanad was ranked last in the overall socio-economic development. The values of the composite indices varied

from 0.64 to 0.99. With respect to over all socio-economic development, the districts of Thrissur, Kattayam, Ernakulum, Kannur, Kallam, Alappuzha and Thiruvenenthapuram were found to be better developed as compared to the remaining districts of the state. The district of Palakkad, Idukki, Kasaragad, Mallapuram and Wayanad were socio-economically low developed districts.

Further, the level of development was examined separately for agricultural, industrial and infrastructural service sectors. The composite indices of development varied from 0.66 to 0.99 in agricultural sector, from 0.00 to 0.90 in industrial sector and from 0.63 to 0.99 in infrastructural service sector. The district of Kollam was placed on the first rank and Wayanad on the last rank in the level of development in agricultural sector. In the case of the level of development in industrial sector, the district of Eranakulum occupied the first position with Wayanad on the last place and in infrastructural service sector the district of Pathanamthitta was ranked first and Wayanad was ranked last. The district of Wayanad was observed to be poorly developed district in all the three sectors of agriculture, industry and infrastructural facilities. Further the districts of Idukki, Kazhikade, Palakkad, Alappuzha, Kasaragod and Wayanad were found to be poorly developed in agricultural sector. The districts of Kasaragod and Wayanad were poorly developed in industrial sector whereas the districts of Kasargod, Palakkad, Idukki, Malappuram and Wayanad had poor level of development in infrastructural service sector. The variation in the level of development in industrial sector was observed to be of higher order as compared to the variation in agricultural sector and infrastructural service sector.

Narain *et al.* (1995) estimated the level of development of various districts of Uttar Pradesh with the help of composite index

based on optimum combination of thirty eight economic indicators. The data for the year 1991-92 for all sixty three districts were used in the study. Findings indicated that with respect to overall socio-economic development, the districts of Ghaziabad, Nainital, Saharanpur, Kanpur, Meerut and Mathura were found to be better developed as compared to the remaining districts of the state. Twenty three districts of the state were categorised as low developed districts and the rest thirty four districts indicated tendency for improvement in the overall development. It was mentioned that situation regarding agricultural development in the state was slightly different where twenty eight districts were found to be better developed and fourteen districts were very poorly developed. In the case of industrial development, Ghaziabad was very highly developed, twenty one districts were developed but the level of their development was much below the level of Ghaziabad and only three districts were observed to have poor development. It was concluded that wide disparities in development among different regions of the state were observed. The western region was found to be better developed as compared to other regions of the state.

Naithani and Pokhriyal (1995) in their study on analysis of levels of development in the rural Himalayas classified the 10 blocks of district Tehri, with regard to the composition of six basic amenities in three levels of development. The blocks namely Bhilangna, Pratapnagar, Jaknidhar and Jakholi were found to be highly developed while Devprayag, Chamba, Kirtinagar and Narendranagar blocks were in the category of middle level of development whereas Thauldhar and Jaunpur were found low developed in basic infrastructural facilities.

Dynamics of socio-economic development in Maharashtra were studied by Narain *et al* (1996). The level of development of various districts of Maharashtra were obtained with the help of composite index based on optimum combination of forty three economic indicators. Twenty nine districts of the state were included in the study. The district wise data for the year 1991-92 on forty three economic indicators were used. The study concluded that the districts of Thane, Raigad, Nasik, Pune, Satara, Sangli, Nagpur and Chandrapur were found to be better developed as compared to the remaining districts of the state with respect to overall socio-economic development. The districts of Ratnagiri, Sindhudurg, Jalna, Parbhani, Beed, Nanded, Buldana, Amraoti, Yavatmal, Bhandara and Gadcharoli were socioeconomically low developed.

The study further revealed that the situations regarding the agricultural and industrial developments in the state were found to be slightly different as compared to overall socio-economic development. Fifteen districts were observed to be developed districts and only two districts were low developed in agriculture sector. The remaining districts were having the tendency of improvement in the level of development. In case of industrial development, the districts of Thane, Pune and Raigad were found to be very highly developed. The remaining districts were much behind in industrial development as compared to these districts. There was much variation between the districts in the availability of infrastructural facilities. Fifteen districts had better level of infrastructural facilities and six districts had lower level of these facilities.

Pokhriyal and Naithani (1996) classified the districts of Uttar Pradesh on the basis of variation in the weighted standard scores of indicators of agriculture development. Study revealed that North-

western districts of U.P. state or North-western region had a very high level of agricultural development. In contrast to it the Central region, Eastern region and Bundelkhand region came to lower medium level in agriculture development. The whole of Himalayan region came under very low/extremely low categories of agriculture development. Due to geographic bottlenecks and lack of micro level agro-climatic agricultural planning hilly region lagged behind. Clear cut spatial concentration of higher level of agricultural productivity and regional variation was observed. The study mentioned that in a state like U.P. specific level of development of a district should be taken into consideration in agricultural planning.

A composite index of development for Rajasthan was constructed by Singh and Pandey (1996). On the basis of average index, the districts were classified into three categories viz. above average, average and below average. The districts classified in the average category were those which were within the 10 per cent of the state index. The above average categories were those which had values more than 10 per cent of the state index and those in the below average category having indices 10 per cent below the state index. The study revealed that Ajmer, Bhilwara, Jaisalmer, Jhunjhunu, Jhalawar, Kota districts were found to be in above average category of development while districts namely Alwar, Banswara, Barmer, Ganganagar, Jaipur, Nagaur, Pali, Sikar, Sirohi, Udaipur and Jodhpur were classified in average category whereas districts like Bharatpur, Bikaner, Bundi, Churu, Dholpur, Dungarpur, Jalore, Sawai Madhopur, Tonk and Dausa were in the below average category according to the indices of development.

Regional pattern of socio-economic development in Karnataka was studied by Narain *et al.* (1997). The level of development of

different districts of Karnataka was obtained with the help of composite index based on optimum combination of thirty nine economic indicators. All the twenty districts of the state and district-wise data mostly for the year 1994-95 in respect of thirty nine indicators were included in the study. It was revealed from the study that with respect to overall socio-economic development, the districts of Bangalore, Chitradurga, Kolar, Shimoga, Balgaum, Hassan, Mandya and Mysore were found to be better developed as compared to the remaining districts of the state. The districts of Bangalore, Uttar Kannada, Bidar, Gulbarga and Kodagu were socio-economically low developed. The level of development in the rest of the districts was of middle order but the districts had the tendency to make improvement in the pattern of development.

Study further revealed that seven districts namely Chitradurga, Shimoga, Bellary, Raichur, Hassan, Mandya and Mysore and eight districts namely Bangalore, Bangalore(Rural), Kolar, Belgaum, Uttar Kannada, Dakshin Kannada, Mandya and Mysore were found to be better developed in agricultural and industrial sectors respectively. Better developed districts in agriculture covered about 36 per cent area and 33 per cent population whereas better developed districts in industrial sector covered about 34 per cent area and 47 per cent population. The districts which were better developed in industrial sector were observed to be more thickly populated as compared to the better developed districts in agricultural sector. Only two districts namely Mandya and Mysore were found to be better developed in agricultural, industrial and overall socio-economic sectors. Six districts in agricultural sector and seven districts in industrial sectors were very poorly developed. Study concluded that wide disparities in the levels of development existed among different districts of the state.

Hooda and Tonk (1998) made an assessment of regional development in Haryana and classified the districts under different stages of development. The findings of the study revealed that Hisar, Karnal, Rohtak and Faridabad, which covered 33.39 per cent area of the state and represented 36.54 per cent population were classified as the most developed districts. Three districts viz. Gurgaon, Rewari and Mahendragarh which covered 13.58 per cent area and represented 14.89 per cent of the state population, were found to be very poorly developed with respect to the overall development. Out of three most backward districts two i.e. Rewari and Mahendergarh were the least developed on agriculture, industrial and socio-economic fronts. Mahendergarh was very poor in industrial development, medical, transport, communication, banking and in education whereas Rewari had very poor agricultural development.

Srivastava (1998) in his study on Development and Disparity : Agriculture in North East India delineated five different homogenous regions on the basis of structure of development in the agriculture sector. The first homogenous region exhibited the areas of geographical disadvantage in terms of cultivable land. The hilly districts of Mizoram, Arunachal Pradesh, Manipur and Nagaland appeared to be more developed than the plain districts of Assam and Tripura. The second regions brought out the degree of commercialisation in crude sense achieved by different districts. Meghalaya, Mizoram, Arunachal Pradesh and Parts of Tripura were placed at the top whereas districts of Nagaland, Assam and Manipur at the bottom. The third major characteristic of the third region was the availability of foodgrains in North East in per capita terms and its relationship with paddy productivity. It was found that all the valley districts of Manipur and parts of Nagaland, Arunachal Pradesh and Assam figure in the categories of developed and highly developed

districts. The fourth region depicted the level of input use in agriculture sector. Irrigation appeared to be a general deficiency in entire North East, except for in plain districts of Manipur (Imphal, Thonbal and Bishnupur). In fact the entire agrarian economy in the region was in a low level of equilibrium trap which needed a big push. First region depicted just two variables i.e. rural literacy rate and per capita bank credit in agriculture sector. None of the districts were in extreme categories. Most of districts had fallen in the category of moderately developed/ underdeveloped districts (37 districts). In terms of spread of education and credit (to rural sector) Arunachal Pradesh appeared to be lagging behind all the other states.

The level of development of different districts of the states of Andhra Pradesh, Karnataka, Kerala, and Tamil Nadu belonging to the Southern Region of the country was studied by Narain *et al.* (1999) with the help of composite index based on an optimum combination of thirty economic indicators. Seventy eight districts of the southern region were included in the analysis. The data on the economic indicators for the year 1991-92 were used in the study. The findings indicated that eleven districts from Kerala namely Thrissur, Alappuzha, Thiruvananthapuram, Palakkad, Kollam, Malappuram, Pathanamthitta, Kottayam, Ernakulam, Kozhikode and Kannur were found to be the highly developed districts in the southern region. Four districts from Andhra Pradesh namely West Godavari, East Godavari, Guntur and Krishna, four districts from Karnataka namely Hassan, Shimoga, Mandya and Mysore and three districts from Tamil Nadu namely Tiruchirapalli, Pudukkottai and Tiruneveli Kottabornan were also observed to be in the first category of developed districts in the southern region. About 76 per cent area and 90 per cent population of Kerala were better developed whereas about 17 per cent area and 20 per cent population of Karnataka fell in the better developed track of

southern region. Similarly about 14 per cent area and 24 per cent population of Andhra Pradesh and about 17 per cent area and 14 per cent population of Tamil Nadu fell in the category of better developed districts.

The study further revealed that eighteen districts of which nine districts came from Andhra Pradesh, six from Karnataka, two from Kerala and one from Tamil Nadu were found to be in the category of low developed districts in the southern region. In agricultural development, 7 districts from Andhra Pradesh, 12 districts from Karnataka, 4 districts from Kerala and 7 districts from Tamil Nadu fell in the better developed category of the districts. In the development of infrastructural facilities, 10 districts from Andhra Pradesh, 2 districts from Karnataka, 12 districts form Kerala and 7 districts from Tamil Nadu were observed to be better developed. The study concluded that wide disparities in the levels of development were observed among different districts of the states of the southern region.

Narain *et al.* (2000) studied the level of development of different districts of Tamil Nadu with the help of composite index based on optimum combination of forty two socio-economic indicators. The district-wise data in respect of forty two indicators were used for twenty two districts of the state for the year 1994-95. The level of development was obtained separately for agricultural, infrastructural service and socio-economic sectors. The district of Chengalpattu MGR was ranked first and the district of Pasumpon Muthuramalinga, Thevar was ranked last in the level of socio-economic development in the state. Wide disparities were obtained in the level of development among different districts. Northern and north-eastern districts were found to be better developed. In the study potential targets were estimated for low developed districts for bringing out uniform regional

development. These districts required improvements of various dimensions in some of the indicators for enhancing the level of overall socio-economic development. Some of the districts required unified balanced integration of curative, preventive and promotional health services.

2.3 INTER-RELATIONSHIP AMONG DIFFERENT SECTORS OF DEVELOPMENT

Progress of a region depends upon the development in all the sectors of economy. For better development, agriculture and industry must flourish together as both provide inputs for each other. Infrastructural development of a region also facilitates the development in other sectors. All the sectors seems to be inter-related.

Narain *et al* (1993) in their study on evaluation of economic development in Orissa found the interrelationship among agriculture, industry, infrastructural facilities and overall economic developments. Findings indicated that the correlation coefficients between the rankings of agricultural and overall economic developments as well as the rankings of industrial and overall economic developments were observed to be quite high and they were statistically highly significant. This was expected since agricultural and industrial sectors were included in the overall development indices. The correlation coefficients between agricultural and industrial rankings was also highly significant but lower in magnitude than their correlations with overall development. The developments in agricultural and industrial sectors went hand in hand in the state. The correlation coefficients between agricultural development and infrastructural service development and industrial and infrastructural development as well as overall economic development and infrastructural development were not significant which indicated that infrastructure in the districts

were not sufficient to influence the developments in agriculture, industry or over all economic fields.

Inter-relationship among different sectors of development in Kerala was worked out by Narain *et al* (1994). Findings indicated that the overall socio-economic development in the state was positively associated with the development in agriculture and industrial sectors. The growth and progress in the fields of agriculture and industry influenced the overall socio-economic development in the positive direction. The correlation coefficients between agricultural and industrial development was found highly significant but lower in magnitude then their correlation with overall socio-economic development. The agricultural and industrial rankings were positively correlated which implied that the districts which were agriculturally developed, were mostly developed in industrial sector also and vice versa. Further, it was mentioned that the infrasturctural facilities did not influence the development in agricultural as well as industrial sectors as their correlations were not significantly different from zero. The ranking between infrastructural facilities and overall socio economic development were found to be positively correlated. Similar findings were revealed by Narain *et al.* (1995) in their study on regional disparities in the levels of development in Uttar Pradesh.

Findings of the study by Narain *et al.* (1996) on dynamics of socio economic development in Maharashtra revealed that the overall socio economic development was positively associated with agricultural and industrial developments in the state. The growth and progress in the fields of agriculture and industry had influenced the level of overall socio-economic development in the positive direction. It was concluded that the level of development in agricultural and industrial sectors was going hand in hand in most of the districts. The

infrastructural facilities had a greater impact in enhancing the level of socio-economic development but these facilities were not fully utilised in the growth and development of agriculture.

Narain *et al.* (1997) in their study on socio-economic development in Karnataka mentioned that the correlation coefficients between agricultural and socio-economic development were observed to be quite high and highly significant. The correlation coefficients between the development in industrial sector and infrastructural facilities was significant at .05 probability level. The growth and progress of industrial and infrastructural facilities influenced each other in the positive direction. Further, the correlation coefficient between agricultural and industrial developments was not significant which indicated that the districts which were agriculturally advanced were not well developed in industrial sector. The districts which had more urban population were well developed in industrial sector and low developed in agricultural field. Infrastructural facilities did not influence the agricultural development. The overall socio-economic development was not influenced by the development in industrial sector.

Hooda and Tonk (1998) examined the relationship among the level of development in Agriculture, Industry, Infrastructure and Socio-economic sectors of economy in Haryana. The study revealed that correlation between development in industry and socio-economic sectors was highly significant, whereas it was non-significant for all other pairs. Correlation analysis also reflected that the correlation of industry sector though non-significant, was negative with the agricultural and infrastructural development.

Interrelationship among different sectors of development was studied by Narain *et al.* (1999) in their study on Inter-district

Variation of Development in Southern Region which included states of Andhra Pradesh, Karnataka, Kerala and Tamil Nadu. The findings indicated statistically significant correlation co-efficient between agricultural and socio-economic development as well as between infrastructural and socio-economic development. It was revealed that infrastructural facilities did not influence the growth of agricultural development. These facilities were mostly related to expansion of education, medical help, transport, communication and banking system in the region and they might have not affected the agricultural development but these facilities are very important for overall socio-economic development.

Similar findings were reported by Narain *et al.* (2000) in their study on regional disparities in socio-economic development in Tamil Nadu. The correlation coefficient between developments in agricultural and socio-economic sector was found to be significant but the correlation coefficient between the developments in agricultural and infrastructural service facilities was not significant. On the deeper examinations of indicators included under infrastructural facilities, it was found that most of the indicators were highly influenced by level of education. The agricultural development was not found to be significantly affected by the level of education. The level of education and other related infrastructural facilities were found to have a very high significant correlation coefficient with the socio-economic development in the state.

3. METHODOLOGY

The present investigation was carried out in Rajasthan state of the country. The state of Rajashan is situated in the northwestern part of the Indian Union (23°30' and 30°11' North Latitude and 69°29' and 78°17' East Longitude). It is surrounded by Punjab in the north, Madhya Pradesh in the south, Pakistan in the west and Haryana and Uttar Pradesh in the east. Its total area is 3,42,239 square kilometers and consists of 32 districts. The methods and procedures used in the execution of present investigation have been described in the following sections :

3.1 Selection of reference points

3.2 Measurement of development

3.3 Collection of data

3.4 Analysis of data

3.1 SELECTION OF REFERENCE POINTS

In order to assess the development of Rajasthan state, the study was carried out for two decadal years i.e. 1980-81 and 1990-91 and to have latest picture the year 1996-97 was also selected for the study as the data regarding the different indictors were available upto 1996-97 only. Hence the study was conducted for three points of time i.e. year 1980-81, 1990-91 and 1996-97 with the purpose of examining the significance of change and variability in development.

3.2 MEASUREMENT OF DEVELOPMENT

In the present study the development of Rajasthan state has been measured in terms of development in Agricultural, Industrial, Infrastructural and Socio-economic sectors. After reviewing the literature, a number of indicators depicting the development in these

sectors were listed and relevant indicators were identified. In all, 47 indicators were selected for assessing the development of each district consisting of 21 indicators from agricultural sector, 8 from industrial sector, 7 from infrastructural sector and 11 from socio-economic sector as under:

3.2.1 Agricultural Sector

(i) Percentage of area sown more than once to net area sown.

(ii) Percentage of gross area sown under food grains to total cropped area.

(iii) Percentage of net area irrigated to net area sown.

(iv) Percentage of forest area to total geographical area.

(v) Percentage of gross irrigated area to gross area sown.

(vi) Average size of operational holding (hectares)

(vii) Percentage of area under commercial crops to total cropped area.

(viii) Number of cows and buffaloes per 1000 human population.

(ix) Production of food grains (000 tons)

(x) Percentage of agriculture workers to the total work force.

(xi) Forest area per lakh of human population (hectares).

(xii) Gross value from agriculture per hectare at current prices (Rs.).

(xiii) Gross value of agriculture output per capita (rural) at current prices (Rs.)

(xiv) Fertilizer consumption in terms of nutrients (tons).

(xv) Yield in Kg./hectare of foodgrains.

(xvi) Total cattle (00).

(xvii) Irrigation intensity (gross area irrigated x 100/net irrigated area).

(xviii) Cropping intensity (gross cropped area x 100/net sown area).

(xix) Percentage of animal power (total number of live stock x 100/ net sown area).

(xx) Use of pumps and oil engines per '000 of population (Total number of pumps + oil engines/Gross irrigated area) x 100

(xxi) Use of tractors per '000 of population (Total number of tractors x 1000/net sown area).

3.2.2 Industrial Sector

(i) Number of workers employed in working factories.

(ii) Number of workers per lakh population in working factories.

(iii) Per capita value added by manufacturing in Rs.

(iv) Percentage of manufacturing industry workers to the total work force.

(v) Gross output in industry per capita.

(vi) Industrial consumption of electricity per capita (kwh).

(vii) Percentage of people who got industrial loan.

(viii) Percentage amount disbursed as industrial loan.

3.2.3 Infrastructural sector

(i) Number of hospitals per lakh of population.

(ii) Number of beds in hospitals per lakh of population.

(iii) Number of high/senior secondary schools per 1000 school going children.

(iv) Number of post offices per lakh of population.

(v) Number of civil veterinary hospitals.

(vi) Number of civil veterinary dispensaries.

(vii) Road length per 100 square km. of geographical area (in km.).

3.2.4 Socio-economic Sector

(i) Density of population per square km. of area.

(ii) Urban population.

(iii) Percentage of main workers to total population.

(iv) Percentage literacy.

(v) Different type of vehicles registered.

(vi) Per capita deposit in scheduled banks.

(vii) Number of commercial vehicles per lakh of population.

(viii) Number of co-operative societies per lakh of population.

(ix) Number villages connected to metalled roads.

(x) Percentage villages electrified.

(xi) Average population per bank (in '000).

To measure the level of development, all the above indicators from the four selected sectors were used to construct composite indices of development for each district of Rajasthan state.

3.3 COLLECTION OF DATA

For the purpose of present investigation the district was considered as the unit of analysis. At present, Rajasthan is administratively divided into 32 districts. The study included 26 districts as existed in the year 1980-81 covering entire geographical area of the state as the required data were not available for newly formulated districts for all the three selected points of time of the study. Secondary data pertaining to the indicators from different sectors for all three selected points of time i.e. 1980-81, 1990-91 and 1996-97 were collected for each district from the following sources :

(i) Census of India, 1981: Rajasthan.

(ii) Census of India, 1991: Series 21 Rajasthan.

(iii) Statistical Abstract Rajasthan, 1981.

(iv) Statistical Abstract Rajasthan, 1983.

(v) Statistical Abstract Rajasthan, 1984.

(vi) Statistical Abstract Rajasthan, 1992.

(vii) Statistical Abstract Rajasthan, 1997.

(viii) Vital Agriculture Statistics, 1996-97.

The data for certain indicators like fertilizer consumption in terms of nutrients, average size of operational holding and number of cooperative societies per lakh of population were not available for the year 1996-97, hence the data for these indicators for the year 1995-96 were used.

3.4 ANALYSIS OF DATA

To arrive at meaningful conclusions, the collected information were analysed using several statistical tools and methods as described below :

3.4.1 Principal Component Analysis

This technique was employed to identify the factors responsible for development in agricultural, industrial, infrastructural and socio-economic sectors. Principal component analysis transforms the original set of variables into a smaller set of linear combinations that account for most of the variance of the original set. The successive linear combinations are extracted in such a way that they are un-correlated with each other and account for successively smaller amounts of the total variation. The factors (i.e. principal components) have been determined which explain as much of the total variation in the data as possible with a few of these factors as possible.

To find the principal components, first a correlation matrix for original variables is worked out. Let this matrix be defined as R which is of size k x k for k original variables. Then the solution of the following set of k equations yields k different values of characteristic roots denoted as λ. These characteristics roots are also called latent roots or eigen values.

$$|R - \hat{\lambda} I| = 0 \qquad (1)$$

Where R is k x k, I is k x k identity matrix and $\hat{\lambda}$ is a scalar. The solution of k equations gives k different values of $\hat{\lambda}$, all of which satisfy set of k equations given in eq.1.

Let these characteristics roots be denoted as $\hat{\lambda}_1$, $\hat{\lambda}_2$..... $\hat{\lambda}_K$ in descending order of their size. Corresponding to each characteristics root (say $\hat{\lambda}_J$), a character vector or eigen vector ($\hat{a}_j$) of size k x 1 is obtained by solving the following :

$$[R - \hat{\lambda}_j I] [\hat{a}_j] = [0] \qquad (2)$$

Where a_j is k x 1 column vector of unknowns corresponding to λj and 0 is a k x 1 column vector of zeros. An additional step is required to normalise $\hat{a}_j$ vector such that $\hat{a}_j' \hat{a}_j = 1$

Having estimated a_j the principal component corresponding to j^{th} characteristic root ($\hat{\lambda}_j$) is then defined as

$$\hat{Z}_j = \hat{a}_{j1} X_1 + \hat{a}_{j2} X_2 + ... + \hat{a}_{jk} X_k \qquad (3)$$

The ratios of $\hat{\lambda}_j$ to $\Sigma\hat{\lambda}_j$ is interpreted as the proportion of total variation in all original variables which is accounted for by the j^{th} principal component given in eq.3.

Only a few principal components are selected according to their magnitude which account for most of the variability in original variable and having eigen values (λ_J) greater than one. Taking eigen values greater than one is quite plausible since the sum of all k roots (eigen values) is precisely k, so that a value of one is merely par and surely if another dimension (principal component) is to be added, it would be desirable to have it account for at least an average contribution.

The correlations (factor loadings) of each of these principal component with all individual original variables were then calculated.

Further, varimax rotation method given by Kaiser (1958) was used to rotate principal components solutions for obtaining normalised loading for each factor. In this method, the variance of the squared loadings across a factor is maximised. The rotation position where the variance is maximised across all factors in the matrix is sought. In such a case, there are several high and small loadings. If loadings are either one or zero, the factor is most interpretable since the several small loadings which cause difficulties are completely eliminated. Loadings were interpreted on the basis of formula suggested by Burt and Banks (1947) and retained upto one per cent level of significance.

Burt and Banks have suggested the following adjustment to the standard error of the correlation coefficients obtained from the critical values for the significance of Pearson correlation coefficients with sample size n in order to obtain the standard error of the loadings :

$$s(a_{mj}) = \{s(r_{x_i x_j})\} \sqrt{\frac{k}{k+1-m}} \qquad (4)$$

Where,

k= number of x's (original variables) in the set.

m = subscript of Z (principal components), that is, the order of its extraction (the position of Z in the extraction process)

For any factor loading to satisfy the 1 per cent level of significance in Z_m its value must be at least equal to s (a_{mj}).

3.4.2 Construction of Composite Indices of Development

To construct the various indices of development for each district of Rajasthan in each sector following procedure was used :

Let a set of n points represent districts 1,2,....n for a group of k indicators 1 ,2,....k. This can be represented by a matrix $[X_{ij}]$; i= 1,2,....n and j = 1,2,....k. As the developmental indicators included in

the analysis are in different units of measurement and since the purpose is to arrive at a single composite index relating to the dimension in question. There is a need for standardisation of the indicators. Hence the indicators were standardised as shown below:

$$Z_{ij} = \frac{X_{ij} - \bar{X}_j}{s_j} \qquad (5)$$

where $s^2_j = \sum_{i=1}^{n} \frac{(X_{ij} - \bar{X}_j)^2}{n}$

and $\bar{X}_j = \sum_{i=1}^{n} \frac{X_{ij}}{n}$ $\qquad (i = 1, 2, \ldots n)$ $\qquad (j = 1, 2, \ldots k)$

[Zij] denotes the matrix of standardised indicators. The best district for each indicator (with maximum/ minimum standardised value depending upon the direction of the indicator) was identified and from this the deviations of the value of each district were taken for all indicators in the following manner :

$$C_i = \left\{ \sum_{j=1}^{k} (Z_{ij} - Z_{oj})^2 \right\}^{1/2} \qquad (6)$$

Where, Z_{oj} is the standardised value of the j^{th} indicator of the best district. The composite indices for various districts and for each sector were obtained through the formula suggested by Narain *et al.* (1991).

$$Di = \frac{Ci}{C} \qquad (7)$$

Where, $C = \bar{C} + 2s$, $\qquad \bar{C} = \sum_{i=1}^{n} \frac{C_i}{n}$

and $s = \left\{ \sum_{i=1}^{n} \frac{(C_i - \bar{C})^2}{n} \right\}^{1/2}$

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

3.4.3 Weighted Mean Development Index ($\overline{Y}_i$)

For classifying different districts as highly developed, developed, developing, backward and very backward, quantile classification from an assumed Beta distribution of the weighted mean ($\overline{Y}_i$) of the composite indices for all four sectors for three selected points of time were computed. The weighted mean development index ($\overline{Y}_i$) was worked out in the following manner :

Let U_{ik} denote the size of the composite index for i^{th} district and for the j^{th} sector ((i= 1,2,.....n; k = 1,2....m (number of sectors, 4 in the present study)).

$$\text{Let } Y_{ik} = \frac{U_{ik} - \text{Min } (U_{ik})}{\text{Max } (U_{ik}) - \text{Min } (U_{ik})} \qquad (8)$$

Where maximum and minimum are taken over the districts i.e. over i. If, however U_{iK} is negatively associated with development than the transformed variate Y_{iK} as defined is positively related with the development and also lies between 0 and 1.

$$Y_{ik} = \frac{\text{Max } (U_{ik}) - U_{ik}}{\text{Max } (U_{ik}) - \text{Min } (U_{ik})} \qquad (9)$$

From the matrix of the transformed indices $Y = (Y_{ik})$, a measure for the overall development level or stage for the various districts was computed as below :

$$Y_i = \sum_{k=1}^{m} W_k Y_{ik} \qquad (10)$$

Where, W's ($0 < W_i < 1$ and $W_1 + W_2 + \ldots\ldots W_m = 1$) are the weights attached with the indices of different sectors. A special case may be when all sectors are considered equi-important, i.e. weights are assumed equal.

However, a more rational view would be to assume that the weights vary inversely as the variation in the respective sectors.

Assume [Iyengar and Sudershan (1982)]

$$W_i = \frac{K}{\sqrt{[\text{Var}\ (Y_i)]}} \qquad (11)$$

Where, $$K = \left[\sum_{i}^{m} \frac{1}{\sqrt{\text{var}(Y_i)}}\right]^{-1} \qquad (12)$$

Since $0 \leq Y_{iK} \leq 1$, hence the weighed mean $\overline{Y}_i$, which represents the overall development of a district also varies from zero to one.

The choice of the weights in this manner ensures that large variation in any one of the sectors will not unduly dominate the contribution of the other of the sectors.

Probability distribution of weighted mean ($\overline{Y}_i$)

A continuous random variable Z that takes values in the interval (0, 1) and has probability density function f(z) given by

$$f(z) = \frac{z^{a-1}\ (1-z)^{b-1}}{B\ (a, b)} \quad 0 < z < 1 \qquad (13)$$

follows a Beta distribution with shape parameters a and b. Also, the distribution function (incomplete Beta function) is

$$F(z) = \frac{\int_0^z z^{a-1}\ (1-z)^{b-1}}{B\ (a, b)}\, dz \qquad (14)$$

Since, $\overline{Y}_i$ ranges from 0 to 1, it is assumed that it follows a Beta distribution with parameters a and b, which is used for fractiles classification. Moments estimates of parameters a and b in the assumed Beta distribution in equation-13 can be obtained by solving the following matrix equation :

$$AP = B \qquad (15)$$

Where,

$$A = \begin{bmatrix} 1 - \overline{Y} & -\overline{Y} \\ \overline{Y} - m_2 & -m_2 \end{bmatrix},$$

$$P = \begin{bmatrix} a \\ b \end{bmatrix} \quad \text{and} \quad B = \begin{bmatrix} 0 \\ m_2 - \overline{Y} \end{bmatrix}$$

$\overline{Y}$ in the above matrix equation is the sample (of weighted indices for various districts) mean of the district indices and m_2 is given by

$$m_2 = S_{\overline{y}}^2 + \overline{Y}^2$$

here $S_{\overline{y}}^2$ is the variance of the district indices.

The linear intervals $(0, z_1)$, (z_1, z_2), (z_2, z_3), (z_3, z_4) and $(z_4, 1)$ with each having area under the fitted Beta probability curve equal to 0.20 were obtained as values of the incomplete beta function (eq. 14) using Biometrika Tables by Pearson and Hartley (1976).

A district was categorised as

Highly developed if $\overline{Y}_i \in [z_4, 1]$

Developed if $\overline{Y}_i \in [z_3, z_4]$

Developing if $\overline{Y}i \in [z_2, z_3]$

backward if $\overline{Y}_i \in [z_1, z_2]$

and very backward if $\overline{Y}_i \in [0, z_1]$

3.4.4 Slippage Test

In order to examine the significance of overall change in development indices over three selected points of time, slippage test proposed by Rai (1987) was utilized. For this purpose the districts were arranged in the ascending order of their development indices for each point of time (1,2,....t). The development indices for different points of time were than ranked for their first order statistic, 2nd order statistic and so on, the nth order statistic. Rank 1 was allotted to the smallest, 2 to the next higher and so on.

The test statistic was calculated as under:

Let R_i denote the sum of ranks of the i^{th} point of time for all the districts.

$$M = \frac{12}{nt\,(t+1)} \sum_{i=1}^{t} R_i^2 - 3n(t+1) \qquad (16)$$

which is distributed as χ^2 statistic with (t-1) d-f.

This test was used to test the null hypothesis that there is no change in the development indices of districts over time. If the hypothesis of no change was rejected then the significance of individual pairs of time periods was tested by using the following inequality. That is, if

$$| R_{t_i} - R_{t_j} | \geq \frac{Z_\alpha}{t(t-1)} \sqrt{\frac{nt(t+1)}{6}} \qquad (17)$$

Where i= 1,2,....t , j= 1,2,....t; i ≠j, then hypothesis of no change in the development indices of districts over two points of time is rejected. Thus, if the difference between the rank sums exceeds the critical value given in equation-17, then it is concluded that the development over two time periods is different. The value of $Z_\alpha/t(t-1)$ is the abscissa value from the unit normal distribution above which lies $\alpha/t(t-1)$ per cent of the distribution. The values of Z were obtained

from probabilities associated with the upper tail of the normal distribution.

3.4.5 The Kendall's Coefficient of Concordance and Spearman's Rank Correlation

The Kendall's coefficient of concordance (Siegel and Castellan, 1988) was computed to ascertain the overall agreement among ranking of agricultural, industrial, infrastructural and socio-economic developments. Further, Spearman's rank correlation was used to study the relationship between each pair of all the four sectors of development.

3.4.6 Development Distances

The developmental distances between different districts were computed to find out model districts in selected sectors for the low developed districts on the basis of composite index of development. Using the standardised variates [Z_{ij}], the development distances between different districts were obtained in the following manner

$$D_{ip} = \left\{\sum_{j=1}^{k}(Z_{ij} - Z_{pj})^2\right\}^{1/2} \quad (i = 1, 2, \ldots n \text{ and } p = 1, 2, \ldots n) \quad (18)$$

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

The distance matrix is obtained in the following form :

$$\begin{bmatrix} 0 & d_{12} & d_{13}.....d_{1n} \\ d_{21} & 0 & d_{23}.....d_{2n} \\ . & . & . \quad . \\ . & . & . \quad . \\ . & . & . \quad . \\ d_{n1} & d_{n2} & d_{n3}.....0 \end{bmatrix} \quad (19)$$

The minimum distance for each row (d_i, i=1,2,...n) is obtained from the distance matrix for computation of upper and lower limits (C.D.) as indicated below.

$$C.D. = \bar{d} \pm 2\,\sigma_d \qquad (20)$$

Where $\bar{d} = \sum_{i=1}^{n} \frac{di}{n}$ and $\sigma_d = \left\{ \sum_{i=1}^{n} \frac{(d_i - \bar{d})^2}{n} \right\}$

The distance matrix was used for fixing targets for indicators of low developed districts in selected sectors (Appendix B1, C1, D1 & E1). For setting out the targets, for example, for district A, the model districts were identified on the basis of composite index lower than that of district A and their individual distance with district A not exceeding the upper limit of C.D. served as model districts for district A on all the indicators in all four selected sectors. Therefore, the arithmetic mean of the original value of the indicator of model districts was computed. The mean value so computed was referred to as potential target for district A for a given indicator. This procedure was repeated for each district for all indicators considered. The districts for which no model district could be identified were considered as better developed districts in different sectors of development.

To set the potential targets for poorly developed districts the analysis was carried out for the latest available data i.e. for the year 1996-97. The indicators of low developed districts with actual value below their respective potential targets were the indicators which needed improvements. Groups of such indicators were regarded as the factors causing regional imbalances.

4. RESULTS AND DISCUSSION

In order to achieve the objectives of the study, the required data were collected from different secondary sources and analysed using suitable statistical techniques. The pertinent findings so obtained have been categorised and reported under the following major sections:

4.1 Identification of factors responsible for development in selected sectors :

4.1.1 Identification of factors responsible for development in agricultural sector :

a) Year 1980-81

b) Year1990-91

c) Year 1996-97

4.1.2 Identification of factors responsible for development in industrial sector :

a) Year 1980-81

b) Year1990-91

c) Year 1996-97

4.1.3 Identification of factors responsible for development in infrastructural sector :

a) Year 1980-81

b) Year1990-91

c) Year 1996-97

4.1.4 Identification of factors responsible for development in socio-economic sector :

a) Year 1980-81

b) Year1990-91

c) Year 1996-97

4.2 Construction of composite indices of development for each district of Rajasthan :

4.2.1 Year 1980-81

4.2.2 Year 1990-91

4.2.3 Year 1996-97

4.3 Classification of districts on the basis of their development :

4.3.1 Year 1980-81

4.3.2 Year 1990-91

4.3.3 Year 1996-97

4.4 Significance of overall change in development indices over selected three points of time :

4.4.1 Significance of change in agricultural development.

4.4.2 Significance of change in industrial development.

4.4.3 Significance of change in infrastructural development.

4.4.4 Significance of change in socio-economic development.

4.4.5 Significance of change in overall development.

4.5 Relationship between the development of different sectors.

4.6 Factors causing regional imbalances and strategy for the development in Rajasthan.

4.1 IDENTIFICATION OF FACTORS RESPONSIBLE FOR DEVELOPMENT IN AGRICULTURAL, INDUSTRIAL, INFRASTRUCTURAL AND SOCIO-ECONOMIC SECTORS

This section deals with identification of factors responsible for development in agricultural, industrial, infrastructural and socio-economic sectors. The data for the indicators (variables) depicting the progress of development in these four sectors were collected separately for three points of time i.e. 1980-81, 1990-91 and 1996-97. There were 47 variables in total, out of which 21 from agricultural, 8 from industrial, 7 from infrastructural and 11 from socio-economic sector were taken in the present study to identify the factors responsible for

development in all four sectors individually. The method principal component of factor analytic technique was used for identification of factors. The same method was used by Narain *et al.* (1991) in their study on 'Statistical Evaluation of Development on Socio-economic Front' undertaken over two period of time i.e. 1971-72 and 1981-82 for 17 major states of India.

4.1.1 Identification of Factors Responsible for Development in Agricultural Sector

Agricultural sector plays a very important role in the economy of Rajasthan state. Agriculture is expected to provide a bulk of employment to the labour force. In the improved practices of cultivation, emphasis is laid on irrigation, multiple cropping and adoption of high yielding production with creation of greater employment avenues. In a state with agrarian economy like Rajasthan, animal resource development activities also play an important role. These activities have varied benefits prominently providing nutrition to the people and generation of employment opportunities.

An attempt has been made to identify the factors responsible for development in agricultural sector. For this purpose 21 indicators were taken in the study for three selected points of time i.e. 1980-81, 1990-91 and 1996-97.

(a) Identification of factors responsible for development in agricultural sector for the year 1980-81

Data in table 4.1 depicts normal varimax solution for 21 indicators of agricultural sector for the year 1980-81. The table illustrates that there are six independent factors identified crucial for agricultural development. These factors collectively explained 85.6 per cent of total variance. The table shows that the first factor has

Table 4.1 : Normal varimax solution for variables of Agricultural sector (1980-81)

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
AG1	0.42994	0.76401	0.19661	0.31273	-0.10028	-0.05469
AG2	-0.20368	0.34471	0.41872	0.47099	-0.57774	-0.05900
AG3	0.66510	0.54231	0.19021	-0.05015	0.27595	-0.23504
AG4	0.03767	0.28055	0.87394	0.23862	0.07018	-0.02228
AG5	0.69761	0.37250	0.08304	-0.23050	0.46203	-0.21263
AG6	-0.33164	-0.53301	-0.28820	-0.51317	-0.21863	0.16730
AG7	0.04954	0.31365	0.06372	0.17983	0.86957	-0.16557
AG8	-0.03982	0.56059	0.56475	0.19314	0.23764	-0.00274
AG9	0.86353	0.09208	-0.21027	0.05181	-0.07873	0.01948
AG10	0.32276	-0.15455	0.50124	-0.07743	0.69957	-0.05720
AG11	-0.12055	0.07203	0.89561	-0.07364	0.02905	-0.19116
AG12	0.48039	0.31441	0.10657	0.62025	0.11857	-0.10327
AG13	0.90282	-0.03360	0.07726	-0.09582	0.12604	0.01998
AG14	-0.11340	-0.14854	-0.03866	-0.01869	-0.06138	0.94288
AG15	0.63829	0.45923	0.37618	0.22314	-0.06439	-0.07522
AG16	0.12485	0.77185	-0.06584	-0.00090	0.12321	-0.01868
AG17	-0.09276	-0.01290	-0.22721	-0.43333	-0.14591	0.79875
AG18	0.42533	0.76747	0.18997	0.30733	-0.10082	-0.05296
AG19	-0.26244	0.83879	0.26357	-0.00271	0.01254	-0.12738
AG20	-0.16338	0.04961	0.00747	0.89988	-0.04772	-0.16064
AG21	0.78343	-0.03670	-0.32575	0.12762	0.28601	-0.20491
Eigen value	7.76	3.85	2.19	1.81	1.34	1.02
Percentage variance	36.9	18.4	10.4	8.6	6.4	4.9
Cumulative percentage	36.9	55.3	65.7	74.3	80.7	85.6

The critical value of factor loading at 1 per cent level of significance is 0.570 and underlined values indicate significant loadings

AG1 - Percentage of area sown more than once to net area sown
AG2 - Percentage of gross area sown under foodgrains to total cropped area
AG3 - Percentage of net area irrigated to net area sown
AG4 - Percentage of forest area to total geographical area
AG5 - Percentage of gross irrigated area to gross area sown
AG6 - Average size of operational holding (hectares)
AG7 - Percentage of area under commercial crops to total cropped area
AG8 - Number of cows and buffaloes per 1000 human population
AG9 - Production of foodgrains (000' tons)
AG10 - Percentage of agriculture workers to the total work force
AG11 - Forest area per lakh of population
AG12 - Gross value from agriculture per hectare at current prices
AG13 - Gross value of agriculture output per capita (rural) at current prices
AG14 - Fertilizer consumption in terms of nutrients (tons.)
AG15 - Yield in kg/hectare of foodgrains
AG16 - Total cattle (00)
AG17 - Irrigation intensity
AG18 - Cropping intensity
AG19 - Percentage of animal power
AG20 - Use of pumps and oil engines per thousand of population
AG21 - Use of tractors per thousand of population

significantly high loadings on the variables namely percentage of net area irrigated to net area sown, percentage of gross irrigated area to gross area sown, production of food grains, gross value of agriculture output per capita (rural) at current prices, yield in kg/hectare of foodgrains and use of tractors per thousand of human population. This factor explained 36.9 per cent of total variance.

The second factor has significantly high loadings on the variable like percentage of area sown more than once to net area sown, total cattle ('00), cropping intensity and percentage of animal power. This factor explained 18.4 per cent of total variance. The table further reveals that the third factor explained 10.4 per cent variance and has significantly high loading on variables viz. percentage of forest area to total geographical area and forest area per lakh of population. The rotated fourth factor loads significantly on use of pumps and oil engines per thousands of human population and gross value from agriculture per hectare at current prices during 1980-81. This factor explained 8.6 per cent of total variance.

Fifth factor has significantly high loadings on two variables namely percentage of area under commercial crops to total cropped area and percentage of agricultural workers to the total work force explaining 6.4 per cent of total variance. The table 4.1 further reveals that the sixth factor has high loadings on two variables namely fertilizer consumption in terms of nutrients (tons.) and irrigation intensity. This factor explained 4.9 per cent of total variance.

(b) Identification of factors responsible for development in agricultural sector for the year 1990-91

Data in Table 4.2 depicts normal varimax solution for 21 indicators of agricultural sector for the year 1990-91. The perusal of table shows that there are six independent factors identified crucial

Table 4.2 : Normal varimax solution for variables of Agricultural sector (1990-91)

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
AG1	-0.14073	0.12674	0.02384	0.01457	0.94640	0.11970
AG2	-0.39544	-0.10613	0.63976	0.11426	0.01247	-0.45501
AG3	0.85817	0.04904	0.25268	0.26589	-0.09700	0.08473
AG4	0.42442	0.65607	0.31200	0.31969	0.08465	0.07425
AG5	0.89325	0.27696	0.02315	0.09419	-0.08918	0.10581
AG6	-0.64668	-0.18138	-0.40122	-0.08822	-0.00619	0.39240
AG7	0.91606	-0.03579	-0.13154	-0.07245	-0.11530	0.07026
AG8	-0.13468	0.73905	-0.29436	0.11647	0.03760	-0.36963
AG9	0.46656	-0.20519	-0.08448	0.80413	0.06371	0.01102
AG10	0.05196	0.76368	-0.24958	-0.12652	-0.13470	0.33407
AG11	0.30619	0.76639	0.40670	-0.15063	0.03483	0.07939
AG12	0.75420	0.17573	-0.05768	0.33269	-0.01419	-0.01364
AG13	0.69965	-0.00340	-0.20389	0.45266	-0.04746	0.27521
AG14	0.47633	0.11037	-0.22288	0.70935	0.01643	0.28778
AG15	0.81938	0.23423	0.31378	0.28436	-0.04130	-0.13573
AG16	0.07060	0.09273	0.49772	0.74546	-0.07874	-0.01518
AG17	-0.01380	0.00445	0.05745	0.09467	0.28828	0.69997
AG18	-0.05645	-0.11976	0.06126	-0.01646	0.91229	-0.08683
AG19	0.05467	-0.04251	0.91482	-0.03344	0.10591	0.05609
AG20	-0.12930	-0.12199	0.12262	-0.11595	0.40593	0.79094
AG21	0.77292	-0.22030	-0.36873	0.11493	-0.05475	0.13867
Eigen value	7.33	3.03	2.33	1.96	1.56	1.31
Percentage variance	34.9	14.4	11.1	9.3	7.5	6.3
Cumulative percentage	34.9	49.3	60.4	69.7	77.2	83.5

The critical value of factor loading at 1 per cent level of significance is 0.570 and underlined values indicate significant loadings

AG1 - Percentage of area sown more than once to net area sown
AG2 - Percentage of gross area sown under foodgrains to total cropped area
AG3 - Percentage of net area irrigated to net area sown
AG4 - Percentage of forest area to total geographical area
AG5 - Percentage of gross irrigated area to gross area sown
AG6 - Average size of operational holding (hectares)
AG7 - Percentage of area under commercial crops to total cropped area
AG8 - Number of cows and buffaloes per 1000 human population
AG9 - Production of foodgrains (000' tons)
AG10 - Percentage of agriculture workers to the total work force
AG11 - Forest area per lakh of population
AG12 - Gross value from agriculture per hectare at current prices
AG13 - Gross value of agriculture output per capita (rural) at current prices
AG14 - Fertilizer consumption in terms of nutrients (tons.)
AG15 - Yield in kg/hectare of foodgrains
AG16 - Total cattle (00)
AG17 - Irrigation intensity
AG18 - Cropping intensity
AG19 - Percentage of animal power
AG20 - Use of pumps and oil engines per thousand of population
AG21 - Use of tractors per thousand of population

for agricultural development during this period which explained 83.5 per cent of total variance collectively.

The table reveals that the first factor has significantly high loadings on percentage of gross area sown under food grains to total cropped area, percentage of gross irrigated area to gross area sown, percentage of area under commercial crops to total cropped area, gross value from agriculture per hectare at current prices, gross value of agriculture output per capita (rural) at current prices, yield in kg/hect. of foodgrains and use of tractors per thousand of human population. This factor explained 34.9 per cent of total variance.

Further, it is observed from Table 4.2 that the second factor has high loadings on the variables namely percentage of forest area to total geographical area, number of cows and buffaloes per thousands of human population, percentage of agriculture workers to the total work force and forest area per lakh of human population. This factor explained 14.4 per cent of total variance.

It can be seen from the Table 4.2 that the third factor which explained 11.1 per cent of total variance has significant loadings on the variables namely percentage of animal power and percentage of gross area sown under food grains to total cropped area. The fourth factor has significantly high loadings on production of food grains, fertilizer consumption in terms of nutrients and total cattle. The total variance explained by this factor came out to be 9.3 per cent.

Perusal of table indicates that the fifth factor has significant loadings on the variables namely percentage of area sown more than once to net area sown and cropping intensity. This factor explained 7.5 per cent of total variance. It can be observed that the sixth factor has significant loadings on irrigation intensity and use of pumps and

oil engines per thousand of human population. This factor explained 6.3 per cent of total variance.

(c) Identification of factors responsible for development in agricultural sector for the year 1996-97

Data in the Table 4.3 reveals that there are five independent factors identified crucial during 1996-97 which explained 84.4 per cent of total variance collectively. The first factor has significantly high loadings on seven variables namely percentage of area sown more than once to net area sown, percentage of net area irrigated to net area sown, average size of operational holding, yield in kg/hectare of foodgrains, irrigation intensity, cropping intensity and use of pumps and oil engines. The variables i.e. average size of operational holding, and irrigation intensity were found to be negatively related with rest of the above variables. This indicates that average size of operational holding and irrigation intensity has not increased with the increase in the rest of the above variables. This factor explained 39 per cent of total variance.

It can be seen from the table that the second factor has high loadings on percentage of gross area sown under food grains to total cropped area, percentage of gross irrigated area to gross area sown, percentage of area under commercial crops to total cropped area, gross value of agriculture output per capita (rural) at current prices, fertilizer consumption in terms of nutrients (tons), percentage of animal power and use of tractors per thousands of human population. The percentage of animal power was observed to be negatively related with rest of above variables. This indicates that with increase in other variables there was decrease in the percentage of animal power. This factor explained 18.7 per cent of total variance.

Table 4.3 : Normal varimax solution for variables of Agricultural sector (1996-97)

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
AG1	0.87516	-0.04935	0.29024	019641	0.13387
AG2	0.25759	-0.82615	-0.16598	0.17666	-0.32320
AG3	0.64910	0.55105	0.42110	0.13277	0.08248
AG4	0.38998	-0.00801	0.86371	-0.04040	0.15063
AG5	0.55097	0.71700	-0.15898	-0.01962	0.12060
AG6	-0.88243	-0.09769	-0.32524	0.00360	0.13966
AG7	0.21183	0.88101	0.14231	-0.07772	-0.04398
AG8	0.08231	-0.29942	0.11167	0.28929	0.79730
AG9	0.27739	0.46748	-0.15090	0.73151	-0.25931
AG10	-0.01399	0.20396	0.13718	-0.14540	0.90114
AG11	0.13125	-0.00998	0.89211	-0.07373	0.36071
AG12	0.35886	0.33771	0.61146	0.16240	-0.24815
AG13	0.28182	0.68211	0.25673	0.25055	-0.15658
AG14	0.09448	0.67229	-0.02353	0.63736	0.08795
AG15	0.62507	0.42305	0.50388	0.28488	-0.09484
AG16	-0.02660	-0.20036	0.10914	0.89169	0.13944
AG17	-0.78401	-0.30180	0.04069	-0.08402	0.00129
AG18	0.87467	-0.04719	0.29570	0.19553	0.12924
AG19	0.28996	-0.60802	0.30473	0.14067	0.32874
AG20	0.71272	0.16819	0.11661	-0.33470	-0.05611
AG21	0.33419	0.80944	0.02644	0.12554	-0.14684
Eigen value	8.20	3.91	2.27	2.06	1.28
Percentage variance	39.0	18.7	10.8	9.8	6.1
Cumulative percentage	39.0	57.7	68.5	78.3	84.4

The critical value of factor loading at 1 per cent level of significance is 0.556 and underlined values indicate significant loadings

AG1 - Percentage of area sown more than once to net area sown
AG2 - Percentage of gross area sown under foodgrains to total cropped area
AG3 - Percentage of net area irrigated to net area sown
AG4 - Percentage of forest area to total geographical area
AG5 - Percentage of gross irrigated area to gross area sown
AG6 - Average size of operational holding (hectares)
AG7 - Percentage of area under commercial crops to total cropped area
AG8 - Number of cows and buffaloes per 1000 human population
AG9 - Production of foodgrains (000' tons)
AG10 - Percentage of agriculture workers to the total work force
AG11 - Forest area per lakh of population
AG12 - Gross value from agriculture per hectare at current prices
AG13 - Gross value of agriculture output per capita (rural) at current prices
AG14 - Fertilizer consumption in terms of nutrients (tons.)
AG15 - Yield in kg/hectare of foodgrains
AG16 - Total cattle (00)
AG17 - Irrigation intensity
AG18 - Cropping intensity
AG19 - Percentage of animal power
AG20 - Use of pumps and oil engines per thousand of population
AG21 - Use of tractors per thousand of population

Perusal of Table 4.3 further depicts that the third factor which explained 10.8 per cent of total variance has significantly high loadings on three variables namely percentage of forest area to total geographical area, forest area per lakh of population and gross value from agriculture per hectare at current prices. The table further reveals that the fourth factor has significantly high loadings on production of foodgrains ('000 tons), fertilizer consumption and total cattle which explained 9.8 per cent of total variance. The fifth factor was observed to load significantly on the variables like number of cows and buffaloes and percentage of agriculture workers to the total work force, explaining 6.1 per cent of total variance.

Srivastava (1998) used the similar technique in his study on 'Development and Disparity Agriculture in North East India' which included data related to 19 indicators of agricultural sector for sixty districts of North Eastern states. Study revealed that five factors were identified crucial which explained 66.9 per cent of total variance. The variance explained by first, second, third, fourth and fifth factor was 18.1, 17.6, 13.7, 9.3 and 7.7 per cent respectively. Rao (1984) used 14 indicators of agricultural sector in Karnataka and brought out two crucial factors explaining the bulk of variation in agriculture development. The first factor explained 55 per cent of the total variance and recorded high factor loadings on variables like cropping intensity, oil engines and electric pumps. The second factor recorded high factor loadings on the intensity of irrigation, high yielding varieties, animal drawn carts and tractors which explained remaining 45 per cent variance.

Data presented in the Table 4.4 depicts the percentage of total variance explained by each factor from agricultural sector for all the three points of time. The close view of table reveals that a broad and

fair representation of the whole spectrum of inter-district disparities for the twenty one variables from agricultural sector has been made in a simple structure of five or six orthogonal factors which accounts for more than 83 per cent of the total variance.

Table 4.4 : Percentage of total variance explained by each factor from agricultural sector

Factor	Year								
	1980-81			1990-91			1996-97		
	Eigen value	Per cent	Cumulative per cent	Eigen value	Per cent	Cumulative per cent	Eigen value	Per cent	Cumulative per cent
1	7.76	36.9	36.9	7.33	34.9	34.9	8.20	39.0	39.0
2	3.85	18.4	55.3	3.03	14.4	49.3	3.91	18.6	57.7
3	2.19	10.4	65.7	2.33	11.1	60.4	2.27	10.8	68.5
4	1.81	08.6	74.3	1.96	9.3	69.7	2.06	9.8	78.3
5	1.34	06.4	80.7	1.56	7.5	77.2	1.28	6.1	84.4
6	1.02	04.9	85.6	1.31	6.3	83.5	-	-	-

The measure of communality (h^2) i.e. the proportion of the variance of a variable common to other variables in the set, reflects percentage of inter-district variation for each of the 21 variables explained by all the 6 factors during 1980-81 and 1990-91 and 5 factors during 1996-97 as indicated in the Table 4.5 from agricultural sector. A perusal of the communality values indicate that for 19 variables for 1980-81 and 1990-91 and 16 variables for 1996-97, the communalities exceed 75 per cent. Thus there is a fairly high degree of representation of all the twenty one considered variables for agricultural sector by the six factors identified crucial during 1980-81, 1990-91 and five factors identified crucial for the study during 1996-97.

Table 4.5 : Percentage of variance of each variable accounted by all the crucial components from agricultural sector

Variable	Communality (h^2)		
	1980-81	1990-91	1996-97
AG1	91.8	94.7	90.9
AG2	89.5	79.7	91.2
AG3	90.6	89.0	92.7
AG4	90.6	82.3	92.2
AG5	94.4	90.3	86.6
AG6	81.6	77.4	91.3
AG7	92.1	88.1	84.9
AG8	72.6	80.2	82.8
AG9	80.8	91.8	92.1
AG10	87.8	79.4	89.4
AG11	86.5	87.7	94.9
AG12	75.0	71.4	70.5
AG13	84.8	81.4	69.8
AG14	92.9	87.5	87.5
AG15	81.9	92.6	91.4
AG16	63.1	82.3	86.7
AG17	90.7	58.5	71.4
AG18	91.3	86.1	91.0
AG19	85.8	85.7	67.4
AG20	86.7	85.0	66.5
AG21	86.1	81.7	80.5

4.1.2 Identification of Factors Responsible for Development in Industrial Sector

The state of Rajasthan has made concerted efforts in promoting industrial growth during different plan periods. The state has a good number of small scale industries, cottage industries, Handloom industries and Khadi and village industries. These industries have played a key role in shaping a self-reliant rural economy through creation of massive gainful employment for the rural poor.

In the present study 8 indicators have been included to identify the factors responsible for development in industrial sector. The analysis has been carried out for three points of time i.e. 1980-81, 1990-91 and 1996-97 separately for the identification of crucial factors.

(a) Identification of factors responsible for development in industrial sector for the year 1980-81

Data in Table 4.6 reveals that during period 1980-81 two factors have been identified crucial for development in industrial sector, which explained 75.7 per cent of total variance.

Perusal of the table reveals that the first factor has significantly high loadings on five variables namely number of workers employed in working factories, number of workers per lakh of population in working factories, per capita value added by manufacturing in Rs., gross output in industry per capita, and industrial consumption of electricity per capita. This factor explained 55.8 per cent of total variance.

The Table 4.6 further depicts that the second factor which has significantly high loadings on percentage of people who got industrial loan and percentage amount disbursed as industrial loan. This factor explained 19.9 per cent of total variance.

Table 4.6 : Normal varimax solution for variables from industrial sector (1980-81)

Variable	Factor 1	Factor 2
IND1	0.69952	0.50693
IND2	0.77091	0.51068
IND3	0.92058	0.26316
IND4	0.19916	0.54361
IND5	0.94477	0.26905
IND6	0.82023	-0.27814
IND7	-0.12672	0.82116
IND8	0.27400	0.78070
Eigen value	4.46	1.59
Percentage variance	55.8	19.9
Cumulative percentage	55.8	75.7

The critical value for factor loading is 0.57 at 1 per cent level of significance and underlined values indicate significant loadings

IND1 - Number of workers employed in working factories
IND2 - Number of workers per lakh population in working factories
IND3 - Per capita value added by manufacturing in Rs
IND4 - Percentage of manufacturing industry workers to the total work force
IND5 - Gross output in industry per capita
IND6 - Industrial consumption of electricity per capita
IND7 - Percentage of people who got industrial loan
IND8 - Percentage amount disbursed as industrial loan

(b) Identification of factors responsible for development in industrial sector for the year 1990-91

The normal varimax solution for variables from industrial sector for the year 1990-91 has been presented in the Table 4.7. The table illustrates that three factors have been identified crucial for development in industrial sector during the period 1990-91. All the three factors explained 86.1 per cent of total variance collectively.

The table reveals that the first factor has significantly high loadings on three variables namely number of workers employed in

working factories, number of workers per lakh population in working factories and percentage of manufacturing industry workers to the total work force. This factor explained 56.5 per cent of total variance.

Table 4.7 : Normal varimax solution for variables from industrial sector (1990-91)

Variable	Factor 1	Factor 2	Factor 3
IND1	0.93202	0.11573	0.08545
IND2	0.90230	0.36235	0.07353
IND3	0.35886	0.78374	0.17124
IND4	0.84459	0.23953	0.13737
IND5	0.49302	0.84677	0.09587
IND6	0.04930	0.94126	0.15722
IND7	0.00289	0.04760	0.94032
IND8	0.30756	0.39225	0.68323
Eigen value	4.52	1.33	1.03
Percentage variance	56.5	16.7	12.9
Cumulative percentage	56.5	73.1	86.1

The critical value for factor loading at 1 per cent level of significance is 0.570 and underlined values indicate significant loadings

IND1 - Number of workers employed in working factories

IND2 - Number of workers per lakh population in working factories

IND3 - Per capita value added by manufacturing in Rs

IND4 - Percentage of manufacturing industry workers to the total work force

IND5 - Gross output in industry per capita

IND6 - Industrial consumption of electricity per capita

IND7 - Percentage of people who got industrial loan

IND8 - Percentage amount disbursed as industrial loan

The second factor which explained 16.7 per cent of total variance has significantly high loadings on per capita value added by

manufacturing in Rs., gross output in industry per capita and industrial consumption of electricity per capita.

The Table 4.7 further reveals that the third factor common to the second factor of the year 1980-81, loads heavy on variables like percentage of people who got industrial loan and percentage amount disbursed as industrial loan. This factor explained 12.9 per cent of the total variance.

(c) Identification of factors responsible for development in industrial sector for the year 1996-97

The normal varimax solution for variables from industrial sector for the year 1996-97 has been presented in Table 4.8.

The table shows that two factors were identified crucial for the industrial development during the period 1996-97. These two factors explained 69.8 per cent of total variance collectively. It can be seen from the table that the first factor has significantly high loadings on number of workers per lakh population in working factories, percentage of manufacturing industry workers to the total work force, gross output in industry per capita, industrial consumption of electricity per capita and percentage amount disbursed as industrial loan. This factor explained 56.5 per cent of total variance. The Table 4.8 further reveals that the second factor has significantly high loadings on the variable namely percentage of people who got industrial loan. This factor explained 13.2 per cent of total variance.

Information presented in Table 4.9 shows the percentage of total variance explained by each factor from industrial sector. Table illustrates that a broad and fair representation of the whole spectrum of inter-district disparities for the eight variables from industrial sector has been made in a simple structure of two or three orthogonal factors which account for 69.8 per cent of the total variance.

Table 4.8 : Normal varimax solution for variables from industrial sector (1996-97)

Variable	Factor 1	Factor 2
IND1	0.79578	0.44848
IND2	0.85142	0.38844
IND3	0.37153	0.01829
IND4	0.82299	0.42768
IND5	0.92392	0.01271
IND6	0.74916	-0.09967
IND7	-0.05583	0.87381
IND8	0.61224	0.55298
Eigen value	4.52	1.06
Percentage variance	56.5	13.2
Cumulative percentage	56.5	69.8

The critical value for factor loading at 1 per cent level of significance is 0.570 and underlined values indicate significant loadings

IND1 - Number of workers employed in working factories
IND2 - Number of workers per lakh population in working factories
IND3 - Per capita value added by manufacturing in Rs
IND4 - Percentage of manufacturing industry workers to the total work force
IND5 - Gross output in industry per capita
IND6 - Industrial consumption of electricity per capita
IND7 - Percentage of people who got industrial loan
IND8 - Percentage amount disbursed as industrial loan

Table 4.9 : Percentage of total variance explained by each factor from industrial sector

Factor	Year								
	1980-81			1990-91			1996-97		
	Eigen value	Per cent	Cumulative per cent	Eigen value	Per cent	Cumulative per cent	Eigen value	Per cent	Cumulative per cent
1	4.46	55.8	55.8	4.52	56.5	56.5	4.52	56.5	56.5
2	1.59	19.9	75.7	1.33	16.7	73.1	1.06	13.2	69.6
3	-	-	-	1.03	12.9	86.4	-	-	-

Data in Table 4.10 illustrates the measure of communalities which reflects the percentage of inter-district variation for each of the eight variables explained by two factors during 1980-81 and 1996-97 and three factors during 1990-91. A perusal of the communality values indicate that for 5 variables in the year 1980-81 and 1996-97 and 7 variables for 1990-91, the communalities exceeds 75 per cent. Thus there is fairly high degree of representation of all the eight considered variables for industrial sector by the two factors identified crucial during 1980-81, 1996-97 and three factors identified crucial for the study during 1990-91.

Table 4.10 : Percentage of variance of each variable accounted by all the crucial components from industrial sector

Variable	Communality (h^2)		
	1980-81	1990-91	1996-97
IND1	85.8	88.9	83.4
IND2	85.5	95.1	87.6
IND3	91.7	77.2	13.8
IND4	33.5	79.0	86.0
IND5	96.5	97.0	85.4
IND6	75.0	91.3	57.1
IND7	69.0	88.6	76.7
IND8	68.4	71.5	68.0

Rao (1984) also identified the factors of industrial development in Karnataka using eight indicators. The findings brought 3 factors which together explained about 84 per cent of the total variance. Out of these factors, the first factor explained 38 per cent of total variance and represented all types of industrial units – small scale, large scale with heavy investment and low investment and with heavy electricity

consumption and low electricity consumption. The second factor explained 26 per cent of total variance and represented only those industrial units which had heavy investments. The third factors which explained 20 per cent of variance represented industrial development owing to the use of electricity.

4.1.3 Identification of Factors Responsible for Development in Infrastructural Sector

The infra-structural facilities play a catalytic role in the process of development, hence great emphasis should be placed on infrastructural facilities like education, health, roads and communication in the programmes of economic development. Various schemes have been implemented under the successive five-year plans for the development of the infrastructure in the various districts of the Rajasthan state.

In order to identify the factors responsible for development in infra-structural sector, 7 variables were included in the study and analysis has been made on the data collected for three points of time i.e. 1980-81, 1990-91 and 1996-97.

(a) Identification of factors responsible for development in infra-structural sector for the year 1980-81

The normal varimax solution for variables from infra-structural sector for the year 1980-81 has been presented in the Table 4.11. The table indicates that three factors have been identified crucial for development in infrastructural sector during 1980-81. All the three factors explained 71.6 per cent of total variance collectively. The perusal of table reveals that the first factor has significant loadings on number of civil veterinary hospitals and number of civil veterinary dispensaries. This factor explained 39.2 per cent of total variance.

The perusal of Table 4.11 further depicts that the second factor has significantly high loadings on two variables namely number of high schools senior secondary schools per thousands of school going children and road length (in km) per 100 square km. of geographical area. This factor explained 39.2 per cent of total variance.

Table 4.11 : Normal varimax solution for variables from infrastructural sector (1980-81)

Variable	Factor 1	Factor 2	Factor 3
INF1	-0.53662	0.36032	0.34568
INF2	0.12451	0.00653	0.60668
INF3	-0.24255	0.90259	-0.05426
INF4	-0.02942	0.15158	0.82097
INF5	0.86532	-0.23969	0.20132
INF6	0.87765	-0.06602	0.15686
INF7	-0.11910	0.91727	-0.10710
Eigen value	2.74	1.18	1.08
Percentage variance	39.2	16.9	15.5
Cumulative percentage	39.2	56.1	71.6

The critical value for factor loading at 1 per cent level of significance is 0.590 and underlined values indicate significant loadings

INF1 - Number of hospitals per lakh of population

INF2 - Number of beds in hospitals per lakh of population

INF3 - Number of high/ senior secondary schools per thousand school going children

INF4 - Number of post offices per lakh of population

INF5 - Number of civil veterinary hospitals

INF6 - Number of civil veterinary dispensaries

INF7 - Road length per 100 square km of geographical area (in km)

It can be observed from Table 4.11 that the third factor which explained 15.5 per cent of total variance has significant loadings on two variables namely number of beds in hospitals per lakh of population and number of post offices per lakh of population.

(b) Identification of factors responsible for development in infra-structural sector for the year 1990-91

The factor loadings of factors identified for the infra-structural development during 1990-91 has been presented in the Table 4.12.

Table 4.12 : Normal varimax solution for variables from infra-structural sector (1990-91)

Variable	Factor 1	Factor 2
INF1	0.70733	-0.54507
INF2	0.51513	0.23816
INF3	0.51423	0.12295
INF4	-0.03213	0.77191
INF5	0.31518	0.79935
INF6	0.66416	0.60134
INF7	0.84259	0.08413
Eigen value	2.70	1.56
Percentage variance	38.5	22.3
Cumulative percentage	38.5	60.8

The critical value for factor loading at 1 per cent level of significance is 0.540 and underlined values indicate significant loadings

INF1 - Number of hospitals per lakh of population
INF2 - Number of beds in hospitals per lakh of population
INF3 - Number of high/ senior secondary schools per thousand school going children
INF4 - Number of post offices per lakh of population
INF5 - Number of civil veterinary hospitals
INF6 - Number of civil veterinary dispensaries
INF7 - Road length per 100 square km of geographical area (in km)

In this year two factors were identified crucial which explained 60.8 per cent of total variance collectively. The table depicts that the first factor has significantly high loadings on three variables namely number of hospitals per lakh of population, number of civil veterinary dispensaries and road length per 100 square km. of geographical area. This factor explained 38.5 per cent of total variance.

The Table 4.12 further reveals that the second factor has significant loadings on number of post offices per lakh of population and number of civil veterinary hospitals. This factor explained 22.3 per cent of total variance.

(c) Identification of factors responsible for development in infra-structural sector for the year 1996-97

The factor loadings of three factors identified crucial for the infra-structural development during the year 1996-97 have been presented in the Table 4.13. These three factors explained 72.9 per cent of total variance. It is observed from the table that the first factor loads significantly on three variables namely number of hospitals per lakh of population, number of beds in hospitals per lakh of population and number of high/ senior secondary schools per 1000 school going children. This factor explained 33.9 per cent of the total variance.

The table reveals that the second factor has significantly high loadings on number of civil veterinary dispensaries and road length per 100 square km of geographical area. This factor explained 23.8 per cent of the total variance.

The table further indicates that the third factor which explained 15.1 per cent of total variance has significant loadings on two variables namely number of post offices per lakh of population and number of civil veterinary hospitals. This third factor is same as in the year 1990-91.

Table 4.13 : Normal varimax solution for variables from infrastructural sector (1996-97)

Variable	Factor 1	Factor 2	Factor 3
INF1	0.80023	-0.20976	0.10212
INF2	0.73187	-0.07715	0.41802
INF3	0.71188	0.47564	-0.21434
INF4	-0.08672	-0.05245	0.74057
INF5	0.09134	0.22779	0.78938
INF6	0.06463	0.76963	0.50338
INF7	-0.15121	0.88817	0.08433
Eigen value	2.37	1.67	1.06
Percentage variance	33.9	23.8	15.1
Cumulative percentage	33.9	57.7	72.9

The critical value for factor loading at 1 per cent level of significance is 0.590 and underlined values indicate significant loadings

INF1 - Number of hospitals per lakh of population

INF2 - Number of beds in hospitals per lakh of population

INF3 - Number of high/ senior secondary schools per thousand school going children

INF4 - Number of post offices per lakh of population

INF5 - Number of civil veterinary hospitals

INF6 - Number of civil veterinary dispensaries

INF7 - Road length per 100 square km of geographical area (in km)

It can be seen from the Table 4.14 that a broad and fair representation of the whole spectrum of inter-district disparities for the seven variables from infra-structural sector has been made in a simple structure of two or three orthogonal factors which accounts for more than 60 per cent of the total variance.

Table 4.14 : Percentage of total variance explained by each factor from infrastructural sector

Factor	Year								
	1980-81			1990-91			1996-97		
	Eigen value	Per cent	Cumulative per cent	Eigen value	Per cent	Cumulative per cent	Eigen value	Per cent	Cumulative per cent
1	2.74	39.2	39.2	2.70	38.5	38.5	2.37	33.9	33.9
2	1.18	16.9	56.1	1.56	22.3	60.8	1.67	23.8	57.7
3	1.08	15.5	71.6	-	-	-	1.06	15.1	72.9

Data presented in Table 4.15 depicts the measure of communalities which reflects the percentage of inter-district variation for each of the seven variables explained by all the three factors during 1980-81 and 1996-97 and two factors during 1990-91. A perusal of the communalities value indicate that for five variables for 1980-81 and 1996-97 and four variables for 1990-91, the communalities exceed about 70 per cent. Thus there is a fair degree of representation of all the seven considered variables for infra-structural sector by the three factors identified crucial during 1980-81 and 1996-97 and two factors during 1990-91.

Table 4.15 : Percentage of variance of each variable accounted by all the crucial components from industrial sector

Variable	Communality (h^2)		
	1980-81	1990-91	1996-97
INF1	53.7	79.7	69.5
INF2	38.4	32.2	71.6
INF3	87.6	27.9	77.9
INF4	69.8	59.7	55.9
INF5	84.7	73.8	68.3
INF6	79.9	80.2	85.0
INF7	86.7	71.7	81.9

4.1.4 Identification of Factors Responsible for Development in Socio-economic Sector

Socio-economic development can be identified with the improvement in standard of living which has remained basic objective of India's planning. Socio-economic development in a region is related to the facilities of education, transport, communication, electricity, financial institutions etc. Present study attempts to identify the factors responsible for development in socio-economic sector. For this purpose 11 indicators were included in the study.

(a) Identification of factors responsible for development in socio-economic sector for the year 1980-81

Data in Table 4.16 depicts that during this period, four factors have been identified crucial for development in socio-economic sector. These factors explained 83.1 per cent of total variance collectively. The normal varimax solution for variables from socio-economic sector has been presented in the Table 4.16. The table reveals that the first factor has significantly high loadings on six variables namely urban population, percentage of main workers to total population, different types of vehicles registered, per capita deposit in scheduled banks, number of commercial vehicles per lakh of population and number of co-operative societies per lakh of human population. This factor explained 42.5 per cent of total variance.

The table reveals that the second factor has significantly high loadings on density of population per square km. of area and percentage of villages electrified during the year 1980-81. This factor explained 17.8 per cent of total variance. Further, the third factor which explained 13.0 per cent of total variance loads significantly on average population per bank (in '000).

Table 4.16 : Normal varimax solution for variables from socio-economic sector (1980-81)

Variable	Factor 1	Factor 2	Factor 3	Factor 4
SOE1	0.03988	0.80708	0.39439	0.16546
SOE2	0.82077	0.20170	0.46360	0.15624
SOE3	0.76542	0.47257	-0.04637	0.11840
SOE4	-0.01655	-0.56245	0.08735	-0.39370
SOE5	0.76626	0.07813	0.48637	0.34417
SOE6	0.90163	0.15358	0.12461	0.11408
SOE7	0.71890	-0.12881	-0.11816	0.55837
SOE8	0.70125	-0.39320	-0.04485	-0.35482
SOE9	0.20724	0.07008	0.24127	0.86658
SOE10	0.17760	0.81712	-0.10976	-0.27542
SOE11	0.12927	-0.00159	0.96324	0.09342
Eigen value	4.67	1.96	1.42	1.08
Percentage variance	42.5	17.8	13.0	9.8
Cumulative percentage	42.5	60.3	73.3	83.1

The critical value of factor loadings at 1 per cent level of significance is 0.586 and underlined values indicate significant loadings.

SOE1 - Density of population per square km. of area

SOE2 - Urban population

SOE3 - Percentage of main workers to total population

SOE4 - Percentage literacy

SOE5 - Different types of vehicles registered

SOE6 - Per capita deposit in scheduled banks

SOE7 - Number of commercial vehicles per lakh of population

SOE8 - Number of co-operative societies per lakh of population

SOE9 - Number of villages connected to metalled roads

SOE10 - Percentage of villages electrified

SOE11 - Average population per bank (in thousand)

The perusal of Table 4.16 further depicts that the fourth factor has significant loadings on the variable i.e. number of villages connected to metalled roads. This factor explained 9.8 per cent of total variance.

(b) Identification of factors responsible for development in socio-economic sector for the year 1990-91

Three factors have been identified crucial for socio-economic development during the year 1990-91 as depicted in Table 4.17. These factors explained 69.1 per cent of total variance collectively. The loadings of all these three factors reveals that the first factor has significantly high loadings on variables viz., urban population, percentage literacy, different types of vehicles registered, per capita deposit in scheduled banks and number of commercial vehicles per lakh of population during the year 1990-91. This factor explained 38.6 per cent of total variance.

The table reveals that the second factor has significant loadings on three variables namely density of population per square km. of area, number of co-operative societies per lakh of human population and average population per bank (in 000). The variable i.e. number of co-operative societies was found to be negatively related with the rest two variables. This indicates that the districts with high density of population per square km. of area and average population per bank were having less number of co-operative societies per lakh of human population. This factor explained 18.8 per cent of total variance. The table further depicts that the third factor has significant loadings on number of villages connected to metalled roads and percentage of villages electrified. This factor explained 11.8 per cent of total variance.

Table 4.17 : Normal varimax solution for variables from socio-economic sector (1990-91)

Variable	Factor 1	Factor 2	Factor 3
SOE1	0.24197	0.70935	0.10613
SOE2	0.91660	0.15523	0.11426
SOE3	-0.18808	-0.43744	0.05005
SOE4	0.73401	0.07890	-0.17730
SOE5	0.88603	0.08903	0.24871
SOE6	0.95778	-0.01195	0.02659
SOE7	0.67526	-0.06859	0.41203
SOE8	0.46554	-0.60889	-0.15064
SOE9	0.38246	0.27640	0.79741
SOE10	0.19922	0.47131	-0.70467
SOE11	-0.20150	0.80604	-0.15523
Eigen value	4.24	2.06	1.29
Percentage variance	38.6	18.8	11.8
Cumulative percentage	38.6	57.3	69.1

The critical value of factor loadings at 1 per cent level of significance is 0.553 and underlined values indicate significant loadings

SOE1 - Density of population per square km. of area

SOE2 - Urban population

SOE3 - Percentage of main workers to total population

SOE4 - Percentage literacy

SOE5 - Different types of vehicles registered

SOE6 - Per capita deposit in scheduled banks

SOE7 - Number of commercial vehicles per lakh of population

SOE8 - Number of co-operative societies per lakh of population

SOE9 - Number of villages connected to metalled roads

SOE10 - Percentage of villages electrified

SOE11 - Average population per bank (in thousand)

(c) Identification of factors responsible for development in socio-economic sector for the year 1996-97

Data in Table 4.18 depicts that during the year 1996-97 four factors have been identified crucial for development in socio-economic sector explaining 74.7 per cent of total variance collectively. The factor loadings observed for each factor as presented in table reveals that the first factor has significantly high loadings on five variables namely urban population, different types of vehicles registered, per capita deposit in scheduled banks, number of commercial vehicles per lakh of population and number of villages connected to metalled roads. This factor explained 38 per cent of total variance.

It can be seen from Table 4.18 that the second factor has significant loadings on number of co-operative societies per lakh of population and average population per bank (in '000). This factor explained 14.5 per cent of total variance. The third factor has significant loadings on two variables namely density of population per square km. of area and percentage of main workers to total population. These two variables were found to be negatively related with each other which indicates that in the districts with high density of population, sufficient employment opportunities to absorb the population as main workers, were not created. This factor explained 11.9 per cent of total variance. The table further depicts that the fourth factor loads significantly on percentage of villages electrified. This factor explained 10.4 per cent of total variance.

Table 4.19 illustrates the percentage of total variance explained by each factor from socio-economic sector. It can be seen from the table that a broad and fair representation of the whole spectrum of inter-district disparities for the eleven variables from socio-economic sector has been made in a simple structure of three or four orthogonal factors which account for more than 69 per cent of the total variance.

Table 4.18 : Normal varimax solution for variables from socio-economic sector (1996-97)

Variable	Factor 1	Factor 2	Factor 3	Factor 4
SOE1	0.31863	0.25099	0.70234	0.15474
SOE2	0.91210	-0.20027	0.17282	-0.01757
SOE3	0.02344	0.26505	-0.74674	0.11523
SOE4	0.51014	-0.50838	0.25579	0.40347
SOE5	0.94822	-0.11559	0.05804	-0.09219
SOE6	0.89593	-0.11210	0.20280	-0.14576
SOE7	0.65120	-0.09152	-0.23997	0.12842
SOE8	0.23874	0.66638	-0.36592	-0.22131
SOE9	0.65178	0.24635	0.15804	-0.37556
SOE10	-0.13493	0.19901	-0.00121	0.92103
SOE11	-0.02524	0.81249	-0.17982	0.07375
Eigen value	4.18	1.59	1.31	1.14
Percentage variance	38.0	14.5	11.9	10.4
Cumulative percentage	38.0	52.5	64.4	74.7

The critical value of factor loadings at 1 per cent level of significance is 0.586 and underlined values indicate significant loadings

SOE1 - Density of population per square km. of area

SOE2 - Urban population

SOE3 - Percentage of main workers to total population

SOE4 - Percentage literacy

SOE5 - Different types of vehicles registered

SOE6 - Per capita deposit in scheduled banks

SOE7 - Number of commercial vehicles per lakh of population

SOE8 - Number of co-operative societies per lakh of population

SOE9 - Number of villages connected to metalled roads

SOE10 - Percentage of villages electrified

SOE11 - Average population per bank (in thousand)

Table 4.19 : Percentage of total variance explained by each factor from socio-economic sector

Factor	Year								
	1980-81			1990-91			1996-97		
	Eigen value	Per cent	Cumulative per cent	Eigen value	Per cent	Cumulative per cent	Eigen value	Per cent	Cumulative per cent
1	4.67	42.5	42.5	4.24	38.6	38.6	4.18	38.0	38.0
2	1.96	17.8	60.3	2.06	18.8	57.3	1.59	14.5	52.5
3	1.42	13.0	73.3	1.29	11.8	69.1	1.31	11.9	64.4
4	1.08	9.8	83.1	-	-	-	1.14	10.4	74.7

Data in Table 4.20 shows the measure of communalities which reflects the percentage of inter-district variation for each of the eleven variables explained by four factors during 1980-81 and 1996-97 and three factors during 1990-91. A perusal of the communality values indicate that for 10 variables in the 1980-81 and 6 variables for 1990-91 and 1996-97, the communalities exceeds about 70 per cent. Thus there is fair degree of representation of all the eleven considered variables for socio-economic sector by the four factors identified crucial during 1980-81 and 1996-97 and three factors identified crucial for the year 1990-91.

Srivastava and Mehrotra (1991) used principal component method of factor analytic technique in their study on spatial variations in levels of living in Eastern region of Uttar Pradesh. The study utilised 20 indicators for which four factors were found statistically significant. Factor loadings were interpreted on the basis of Burt and Banks (1947) formula. These four factors explained 83.9 per cent of total variance, out of which first factor explained 40.1 per cent variance while second factor 25.1 per cent variance whereas 13.4 and 5.3 per cent variance was explained by third and fourth factor respectively.

Table 4.20 : Percentage of variance of each variable accounted by all the crucial components from socio-economic sector

Variable	Communality (h^2)		
	1980-81	1990-91	1996-97
SOE1	83.6	57.3	68.2
SOE2	95.4	87.7	90.2
SOE3	82.5	22.9	64.2
SOE4	47.9	57.6	74.7
SOE5	94.8	85.5	92.4
SOE6	86.5	91.8	87.8
SOE7	85.9	63.0	50.6
SOE8	77.4	61.0	68.4
SOE9	85.7	85.8	65.1
SOE10	78.7	75.8	90.6
SOE11	95.3	71.4	69.9

4.2 CONSTRUCTION OF COMPOSITE INDICES OF DEVELOPMENT FOR EACH DISTRICT OF RAJASTHAN

This section describes the construction of indices of development in selected sectors for each district of Rajasthan. To construct composite indices of development, variables in respect of different sectors were standardised. The best district for each indicator (with maximum/ minimum standardised value depending upon the direction of the indicator) was identified and the deviations of different indicators from their best value were obtained for each district. The statistical technique presented by Narain *et al.* (1991) was used to estimate the composite index of development for agricultural, industrial, infrastructural and socio-economic sectors for each district for three points of time i.e. 1980-81, 1990-91 and 1996-97. The value

of the composite index thus obtained is non-negative and lies between 0 and 1. A value close to zero indicates higher level of development whereas the value close to one indicates lower level of development. Further a linear combination of these indices was used to represent the overall development of each district.

For each districts of Rajasthan, 21 indicators depicting the development in agricultural, 8 indicators in industrial, 7 indicators in infrastructural, 11 indicators in socio-economic and all the 47 indicators for overall development were used to construct the indices of development. The composite indices of development were worked out for different districts separately for agricultural, industrial, infrastructural and socio-economic sectors. The districts were ranked on the basis of development indices.

4.2.1 Construction of Composite Indices of Development for the Year 1980-81

Data in Table 4.21 indicates the composite indices along with the ranks of each district separately for agricultural, industrial, infrastructural and socio-economic sectors and overall development for the year 1980-81.

(a) Agricultural sector

Perusal of Table 4.21 reveals that out of 26 districts included in the analysis, district Chittorgarh ranked first followed by Bhilwara, Udaipur, Bundi and Kota. Desertic districts namely Jodhpur, Sikar, Jhunjhunu, Bikaner and Jaisalmer were placed at the bottom ranks on the basis of their agricultural development. The values of composite indices varied from 0.677 to 0.997 during this period with mean index 0.816 and coefficient of variation (CV) 11.05 per cent.

Almost similar findings were revealed by Bhargava (1987) who used 3 variables i.e. consumption of chemical fertilizers, use of

Table 4.21 : Composite indices of development for the year 1980-81

District	Sector									
	Agricultural		Industrial		Infrastructural		Socio-economic		Overall	
	CI	Rank	CI	Rank	CI	Rank	CI	Rank	CI	Rank
1. Ajmer	0.817	15	0.545	3	0.634	2	0.646	4	0.762	4
2. Alwar	0.733	7	0.688	7	0.730	19	0.718	8	0.824	9
3. Banswara	0.810	14	0.804	16	0.732	21	0.853	21	0.887	16
4. Barmer	0.898	20	0.792	14	0.733	22	0.880	25	0.925	22
5. Bharatpur	0.746	8	0.780	11	0.726	18	0.708	6	0.820	8
6. Bhilwara	0.698	2	0.627	4	0.661	4	0.754	9	0.764	5
7. Bikaner	0.949	25	0.733	10	0.681	7	0.774	11	0.895	18
8. Bundi	0.710	4	0.795	15	0.680	6	0.829	17	0.830	10
9. Chittorgarh	0.677	1	0.783	12	0.708	12	0.780	12	0.810	7
10. Churu	0.886	18	0.812	18	0.721	17	0.849	20	0.914	21
11. Dungarpur	0.807	13	0.864	22	0.711	13	0.864	23	0.897	19
12. Ganganagar	0.756	10	0.715	9	0.731	20	0.645	3	0.796	6
13. Jaipur	0.729	6	0.306	1	0.685	8	0.312	1	0.638	1
14. Jaisalmer	0.997	26	0.888	25	0.537	1	0.898	26	0.950	26
15. Jalore	0.858	17	0.883	23	0.799	26	0.877	24	0.946	25
16. Jhalawar	0.798	12	0.830	20	0.742	25	0.830	18	0.886	15
17. Jhunjhunu	0.923	24	0.707	8	0.695	9	0.757	10	0.878	13
18. Jodhpur	0.909	22	0.670	6	0.696	10	0.641	2	0.839	11
19. Kota	0.718	5	0.459	2	0.715	15	0.685	5	0.739	2
20. Nagaur	0.897	19	0.891	26	0.734	23	0.795	15	0.926	24
21. Pali	0.841	16	0.809	17	0.717	16	0.787	13	0.879	14
22. Sawai Madhopur	0.755	9	0.792	13	0.713	14	0.794	14	0.844	12
23. Sikar	0.914	23	0.827	19	0.677	5	0.805	16	0.908	20
24. Sirohi	0.786	11	0.887	24	0.702	11	0.860	22	0.892	17
25. Tonk	0.900	21	0.863	21	0.739	24	0.834	19	0.931	23
26. Udaipur	0.700	3	0.634	5	0.648	3	0.713	7	0.752	3
Mean	0.816		0.745		0.702		0.765		0.851	
S.D.	0.090		0.141		0.048		0.120		0.076	
CV	11.052		18.921		6.791		15.647		8.904	

CI = Composite index

tractors, electric pumps and oil engines and percentage of cultivators and agriculture workers to total workers to compute the index of agricultural development in Rajasthan for the year 1980-81. The findings indicated that Bundi, Ganganagar, Jaipur, Bhilwara and Chittorgarh districts obtained the first five ranks whereas districts namely Nagaur, Bikaner, Barmer, Jaisalmer and Churu got the last five ranks respectively.

(b) Industrial sector

The indices of development for each district in industrial sector were computed on the basis of 8 indicators depicting the industrial development. Data in Table 4.21 reveals that of the 26 districts included in the analysis, the district Jaipur ranked first followed by Kota, Ajmer, Bhilwara and Udaipur. Dungarpur, Jalore, Sirohi, Jaisalmer and Nagaur districts obtained the last ranks on the basis of their industrial development. Composite indices varied from 0.306 to 0.891 during this period with mean index 0.745 and CV 18.921 per cent.

(c) Infrastructural sector

To construct the composite indices of development for each district, 7 indicators depicting the progress of infrastructural sector were used. The data in the Table 4.21 indicates that the district Jaisalmer ranked first followed by Ajmer, Udaipur, Bhilwara and Sikar districts. The districts Barmer, Nagaur, Tonk, Jhalawar and Jalore ranked last in infrastructural development. The mean index of development in this sector was 0.702 with CV 6.791 per cent. The composite indices of development varied from 0.537 to 0.799.

(d) Socio-economic sector

Eleven indicators depicting the development in socio-economic sector were used to construct the indices of development for each district.

Perusal of the Table 4.21 reveals that the district Jaipur stood first in the order of socio-economic development closely followed by district Jodhpur, Ganganagar, Ajmer and Kota. The districts namely Sirohi, Dungarpur, Jalore, Barmer and Jaisalmer obtained the last five ranks respectively. The composite indices varied from 0.312 to 0.898 during this period with mean index 0.765 and CV 15.647 per cent.

To compute the indices of overall development, all the 47 indicators related to selected sectors i.e. agricultural, industrial, infrastructural and socio-economic were pooled together and the districts were ranked on the basis of development index obtained. The data in the Table 4.21 depicts that the district Jaipur ranked first followed by Kota, Udaipur, Ajmer and Bhilwara while the districts Barmer, Tonk, Nagaur, Jalore and Jaisalmer were ranked at last in the overall development. The values of composite indices varied from 0.638 to 0.950. Further the table reveals that there is greater variability in level of development in socio-economic and industrial sectors as compared to agricultural and infrastructural sectors. The overall mean index was 0.851 with CV 8.904 per cent.

Bhargava (1987) utilised 11 variables to compute composite index of overall economic development in Rajasthan for the year 1981. Similar findings were revealed by the study which indicated that district Jaipur, Kota, Ajmer, Bhilwara and Sirohi occupied the first five positions and Banswara, Tonk, Churu, Jaisalmer and Barmer districts obtained the last five ranks respectively.

4.2.2 Construction of Composite Indices of Development for the Year 1990-91

The composite indices along with the district ranks have been presented in the Table 4.22 separately for agricultural, industrial,

infrastructural, socio-economic sectors and overall development for the period 1990-91.

(a) Agricultural sector

It can be seen from Table 4.22 that district Ganganagar, which was placed at tenth position in the year 1980-81, was ranked first during this year. This was followed by Chittorgarh, Kota, Udaipur and Sawai Madhopur districts. Again the desertic districts namely Sikar, Jhunjhunu, Bikaner, Barmer and Jaisalmer continued to obtain the lower ranks. The values of composite indices varied from 0.689 to 0.998 with mean index 0.827 and CV 10.036 per cent.

(b) Industrial sector

Data in Table 4.22 indicates that the district Jaipur again ranked first followed by Alwar, Ajmer, Udaipur and Kota. The districts namely Jalore, Dungarpur, Churu, Sawaimadhopur and Jaisalmer were found to be least developed in industrial development. Comparative study of the Table 4.21 and Table 4.22 reveals that Sirohi and Pali districts have depicted major improvements in their ranking this year while Sawai Madhopur district had declined in the ranking from thirteenth to twenty fifth place. The values of composite indices varied from 0.414 to 0.913 with mean index 0.735 and CV 18.375 per cent.

(c) Infrastructural sector

The Table 4.22 reveals that the composite indices of development for the period 1990-91 varied from 0.567 to 0.977 with mean index value 0.790 and CV 13.536 per cent. A close observation of the table depicts that district Udaipur ranked first followed by Ajmer, Jhunjhunu, Sirohi and Dungarpur. The district namely Ganganagar, Barmer, Bhilwara, Jalore got the last ranks with

Table 4.22 : Composite indices of development for the year 1990-91

District	Sector									
	Agricultural		Industrial		Infrastructural		Socio-economic		Overall	
	CI	Rank	CI	Rank	CI	Rank	CI	Rank	CI	Rank
1. Ajmer	0.872	20	0.533	3	0.580	2	0.601	2	0.745	5
2. Alwar	0.832	13	0.509	2	0.803	16	0.671	6	0.705	2
3. Banswara	0.840	14	0.806	16	0.737	8	0.867	22	0.876	16
4. Barmer	0.996	25	0.822	20	0.924	23	0.843	19	0.965	25
5. Bharatpur	0.816	12	0.814	18	0.753	11	0.673	7	0.817	11
6. Bhilwara	0.778	7	0.689	8	0.951	24	0.745	9	0.822	12
7. Bikaner	0.921	24	0.741	11	0.854	18	0.758	10	0.883	18
8. Bundi	0.747	6	0.820	19	0.851	17	0.840	18	0.851	13
9. Chittorgarh	0.695	2	0.739	10	0.739	9	0.767	11	0.774	7
10. Churu	0.863	17	0.884	24	0.856	19	0.820	16	0.907	22
11. Dungarpur	0.842	15	0.877	23	0.717	5	0.857	21	0.889	20
12. Ganganagar	0.689	1	0.770	13	0.877	22	0.670	5	0.773	6
13. Jaipur	0.780	9	0.414	1	0.719	6	0.434	1	0.660	1
14. Jaisalmer	0.998	26	0.913	26	0.778	13	0.952	25	0.997	26
15. Jalore	0.867	19	0.861	22	0.976	25	0.875	24	0.936	24
16. Jhalawar	0.784	10	0.791	15	0.977	26	0.861	23	0.884	19
17. Jhunjhunu	0.909	23	0.758	12	0.654	3	0.786	13	0.863	14
18. Jodhpur	0.890	21	0.673	7	0.756	12	0.623	3	0.807	9
19. Kota	0.705	3	0.561	5	0.862	21	0.668	4	0.730	4
20. Nagaur	0.866	18	0.772	14	0.781	14	0.792	14	0.865	15
21. Pali	0.802	11	0.723	9	0.724	7	0.778	12	0.815	10
22. Sawai Madhopur	0.746	5	0.894	25	0.861	20	0.964	26	0.908	23
23. Sikar	0.904	22	0.824	21	0.752	10	0.803	15	0.892	21
24. Sirohi	0.779	8	0.582	6	0.715	4	0.853	20	0.799	8
25. Tonk	0.843	16	0.811	17	0.787	15	0.837	17	0.877	17
26. Udaipur	0.731	4	0.535	4	0.567	1	0.708	8	0.706	3
Mean	0.827		0.735		0.790		0.771		0.836	
S.D.	0.083		0.135		0.107		0.117		0.083	
CV	10.036		18.375		13.536		15.133		9.976	

CI = Composite index

Jhalawar at the bottom in ranking on the basis of infrastructural development. Comparative study of the Table 4.21 and 4.22 reveals that some of the districts have shown major changes in their ranking over the decade. District Banswara, Dungarpur, Nagaur, Pali, Sirohi and Tonk have influenced their ranking while districts like Bhilwara, Bikaner, Bundi and Jaisalmer have declined in their ranking this year.

(d) Socio-economic sector

It can be seen from the Table 4.22 that the district Jaipur again stood first in the order of socio-economic development followed by Ajmer, Jodhpur, Kota and Ganganagar districts. Banswara, Jhalawar, Jalore, Jaisalmer and Sawai Madhopur districts obtained the last five ranks in socio-economic development during the period 1990-91. The value of composite indices varied from 0.434 to 0.964 with mean index of socio-economic development as 0.771 and CV 15.133 per cent.

The perusal of Table 4.22 further indicates that the district Jaipur continued to rank first followed by Alwar, Udaipur, Kota and Ajmer during this period too in the overall ranking. The district Churu, Sawai Madhopur, Jalore, Barmer and Jaisalmer occupied last ranks in the overall development. The value of composite indices varied from 0.660 to 0.997 with mean index 0.836 and CV 9.976.

It was observed that there was greater variability in level of development in socio-economic and industrial sectors as compared to agricultural and infrastructural sectors. The same phenomenon was observed during the period 1980-81.

4.2.3 Construction of Composite Indices of Development for the Year 1996-97

The composite indices along with the district ranks have been presented in Table 4.23 for agricultural, industrial, infrastructural, socio-economic sectors and overall development for the period 1996-97.

(a) Agricultural sector

It is observed from Table 4.23 that the district Kota ranked first followed by Udaipur, Bundi, Bhilwara and Chittorgarh in the ranking of agricultural development. Again desertic districts i.e. Jodhpur, Jhunjhunu, Jaisalmer, Barmer and Churu continued to obtain the lower ranks during this period. The values of composite indices varied from 0.642 to 0.996 with mean index 0.803 and CV 12.309 per cent.

(b) Industrial sector

It is evident from the table that the value of composite indices of industrial sector varied from 0.450 to 0.890 with mean index 0.713 and CV 20.519 per cent during the period 1996-97. The table reveals that the district Ajmer ranked first followed by Jaipur, Alwar, Bhilwara and Ganganagar. Districts namely Barmer, Jaisalmer, Sikar, Churu and Sawai Madhopur were placed at last five places respectively in the ranking of industrial development. Major change was observed in the ranking of district Ganganagar which moved from thirteenth rank in 1990-91 to fifth position in this year.

(c) Infrastructural sector

The perusal of the Table 4.23 shows that district Udaipur again ranked first in infrastructural development during this period of study followed by Bhilwara, Ajmer, Jaipur and Jhunjhunu. The districts viz., Ganganagar, Sawai Madhopur, Jhalawar, Bundi and Jalore obtained the lowest ranks on the basis of their infrastructural development.

Table 4.23 : Composite indices of development for the year 1996-97

District	Sector									
	Agricultural		Industrial		Infrastructural		Socio-economic		Overall	
	CI	Rank	CI	Rank	CI	Rank	CI	Rank	CI	Rank
1. Ajmer	0.843	18	0.450	1	0.601	3	0.642	2	0.719	4
2. Alwar	0.754	9	0.477	3	0.801	16	0.708	6	0.732	7
3. Banswara	0.780	13	0.781	13	0.843	19	0.877	21	0.861	15
4. Barmer	0.961	25	0.845	22	0.885	21	0.894	24	0.953	25
5. Bharatpur	0.765	12	0.828	18	0.774	12	0.772	8	0.820	12
6. Bhilwara	0.696	4	0.486	4	0.600	2	0.774	9	0.709	3
7. Bikaner	0.891	21	0.727	12	0.798	15	0.802	11	0.860	14
8. Bundi	0.695	3	0.830	19	0.954	25	0.872	20	0.856	13
9. Chittorgarh	0.697	5	0.647	10	0.768	11	0.787	10	0.762	8
10. Churu	0.996	26	0.890	25	0.816	17	0.847	16	0.952	24
11. Dungarpur	0.822	16	0.837	21	0.759	10	0.878	22	0.878	20
12. Ganganagar	0.709	6	0.542	5	0.867	22	0.689	4	0.727	6
13. Jaipur	0.717	7	0.476	2	0.648	4	0.490	1	0.625	1
14. Jaisalmer	0.952	24	0.855	23	0.785	13	0.976	26	0.968	26
15. Jalore	0.836	17	0.835	20	0.989	26	0.879	23	0.912	23
16. Jhalawar	0.757	10	0.810	17	0.944	24	0.866	18	0.869	18
17. Jhunjhunu	0.930	23	0.808	16	0.658	5	0.896	25	0.909	22
18. Jodhpur	0.901	22	0.551	6	0.756	9	0.669	3	0.786	9
19. Kota	0.642	1	0.656	11	0.818	18	0.705	5	0.722	5
20. Nagaur	0.885	19	0.785	14	0.750	8	0.810	12	0.867	16
21. Pali	0.798	14	0.642	9	0.666	6	0.811	13	0.796	10
22. Sawai Madhopur	0.758	11	0.891	26	0.903	23	0.830	14	0.868	17
23. Sikar	0.890	20	0.856	24	0.723	7	0.836	15	0.890	21
24. Sirohi	0.732	8	0.636	8	0.790	14	0.870	19	0.807	11
25. Tonk	0.816	15	0.803	15	0.852	20	0.852	17	0.870	19
26. Udaipur	0.666	2	0.596	7	0.579	1	0.723	7	0.695	2
Mean	0.803		0.713		0.782		0.798		0.824	
S.D.	0.099		0.146		0.110		0.103		0.090	
CV	12.309		20.519		14.073		12.891		10.929	

CI = Composite index

Major downward movement in the ranking of district Banswara and Sirohi was observed while Bhilwara district had moved to second place in the ranking this year. The value of composite indices varied from 0.579 to 0.989 with mean index of infrastructural development as 0.782 and CV 14.073 per cent.

(d) Socio-economic sector

It can be seen from the Table 4.23 that the district Jaipur ranked first in the order of socio-economic development during this period also, followed by Ajmer, Jodhpur, Ganganagar and Kota. The districts Dungarpur, Jalore, Barmer, Jhunjhunu and Jaisalmer obtained the last five ranks respectively in the ranking of socio-economic development. Two districts had shown major changes in their ranking this year over the year 1990-91. The district Sawai Madhopur improved its ranking from twenty sixth to fourteenth while Jhunjhunu district moved down from thirteenth to twenty third rank. The value of composite indices varied from 0.490 to 0.976 with mean index 0.798 and CV 12.891 per cent.

The data in the Table 4.23 further depicts that the district Jaipur again continued to rank first followed by Udaipur, Bhilwara, Ajmer and Kota during the period 1996-97 in the ranking of overall development. Again the desertic districts like Jhunjhunu, Jalore, Churu, Barmer and Jaisalmer occupied the last five rankings. During this period Bhilwara district exhibited major change which moved to third place from twelfth rank on the basis of its overall development. The value of composite indices varied from 0.625 to 0.968 during this period. The mean index of overall development was 0.824 with cv. 10.929 per cent. Greater variability in level of development was observed in industrial sector as compared to rest of the sectors. This indicates that major emphasis must be laid on the development of industrial sector.

4.3 CLASSIFICATION OF DISTRICTS ON THE BASIS OF THEIR DEVELOPMENT

In order to achieve the objectives of promoting the growth rate in backward regions and to reduce regional disparities, it is essential to identify regions according to the divergent realised levels of development. Assessment of relative position of different regions and delineation of homogeneous regions is helpful in planning strategies for development of different regions. Therefore an attempt has been made in the present study to classify the districts on the basis of their development.

Different districts have been classified as highly developed, developed, developing, backward and very backward on the basis of quantile classification from an assumed Beta distribution of the weighted mean ($\overline{Y}_i$) of the composite indices for all the sectors separately for three points of time i.e. 1980-81, 1990-91 and 1996-97 (Appendix A1 – A3). The weights obtained have been presented in the Table 4.24.

Table 4.24 : Weights for different sector for three points of time

S.No.	Weights	1980-81	1990-91	1996-97
1.	Agricultural (W_1)	0.193	0.237	0.237
2.	Industrial (W_2)	0.228	0.236	0.198
3.	Infrastructural (W_3)	0.302	0.240	0.246
4.	Socio-economic (W_4)	0.270	0.291	0.311

A district has been categorised as :

Highly developed if $\overline{Y}_i \in (z_4, 1)$

Developed if $\overline{Y}_i \in (z_3, z_4)$

Developing if $\overline{Y}_i \in (z_2, z_3)$

Backward if $\overline{Y}_i \in (z_1, z_2)$ and

Very backward if $\overline{Y}_i \in (0, z_1)$

The intervals (0, z_1), (z_1, z_2), (z_2, z_3), (z_3, z_4) and (z_4, 1) with each having area under the fitted Beta probability curve equal to 0.20 obtained as values of the incomplete Beta functions (eq. 14). Further Biometrika tables for statisticians by Pearson and Hartley (1976) were used to compute fractiles z_1, z_2, z_3 and z_4 (Table 4.25).

Iyengar and Sudarshan (1982) used the same procedure for measuring spatial differentials in the level of development for categorizing the districts of Andhra Pradesh and Karnataka in the five categories of development.

Narain *et al.* (1995) also felt appropriate to assume that the mean has a Beta distribution in the range (0, 1) and the fractile group could be used to characterise the various stages of development while studying the regional disparities. Hooda and Tonk (1998) used the same technique while classifying the districts of Haryana on the basis of their development.

4.3.1 Classification of Districts on the Basis of their Development for the Year 1980-81

For the fractile classification the value of z_1, z_2, z_3 and z_4 were obtained as 0.191, 0.213, 0.486 and 0.882 respectively for the year 1980-81. Classification of districts along with the relative share of area and population under different categories of development have been presented in the Table 4.25. It can be observed from the table that wide disparities exist in the level of development of districts of the state. Districts namely Bhilwara, Ajmer, Jaipur and Udaipur, which covers 14.77 per cent area of the state and represent 24.89 per cent population have been classified as the developed districts. Out of 26 districts, more than half of the districts i.e. 15 districts have been categorised as developing, which covers 56.14 per cent area of the state and 52.72 per cent of the population.

Districts namely Jhalawar and Churu were categorised as backward districts covering 6.75 per cent area of the state which represent 5.73 per cent population. Districts Jalore, Nagaur, Pali, Barmer and Tonk were found to be very backward districts.

Table 4.25 : Classification of districts on the basis of their development in the year 1980-81

S.No.	Development Category	Interval for $\bar{Y}_i$	Districts	Population covered %	area covered %
1	Very Backward	0-0.191	Jalore,Nagaur, Pali,Barmer, Tonk	16.66	22.34
2	Backward	0.191-0.213	Jhalawar, Churu	5.73	6.75
3	Developing	0.213-0.486	Dungarpur, Banswara, Sikar, Sirohi, Bikaner, S.Madhopur, Bharatpur, Jodhpur, Jhunjhunu, Bundi, Chittorgarh, Alwar, Ganganagar, Kota, Jaisalmer	52.72	56.14
4	Developed	0.486-0.882	Bhilwara, Udaipur, Ajmer, Jaipur	24.89	14.77
5	Highly developed	0.882-1.00	-	-	-

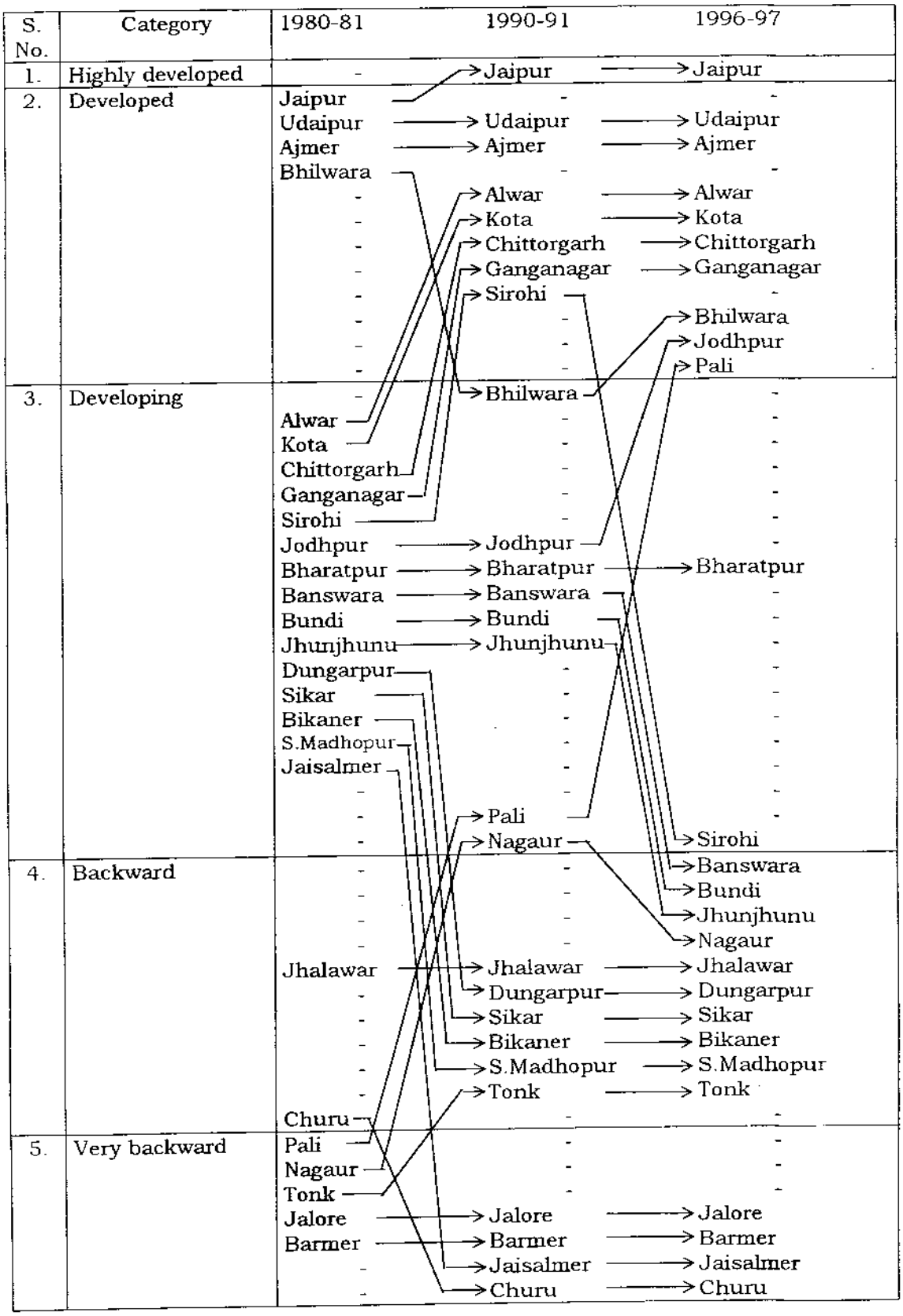
These districts shares 22.34 per cent area of the state with 16.66 per cent of the total population. None of the districts was found to be highly developed district. Data in the table indicates that half of population of the state resided in the developing districts and nearly one fourth of the population resided in the developed districts during the year 1980-81.

These findings are in conformity with the findings of Mehta and Dave (1987) who reported that districts Jaisalmer, Jalore, Churu, Barmer, Nagaur, Tonk and Dungarpur exhibited quite low development status in the year 1980-81 while the districts to show relatively high development were Sirohi, Ajmer, Alwar, Ganganagar, Bhilwara, Chittorgarh and Udaipur.

4.3.2 Classification of Districts on the Basis of Their Development for the Year 1990-91

Classification of districts along with the relative share of area and population under different stages of development are presented in Table 4.26. The value z_1, z_2, z_3 and z_4 were obtained as 0.270, 0.362, 0.515 and 0.770 respectively for fractile classification. Table reveals that only one district Jaipur was found to be highly developed covering 4.08 per cent area which represented only 10.73 per cent population of the state. Out of 26 districts 7 districts namely Ganganagar, Sirohi, Chittorgarh, Alwar, Kota, Ajmer and Udaipur were classified as developed covering 24.32 per cent area with 31.15 per cent of state population. In the year 1980-81 Ajmer and Udaipur districts were in the same category but the districts Ganganagar, Sirohi, Chittorgarh, Alwar and Kota have improved their position from developing to developed during this period (Fig. 2). The table further depicts that the districts namely Banswara, Nagaur, Bundi, Bhilwara, Jhunjhunu, Bharatpur and Jodhpur were classified as developing districts sharing 25.71 per cent area which represents 30.19 per cent of population. The district Banswara, Bundi, Jhunjhunu, Bharatpur and Jodhpur remained in the developing category in this period too. The districts Nagaur and Pali have shifted from very backward category to developing category and the district Bhilwara has improved its position from backward to developing category during this period (Fig.2). The districts Jhalawar, S. Madhopur, Bikaner,

Fig. 2 : Classification of districts according to their development and shift in development over three points of time



Sikar, Dungarpur and Tonk were categorised as backward districts which occupy 18.31 per cent area with 17.81 per cent of population. The only district Jhalawar did not shift its position but the districts Sawai Madhopur, Bikaner, Sikar and Dungarpur which were in the developing category during 1980-81 have shifted to backward category in this year 1990-91 (Fig.2).

Table 4.26 : Classification of districts on the basis of their development in the year 1990-91

S.No.	Development Category	Interval for $\overline{Y}_i$	Districts	Population covered %	area covered %
1	Very Backward	0-0.270	Jaisalmer, Barmer, Jalore, Churu	10.15	27.58
2	Backward	0.270-0.362	Jhalawar, S.Madhopur, Bikaner, Sikar, Dungarpur, Tonk	17.78	18.31
3	Developing	0.362-0.515	Banswara, Nagaur,Bundi, Bhilwara, Jhunjhunu, Bharatpur, Pali, Jodhpur	30.19	25.71
4	Developed	0.515-0.770	Ganganagar, Sirohi, Chittorgarh, Alwar, Kota, Ajmer, Udaipur	31.15	24.32
5	Highly developed	0.770-1.000	Jaipur	10.73	04.08

The only district Tonk has improved its position from very backward to backward during this period. It can be seen from the table that out of 26 districts, 4 districts namely Jaisalmer, Barmer, Jalore and Churu are classified as very backward districts which shares 27.58 per cent area and 10.15 per cent of population. The

districts Barmer and Jalore did not improve their position in this period where as the district Jaisalmer had gone down from developing to very backward category. The district Churu which was under backward category, previously has now been shifted to very backward category during this period.

4.3.3 Classification of Districts on the Basis of their Development for the Year 1996-97

The value z_1, z_2, z_3 and z_4 for the period 1996-97 were obtained as 0.266, 0.379, 0.530 and 0.766 respectively to characterise the various stages of development. The data in the Table 4.27 illustrates the classification of districts in Rajasthan on the basis of their development for the period 1996-97. It can be observed from the table that during this period of study also the district Jaipur was found to be the only highly developed district. This district covers 4.23 per cent area and shares 10.73 per cent population of the state. The table further shows that 9 districts namely Pali, Chittorgarh, Jodhpur, Kota, Ganganagar, Alwar, Ajmer, Bhilwara and Udaipur were classified as developed districts. These districts occupies 36.14 per cent area and covers 41.56 per cent of population. The districts Chittorgarh, Kota, Ganganagar, Alwar, Ajmer and Udaipur continue to remain in the same category i.e. developed during this period of study. Further it is encouraging to see that the districts like Plai, Jodhpur and Bhilwara have moved up to category of developed from developing districts.

It can be noticed from the table that only two districts i.e. Bharatpur and Sirohi were found in the developing category. Both the districts occupies 3.87 per cent area and inhabited by 6.94 per cent population of the state. It is unfortunate to note that during this

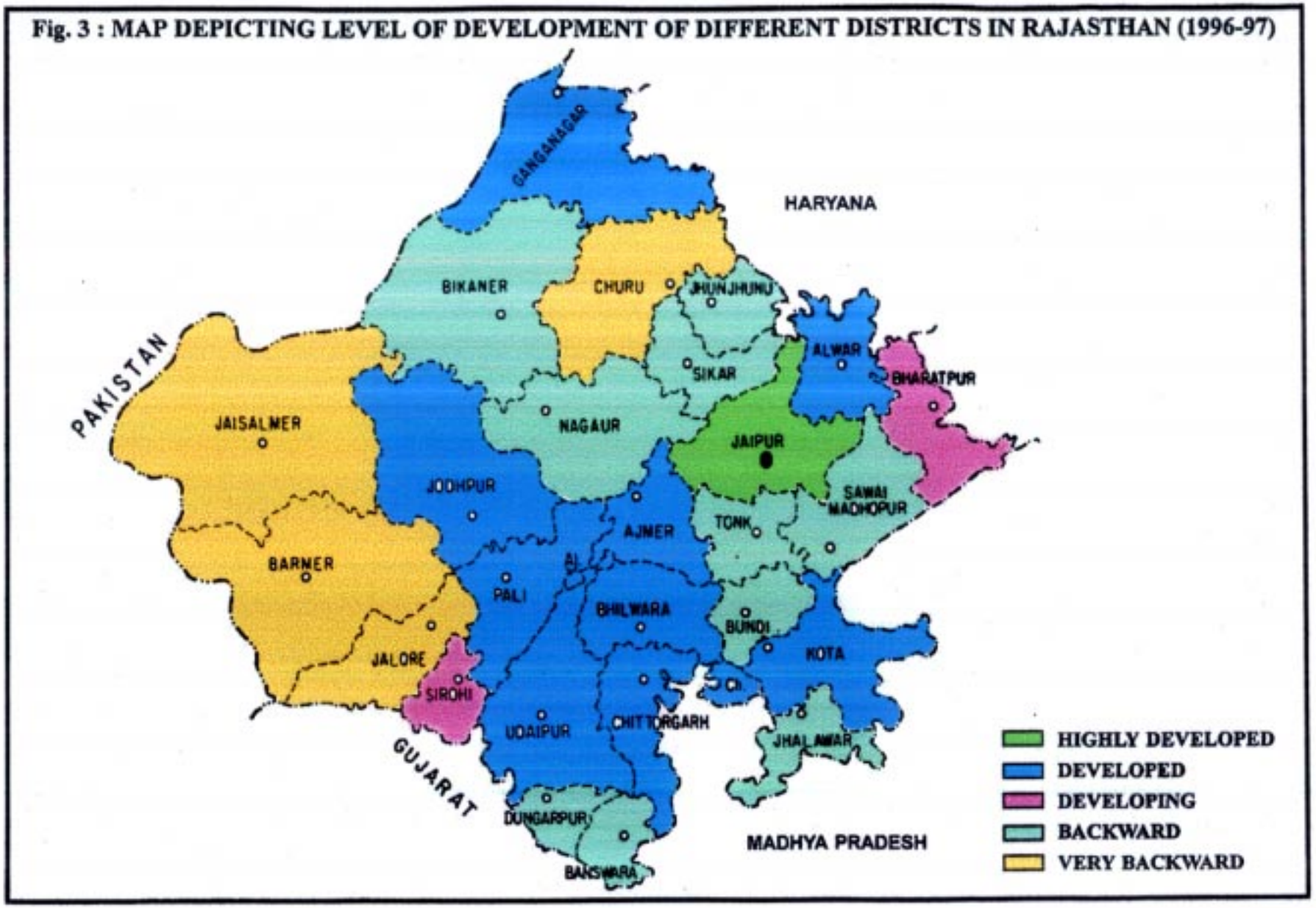
period of study the district Sirohi moved down from developed to developing category. The district Bharatpur has continued to be in the category of developing districts.

Table 4.27 : Classification of districts on the basis of their development in the year 1996-97

S.No.	Development Category	Interval for $\bar{Y}i$	Districts	Population covered %	area covered %
1	Very Backward	0.0-0.266	Barmer, Jaisalmer, Jalore, Churu	10.15	27.45
2	Backward	0.266-0.379	Jhalawar, S.Madhopur, Bundi,Tonk, Jhunjhunu, Sikar, Dungarpur, Banswara, Bikaner, Nagaur	30.62	28.31
3	Developing	0.379-0.530	Bharatpur, Sirohi	06.94	03.87
4	Developed	0.530-0.766	Pali, Chittorgarh Jodhpur, Kota, Ganganagar, Alwar, Ajmer, Bhilwara, Udaipur	41.56	36.14
5	Highly developed	0.766-1.000	Jaipur	10.73	04.23

In this period of study the number of districts in the backward category has increased from 6 to 10 districts which includes Jhalawar, S. Madhopur, Bundi, Tonk, Jhunjhunu, Sikar, Dungarpur, Banswara, Bikaner and Nagaur. These districts occupies 28.31 per cent area and covers 30.62 per cent population of the state. Among these districts, Bundi, Sikar, Banswara and Nagaur have shifted down from the category of developing districts.

Fig. 3 : MAP DEPICTING LEVEL OF DEVELOPMENT OF DIFFERENT DISTRICTS IN RAJASTHAN (1996-97)



No shift in the development was observed for the districts like Barmer, Jaisalmer, Churu and Jalore which are again categorised as very backward during this period of study (Fig.2).

The above analysis throws light on the level of development of districts in Rajasthan and only the Jaipur district was found to be highly developed as compared to other districts of the state (Fig.3).

4.4 SIGNIFICANCE OF OVERALL CHANGE IN DEVELOPMENT INDICES OVER THREE POINTS OF TIME

Having obtained the measure of development (composite index) for each district over different points of time, attempt was made to examine the significance of change in development indices over time. For this, the slippage test proposed by Rai (1987) was employed. The significance of overall change in development indices over three points of time for all the sectors i.e. agricultural industrial, infrastructural and socio-economic have been examined separately.

4.4.1 Significance of Change in Agricultural Development

Data in Table 4.28 illustrates the composite indices of agricultural development of each district and their ranking over three points of time. The rankings over different points of time have been examined by the slippage test. The value of test statistic M was worked out to be 7.15 which is significant at 5 per cent level of significance. This indicates the rejection of null hypothesis of no change in development in districts over time. From this, it can be concluded that the level of agricultural development is significantly different over three points of time. Since the null hypothesis was rejected, multiple comparisons to determine the significance of difference in agricultural development over individual pairs of time periods i.e. 1980-81 (t_1) and 1990-91 (t_2), 1980-81 (t_1) and 1996-97

Table 4.28 : Ranking of composite indices of agricultural development of each district over three points of time

Districts	1980-81		1990-91		1996-97	
	Composite index	Rank	Composite index	Rank	Composite index	Rank
Ajmer	0.817	1	0.872	3	0.843	2
Alwar	0.733	1	0.832	3	0.754	2
Banswara	0.810	2	0.840	3	0.780	1
Barmer	0.898	1	0.996	3	0.961	2
Bharatpur	0.746	1	0.816	3	0.765	2
Bhilwara	0.698	2	0.778	3	0.696	1
Bikaner	0.949	3	0.921	2	0.891	1
Bundi	0.710	2	0.747	3	0.695	1
Chittorgarh	0.677	1	0.695	2	0.697	3
Churu	0.886	2	0.863	1	0.996	3
Dungarpur	0.807	1	0.842	3	0.822	2
Ganganagar	0.756	3	0.689	1	0.709	2
Jaipur	0.729	2	0.780	3	0.717	1
Jaisalmer	0.997	2	0.998	3	0.952	1
Jalore	0.858	2	0.867	3	0.836	1
Jhalawar	0.798	3	7840.	2	0.757	1
Jhunjhunu	0.923	2	0.909	1	0.930	3
Jodhpur	0.909	3	0.890	1	0.901	2
Kota	0.718	3	0.705	2	0.642	1
Nagaur	0.897	3	0.866	2	0.885	1
Pali	0.841	3	0.802	2	0.798	1
Sawai Madhopur	0.755	2	0.746	1	0.758	3
Sikar	0.914	3	0.904	2	0.890	1
Sirohi	0.786	3	0.779	2	0.732	1
Tonk	0.900	3	0.843	2	0.816	1
Udaipur	0.700	2	0.731	3	0.666	1
Rank Total (R_i)		56		59		41
Mean	0.816		0.827		0.803	

(t_3) and 1990-91 (t_2) and 1996-97 (t_3) were made. Following differences of sums of ranks were obtained :

$$|R_{t_1} - R_{t_2}| = 3$$

$$|R_{t_1} - R_{t_3}| = 15$$

$$|R_{t_2} - R_{t_3}| = 18$$

The critical difference (C.D.) at 5 per cent level of significance was computed as 12.21. The difference between the periods 1980-81 & 1996-97 and 1990-91 & 1996-97 was found significant whereas difference in agricultural development between the year 1980-81 and 1990-91 was observed to be non-significant.

The perusal of the table further reveals that mean value of composite index has increased from 0.816 in the year 1980-81 to 0.827 in the year 1990-91 which indicates that level of agricultural development has gone down during these periods. It can be further observed from the table that mean composite index value has decreased from 0.827 in the year 1990-91 to 0.803 in the year 1996-97 which depicts the improvement in the agricultural development. This may be due to the programmes initiated by the government for the development in agricultural sector.

4.4.2 Significance of Change in Industrial Development

Data in Table 4.29 depicts the composite indices of industrial development of each district and their ranking over three points of time. The rankings over different points of time has been examined and the test statistic M was worked out to be 1.46 which comes out to be non-significant at 5 per cent level of significance. This indicates the acceptance of null hypothesis of no change in development in districts over time. From this, it can be concluded that the level of industrial development is equal over three points of time. The perusal of the

Table 4.29 : Ranking of composite indices of industrial development of each district over three points of time

Districts	1980-81		1990-91		1996-97	
	Composite index	Rank	Composite index	Rank	Composite index	Rank
Ajmer	0.545	3	0.533	2	0.450	1
Alwar	0.688	3	0.509	2	0.477	1
Banswara	0.804	2	0.806	3	0.781	1
Barmer	0.792	1	0.822	2	0.845	3
Bharatpur	0.780	1	0.814	2	0.828	3
Bhilwara	0.627	2	0.689	3	0.486	1
Bikaner	0.733	2	0.741	3	0.727	1
Bundi	0.795	1	0.820	2	0.830	3
Chittorgarh	0.783	3	0.739	2	0.647	1
Churu	0.812	1	0.884	2	0.890	3
Dungarpur	0.864	2	0.877	3	0.837	1
Ganganagar	0.715	2	0.770	3	0.542	1
Jaipur	0.306	1	0.414	2	0.476	3
Jaisalmer	0.888	2	0.913	3	0.855	1
Jalore	0.883	3	0.861	2	0.835	1
Jhalawar	0.830	3	0.791	1	0.810	2
Jhunjhunu	0.707	1	0.758	2	0.808	3
Jodhpur	0.670	2	0.673	3	0.551	1
Kota	0.459	1	0.561	2	0.656	3
Nagaur	0.891	3	0.772	1	0.785	2
Pali	0.809	3	0.723	2	0.642	1
Sawai Madhopur	0.792	1	0.894	3	0.891	2
Sikar	0.827	2	0.824	1	0.856	3
Sirohi	0.887	3	0.582	1	0.636	2
Tonk	0.863	3	0.811	2	0.803	1
Udaipur	0.634	3	0.535	1	0.596	2
Rank Total (R_i)		54		55		47
Mean	00.475		0.735		0.713	

table further shows that the level of industrial development from 1980-81 to 1996-97 has gone up to some extent which is non-significant. The mean index values i.e. 0.745, 0.735 and 0.713 for the three successive periods indicates slight improvement in the industrial sector.

4.4.3 Significance of Change in Infrastructural Development

The perusal of Table 4.30 depicts the composite indices of infrastructural development of each district and their ranking over thee points of time. The rankings over different points of time has been examined and the value of test statistic M was worked out to be 16.75 which comes out to be significant at 1 per cent level of significance. This indicates the rejection of null hypothesis of no change in development in districts over time. From this, it can be concluded that the level of infrastructural development is significantly different over three points of time. Since the null hypothesis was rejected, multiple comparisons to determine the significance of difference in infrastructural development over individual pairs of time periods i.e. t_1 and t_2, t_1 and t_3, and t_2 and t_3 were made. Following differences of sums of ranks were obtained :

$$|R_{t_1} - R_{t_2}| = 26.5$$

$$|R_{t_1} - R_{t_3}| = 24.5$$

$$|R_{t_2} - R_{t_3}| = 2.00$$

The critical difference (C.D.) at 1 per cent level of significance was computed as 21.27. The difference between the periods t_1 and t_2, and t_1 and t_3 was found significant whereas difference between infrastructural development in the period t_2 and t_3 was observed to be non-significant. This indicates that infarstructural development in the last two periods remained equal.

Table 4.30 : Ranking of composite indices of infrastrructural development of each district over three points of time

Districts	1980-81		1990-91		1996-97	
	Composite index	Rank	Composite index	Rank	Composite index	Rank
Ajmer	0.634	3	0.580	1	0.601	2
Alwar	0.730	1	0.803	3	0.801	2
Banswara	0.732	1	0.737	2	0.843	3
Barmer	0.733	1	0.924	3	0.885	2
Bharatpur	0.726	1	0.735	2	0.744	3
Bhilwara	0.661	2	0.951	3	0.600	1
Bikaner	0.681	1	0.854	3	0.798	2
Bundi	0.680	1	0.851	2	0.954	3
Chittorgarh	0.708	1	0.739	2	0.768	3
Churu	0.721	1	0.856	3	0.816	2
Dungarpur	0.711	1	0.717	2	0.759	3
Ganganagar	0.731	1	0.877	3	0.867	2
Jaipur	0.685	2	0.719	3	0.648	1
Jaisalmer	0.537	1	0.778	2	0.785	3
Jalore	0.799	1	0.976	2	0.989	3
Jhalawar	0.742	1	0.977	3	0.944	2
Jhunjhunu	0.695	3	0.654	1	0.658	2
Jodhpur	0.696	1	0.756	20.5	0.756	20.5
Kota	0.715	1	0.862	3	0.818	2
Nagaur	0.734	1	0.781	3	0.750	2
Pali	0.717	2	0.724	3	0.666	1
Sawai Madhopur	0.713	1	0.861	2	0.903	3
Sikar	0.677	1	0.752	3	0.723	2
Sirohi	0.702	1	0.715	2	0.790	3
Tonk	0.739	1	0.787	2	0.852	3
Udaipur	0.648	3	0.567	1	0.579	2
Rank Total (R_i)		35		610.5		590.5
Mean	0.702		0.790		0.782	

The perusal of the table further shows that mean value of composite index has increased from 0.702 in the year 1980-81 to 0.790 in the year 1990-91 which indicates that level of infrastructural development has gone down. Further it can be observed from the table that mean composite index value has decreased from 0.790 in the year 1990-91 to 0.782 in the year 1996-97 which depicts the improvement in the infrastructural development.

4.4.4 Significance of Change in Socio-economic Development

Data presented in the Table 4.31 indicates the composite indices of socio-economic development of each district and their ranking over three points of time. The rankings over different points of time has been examined and the value of test statistic M was worked out to be 29.85 which was significant at 1 per cent level of significance. This indicates the rejection of null hypothesis of no change in development in districts over time. It was concluded that the level of socio-economic development was significantly different over three points of time. Since the null hypothesis was rejected, multiple comparisons to determine the significance of difference in socio-economic development over individual pairs of time periods i.e. t_1 and t_2, t_1 and t_3, and t_2 and t_3 were made. Following differences of sums of ranks were obtained

$$|R_{t_1} - R_{t_2}| = 10$$

$$|R_{t_1} - R_{t_3}| = 28$$

$$|R_{t_2} - R_{t_3}| = 38$$

The critical difference (C.D.) at 1 per cent level of significance was computed as 21.27. The difference between the periods t_1 and t_3, and t_2 and t_3 was found significant whereas difference between socio-economic development in the period t_1 and t_2 was observed to be non-significant.

Table 4.31 : Ranking of composite indices of socio-economic development of each district over three points of time

Districts	1980-81		1990-91		1996-97	
	Composite index	Rank	Composite index	Rank	Composite index	Rank
Ajmer	0.646	3	0.601	1	0.642	2
Alwar	0.718	3	0.671	1	0.708	2
Banswara	0.853	1	0.876	2	0.877	3
Barmer	0.880	2	0.843	1	0.894	3
Bharatpur	0.708	2	0.673	1	0.772	3
Bhilwara	0.754	2	0.745	1	0.774	3
Bikaner	0.774	2	0.758	1	0.802	3
Bundi	0.829	1	0.840	2	0.872	3
Chittorgarh	0.780	2	0.767	1	0.787	3
Churu	0.849	3	0.820	1	0.847	2
Dungarpur	0.864	2	0.857	1	0.878	3
Ganganagar	0.645	1	0.670	2	0.689	3
Jaipur	0.312	1	0.434	2	0.490	3
Jaisalmer	0.898	1	0.952	2	0.976	3
Jalore	0.877	2	0.875	1	0.879	3
Jhalawar	0.830	1	0.861	2	0.866	3
Jhunjhunu	0.757	1	0.786	2	0.896	3
Jodhpur	0.641	2	0.623	1	0.669	3
Kota	0.685	2	0.668	1	0.705	3
Nagaur	0.795	2	0.792	1	0.810	3
Pali	0.787	2	0.778	1	0.811	3
Sawai Madhopur	0.794	1	0.964	3	0.830	2
Sikar	0.805	2	0.803	1	0.836	3
Sirohi	0.860	2	0.853	1	0.870	3
Tonk	0.834	1	0.837	2	0.852	3
Udaipur	0.713	2	0.708	1	0.723	3
Rank Total (R_i)		46		36		74
Mean	0.765		0.771		0.798	

The perusal of the table further shows that mean value of composite index has increased from 0.765 in the year 1980-81 to 0.798 in the year 1996-97. This indicates that level of socio-economic development has gone down in the successive years. It can be said that development programmes undertaken by the government for the socio-economic development could not bring the desired change. The efforts made by the government might have been nullified by the rapidly growing population.

4.4.5 Significance of Change in Overall Development

Data in the Table 4.32 shows the composite indices of overall development of each district and their ranking over three points of time. The ranking over different point of time has been examined and the value of test statistic M was worked out to be 8.21 which was significant at 5 per cent level of significance. This indicates the rejection of null hypothesis of no change in development in districts over time. It was concluded that the level of overall development is significantly different over three points of time. Since the null hypothesis was rejected, multiple comparisons were made. Following differences of sums of ranks were observed :

$|R_{t_1} - R_{t_2}| = 14.5$

$|R_{t_1} - R_{t_3}| = 20.0$

$|R_{t_2} - R_{t_3}| = 5.5$

The critical difference at 5 per cent level of significance was computed as 12.21. The difference between the periods 1980-81 and 1990-91 and, 1980-81 and 1996-97 was found significant whereas difference in overall development between the year 1990-91 and 1996-97 was observed to be non-significant.

Table 4.32 : Ranking of composite indices of overall development of each district over three points of time

Districts	1980-81		1990-91		1996-97	
	Composite index	Rank	Composite index	Rank	Composite index	Rank
Ajmer	0.762	3	0.745	2	0.719	1
Alwar	0.824	3	0.705	1	0.732	2
Banswara	0.887	3	0.876	2	0.861	1
Barmer	0.925	1	0.965	3	0.953	2
Bharatpur	0.820	2.5	0.817	1	0.820	2.5
Bhilwara	0.764	2	0.822	3	0.709	1
Bikaner	0.895	3	0.883	2	0.860	1
Bundi	0.830	1	0.851	2	0.856	3
Chittorgarh	0.810	3	0.774	2	0.762	1
Churu	0.914	2	0.907	1	0.952	3
Dungarpur	0.897	3	0.889	2	0.878	1
Ganganagar	0.796	3	0.773	2	0.727	1
Jaipur	0.638	2	0.660	3	0.625	1
Jaisalmer	0.950	1	0.997	3	0.968	2
Jalore	0.946	3	0.936	2	0.912	1
Jhalawar	0.886	2	0.884	1	0.868	3
Jhunjhunu	0.878	2	0.863	1	0.909	3
Jodhpur	0.839	2	0.807	1	0.786	3
Kota	0.739	3	0.730	2	0.722	1
Nagaur	0.926	3	0.865	1	0.867	2
Pali	0.879	3	0.815	2	0.796	1
Sawai Madhopur	0.844	1	0.908	3	0.868	2
Sikar	0.908	3	0.892	2	0.890	1
Sirohi	0.892	3	0.799	1	0.807	2
Tonk	0.931	3	0.877	2	0.870	1
Udaipur	0.752	3	0.706	2	0.695	1
Rank Total (R_i)		63.5		49		43.5
Mean	0.851		0.836		0.823	

The perusal of the table reveals that mean value of composite index has decreased from 0.851 in the year 1980-81 to 0.836 in the year 1990-91 which indicates that level of overall development has gone up during these points of time. The same was observed for the year 1990-91 and 1996-97 which is illustrated by the decrease in the mean index value from 0.836 to 0.823 respectively. It can be seen from the previous tables that there was positive change in the development of agricultural and infrastructural sectors over the years 1990-91 and 1996-97 while industrial development has remained static, whereas development in only one sector i.e. socio-economic sector has gone down. This has accounted for the positive change in the overall development.

Changes in development indices of seventeen major states of India over two periods of time i.e. 1971-72 and 1981-82 was also statistically examined by Narain *et al.* (1991) using the slippage test. The study concluded that the level of development was significantly different between the two periods of time. Findings of the study revealed that the level of development in almost all the states have gone down during the second period inspite of various development programmes initiated to improve the socio-economic structure of the masses.

4.5 RELATIONSHIP BETWEEN THE DEVELOPMENT OF DIFFERENT SECTORS

The growth and development of one sector of economy is associated with the development in other sectors of economy. The present study seeks to examine the relationship among the development in agricultural, industrial, infrastuctural and socio-economic sectors. For this purpose. Kendall's coefficient of concordance was worked out for the three points of time i.e. year

1980-81, 1990-91 and 1996-97 (Table 4.33). These coefficients were computed on the basis of ranks obtained from development indices of each district for all the four sectors for different points of time (Table 4.21 – 4.23). It can be seen from Table 4.33 that coefficients of concordance among rankings of all four sectors were found to be significant at 1 per cent level of significance. This indicates good agreement among the rankings of all four sectors i.e. development in all the sectors is inter-related.

For indepth analysis of relationship between different sectors of development, pair-wise Spearman's rank correlation was employed. The table indicates that for the year 1980-81 and 1996-97, the correlation coefficients between the rankings of agricultural and industrial sector are quite high and statistically significant. This indicates that districts which are agriculturally developed are mostly developed in industrial sector also. Agriculture and industry flourish together in state because industries provide basic inputs for agricultural improvement and use agricultural produce as the raw material for preparing finished goods. The developments in agricultural and industrial sectors seem to go hand in hand in most of the districts of the state. It can be said that priorities should be given to promote setting of more and more agro-industries in the state particularly in the rural areas. Data in table further shows that relationship between industrial and socio-economic sector was found to be highly significant for all three points of time. This significant positive relationship between industrial and socio-economic development implies that socio-economic progress of the district is associated with the development in industrial sector.

Data in Table-4.33 further depicts the positive significant relationship between agricultural and industrial, agricultural and

socio-economic, industrial and infrastructual and industrial and socio-economic sector in the year 1996-97, which indicates that development of one sector results in progress of other.

Table 4.33 : Pair-wise rank correlation and coefficient of concordance

S.No.	Pair of sectors	Correlation coefficients		
		1980-81	1990-91	1996-97
1.	Agricultural and Industrial	0.56**	0.36	0.46*
2.	Agricultural and Infrastructural	0.06	-0.07	-0.03
3.	Agricultural and Socio-economic	0.37	0.20	0.43*
4.	Industrial and Infrastructural	0.38	0.35	0.46*
5.	Industrial and Socio-economic	0.85**	0.78**	0.72**
6.	Infrastructural and Socio-economic	0.29	0.24	0.38
	Coefficient of concordance among rankings of all the four sectors	0.55**	0.47**	0.55**

* *Significant at 0.05 level*

** *Significant at 0.01 level*

It can be noticed from the table that non-significant relationship was found in the pairs of agricultural and infrastructural sector and infrastructual and socio-economic sectors of development for all the three points of time. Progress of infrastrructural sector is not associated with development in agricultural and socio-economic sectors as the correlation coefficients are low and not statistically significant. This indicates that development in infrastructural sector is not fully used in development of either agricultural or socio-economic sectors. The infrastructural facilities in the districts are not sufficient to influence the development in agricultural and socio-economic sector. This may be due to the lack of proper education and motivation among the people of state towards the developmental

activities. Data indicates that only 38.55 per cent of the total population of the state are literate. The literacy of women is also not encouraging, which contributes only 20.44 per cent of total literates. People should be influenced to participate fully in economic development of the state.

Narain *et al.* (1993) reported the same findings in their study on "Evaluation of economic development in Orissa". They revealed that the overall economic development of different districts was found to be positively associated both with agricultural and industrial developments. The Spearman's correlation coefficient between overall economic development and agricultural development as well as between overall economic development and industrial development were observed to be highly significant indicating that the economic development is very much dependent on the growth and development of agriculture and industry. The correlation coefficients between agricultural development and infrastructural service development and industrial development and infrastructual development as well as over all economic development and infrastructural development were not significant. The correlation coefficient between the level of development in agricultural and industrial sectors were highly significant which indicates that the districts which were agriculturally well developed, were also industrially well developed and vice versa.

4.6 FACTORS CAUSING REGIONAL IMBALANCES AND THE STRATEGY FOR DEVELOPMENT

Findings presented in the earlier sections indicate that the level of development varies from region to region. Therefore, in the present study, an attempt was made to identify factors causing regional imbalances and the improvement required in various indicators of the low developed districts. For this purpose, model districts for each low

developed district were identified. The identification of model districts was made on the basis of composite index of development and developmental distances (Appendix B1, C1, D1 and E1) between different districts. The arithmetic mean of the values of indicators of model districts was taken as potential target for the low developed districts for each indicator as described in methodology (Chapter 3). The tables depicting model districts for low developed districts in agricultural, industrial, infrastructural and socio-economic sectors are given in Appendix B2, C2, D2 and E2. Estimates of potential targets and actual achievements in all the four sectors are presented in Appendix B3, C3, D3 and E3.

The indicators in which the value of potential target exceeded the actual achieved indicator value were considered as the factors causing regional imbalances. Improvement in these indicators would lead to balanced development in the state. Such information may help the planners and administrators to readjust the resources and priorities to reduce inequalities in the levels of development among different districts of the state.

The information presented in Tables 4.34 to 4.37 depicts the improvements needed in different indicators of various districts in agricultural, industrial, infrastructural and socio-economic sectors respectively. It is hypothesized that indicator pertaining to agriculture sector i.e., percentage of agriculture workers to the total work force contribute in negative direction of development whereas the values of other indicators contribute positively. With regard to socio-economic sector, indicators like density of population per square km of area and average population per bank contributed negatively in development.

There cannot be a single strategy for the development of all the districts for reducing disparities between them. Different strategies

Table 4.34 : Improvements needed in different indicators of Agricultural sector

S. No.	Districts	Indicators requiring improvements
1.	Ajmer	Percentage of net area irrigated to net area sown (31.7 to 34.3), percentage of forest area to total geographical area (5.8 to 6.4), percentage of gross irrigated area to gross area sown (36.7 to 66), average size of operational holding (2.3 to 3.9 hect), percentage of area under commercial crops to total cropped area (11.8 to 35.5), number of cows and buffaloes per 1000 human population (459 to 491), Forest area per lakh of population (2832 to 5323 hect), gross value from agriculture per hectare at current prices (Rs. 108605 to 117826), gross value of agriculture output per capita (rural) at current prices (Rs. 2347 to 3013), fertilizer consumption in terms of nutrients (11445 to 25883 tons), use of pumps and oil engines per thousand of population (46 to 67).
2.	Alwar	Percentage of forest area to total geographical area (6.5 to 19.3), average size of operational holding (1.8 to 2.5 hect.), number of cows and buffaloes per 1000 human population (422 to 584), forest area per lakh of population (2165 to 13870 hect.), fertilizer consumption in terms of nutrients (27579 to 28070 tons), total cattle (204628 to 455054), irrigation intensity (109 to 115), percentage of animal power (315 to 457).
3.	Banswara	Percentage of area sown more than once to net area sown (49.7 to 55.5), percentage of net area irrigated to net area sown (36.3 to 55.3), percentage of gross irrigated area to gross area sown (28 to 63.7), average size of operational holding (1.6 to 2.3 hect.), percentage of area under commercial crops to total cropped area (3.5 to 18.5), number of cows and buffaloes per 1000 human population (698 to 736), production of foodgrains (371581 to 557016 thousand tons), forest area per lakh of population (9196 to 12131 hect.), gross value of agriculture output per capita

Figures in parentheses indicate actual values of indicators and potential targets

S. No.	Districts	Indicators requiring improvements
		(rural) at current prices (Rs. 2705 to 3343), fertilizer consumption in terms of nutrients (17178 to 29305 tons), yield in kg/hect of foodgrains (1165 to 1559), total cattle (580133 to 697037), cropping intensity (150 to 155), use of pumps and oil engines per thousand of population (97 to 124), use of tractors per thousand of population (3 to 11).
4.	Barmer	Percentage of area sown more than once to net area sown (5.7 to 33.5), percentage of net area irrigated to net area sown (4.5 to 44), percentage of forest area to total geographical area (0.9 to 10.6), percentage of gross irrigated area to gross area sown (11.7 to 52.1), percentage of area under commercial crops to total cropped area (2.0 to 20.8), number of cows and buffaloes per thousand human population (442 to 526), production of foodgrains in thousand tons (198004 to 544313), percentage of agricultural workers to the total work force (2.8 to 9.0), forest area per lakh of population (1722 to 6272), gross value from agriculture per hectare at current prices (Rs. 58245 to 165229), gross value of agriculture output per capita at current prices (Rs. 728 to 3214), fertilizer consumption in terms of nutrients (2734 to 27751 tons), yield in kg/hect of foodgrains (181 to 1294), cropping intensity (106 to 133), percentage of animal power (284 to 402), use of pumps and oil engines per thousand of population (61 to 79), use of tractors per thousand of population (5 to 14).
5.	Bharatpur	Percentage of area sown more than once to net area sown (26.5 to 42.4), percentage of gross area sown under food grains to total cropped area (50.1 to 59), percentage of forest area to total geographical area (6.3 to 18.0), average size of operational holding (1.6 to 2.1 hect.), number of cows and buffaloes per 1000 human population (402 to 555), forest area per lakh of population (2122 to 11633 hect.), total cattle (179720 to 536224), irrigation intensity (103 to 112), cropping intensity (127 to 142), percentage of animal power (252 to 487).

S. No.	Districts	Indicators requiring improvements
6.	Bhilwara	Percentage of net area irrigated to net area sown (53.5 to 73), percentage of forest area to total geographical area (6.10 to 25.4), average size of operational holding (2.05 to 2.7 hect.), percentage of area under commercial crops to total cropped area (14.9 to 24.8), forest area per lakh of population (3968 to 17139 hect), gross value from agriculture per hectare at current prices (Rs. 198023 to 294466), gross value of agriculture output per capita (rural) at current prices (3551 to 4948), fertilizer consumption in terms of nutrients (21568 to 36187 tons), yield in kg/hect. of food grains (1658 to 2154), irrigation intensity (116 to 120), use of tractors per thousand of population (11 to 18).
7.	Bikaner	Percentage of area sown more than once to net area sown (6.4 to 34.9), percentage of gross area sown under foodgrains to total cropped area (52.7 to 64.6), percentage of net area irrigated to net area sown (10.2 to 45.7), percentage of forest area to total geographical area (2.8 to 12.6), percentage of gross irrigated area to gross area sown (29.5 to 53.4), percentage of area under commercial crops to total cropped area (10.6 to 21.6), production of foodgrains in thousand tons (298422 to 461906), percentage of agriculture workers to the total work force (4.6 to 9.9), forest area per lakh of population (6244 to 7631 hect.), gross value from agriculture per hectare at current prices (Rs. 54834 to 145282), gross value of agriculture output per capita at current prices (Rs. 3126 to 3295), yield in kg/hect of foodgrains (451 to 1280), cropping intensity (106 to 135), percentage of animal power (211 to 414), use of pumps and oil engines per thousand of population (0 to 85), use of tractors per thousand of population (4 to 13).
8.	Bundi	None

S. No.	Districts	Indicators requiring improvements
9.	Chittorgarh	None
10.	Churu	Percentage of area sown more than once to net area sown (4.8 to 33.7), percentage of net area irrigated to net area sown (2.2 to 43.3), percentage of forest area to total geographical area (0.4 to 12.0), percentage of gross irrigated area to gross area sown (3.6 to 48.3), percentage of area under commercial crops to total cropped area (2.0 to 19.6), number of cows and buffaloes per thousand human population (347 to 526), percentage of agriculture workers to the total work force (3.6 to 9.2), forest area per lakh of population (432 to 7512 hect.), gross value from agriculture per hectare at current prices (Rs. 59326 to 159629), gross value of agriculture output per capita at current prices (Rs. 2346 to 3094), fertilizer consumption in terms of nutrients (685 to 22262 tons), yield in kg/hect of foodgrains (506 to 1249), total cattle in hundreds (328579 to 472174), cropping intensity (105 to 134), percentage of animal power (153 to 434), use of pumps and oil engines per thousand of population (8 to 78), use of tractors per thousand of population (3 to 12).
11.	Dungarpur	Percentage of net area irrigated to net area sown (25.5 to 50.6), percentage of gross irrigated area to gross area sown (19.7 to 53.5), average size of operational holding (1.3 to 2.7 hect), percentage of area under commercial crops to total cropped area (1.1 to 23.0), production of foodgrains (190257 to 468181 thousand tons), percentage of agriculture workers to the total work force (9.2 to 11.8), forest area per lakh of population (6971 to 10580 hect.), gross value from agriculture per hectare at current prices (Rs. 134207 to 147191), gross value of agriculture output per capita at current prices (Rs. 1336 to 3612), fertilizer consumption in terms of nutrients (3460 to 24031 tons),

S. No.	Districts	Indicators requiring improvements
		yield in kg/hect. of foodgrains (1073 to 1461), total cattle (401058 to 447842 in hundreds), use of tractors per thousand of population (5 to 13).
12.	Ganganagar	Percentage of area sown more than once to net area sown (31.1 to 46.2), percentage of gross area sown under foodgrains to total cropped area (47.1 to 63.9), percentage of net area irrigated to net area sown (54.1 to 59.9), percentage of forest area to total geographical area (3.1 to 19.1), number of cows and buffaloes per thousand human population (641 to 671), forest area per lakh of population (1354 to 12890 hect.), gross value from agriculture per hectare at current prices (Rs. 85071 to 245309), yield in kg/hect of foodgrains (1460 to 1840), irrigation indensity (99 to 114), cropping intensity (131 to 146), percentage of animal power (166 to 584), use of pumps and oil engines per thousand of population (11 to 66).
13.	Jaipur	Percentage of area sown more than once to net area sown (38.3 to 55.5), percentage of forest area to total geographical area (6.5 to 17.4), number of cows and buffaloes per 1000 human population (362 to 736) percentage of agricultural workers to the total work force (5.2 to 8.2), forest area per lakh of population (2006 to 12131 hect.), total cattle (587718 to 697037), cropping intensity (138 to 155), percentage of animal power (343 to 437), use of pumps and oil engines per thousand of population (104 to 124).
14.	Jaisalmer	Percentage of area sown more than once to net area sown (3.1 to 31.1), percentage of gross area sown under foodgrains to total cropped area (54.1 to 62.0), percentage of net area irrigated to net area sown (5.7 to 45.3), percentage of forest area to total geographical area (0.6 to 11.0), percentage of gross irrigated area to gross area sown (15.5 to 53.5), percentage of area under commercial crops to total cropped area (6.0 to 22.4), production of foodgrains

S. No.	Districts	Indicators requiring improvements
		in thousand tons (22455 to 541102), forest area per lakh of population (6596 to 7012 hect.), gross value from agriculture per hectare at current prices (Rs. 0 to 167428), gross value of agriculture output per capita at current prices (Rs. 0 to 3283), fertilizer consumption in terms of nutrients (843 to 28382 tons), yield in kg/hect of food grains (122 to 1308), total cattle (310197 to 487162), cropping intensity (103 to 132), use of pumps and oil engines per thousand of population (4 to 75), use of tractors per thousand of population (3 to 14), percentage of agriculture work force to total work force (23.6 to 9.4).
15.	Jalore	Percentage of gross area sown under food grains to total cropped area (50.7 to 52.6), percentage of forest area to total geographical area (1.8 to 6.4), percentage of area under commercial crops to total cropped area (22.6 to 35.5), production of food grains in thousand tons (19915 to 288533), percentage of agriculture workers to the total work force (10.6 to 14.5), forest area per lakh of population (1637 to 5323 hect.), gross value of agriculture output per capita at current prices (Rs. 2509 to 3013), fertilizer consumption in terms of nutrients (14950 to 25883 tons.), yield in kg/hect of food grains (500 to 790), total cattle (287535 to 416034 in hundreds), irrigation intensity (109 to 117), percentage of animal power (290 to 449).
16.	Jhalawar	Percentage of gross area sown under food grains to total cropped area (49.2 to 57.8), percentage of net area irrigated to net area sown (53.6 to 55.1), percentage of area under commercial crops to total cropped area (10.2 to 27.0), production of food grains in thousand tons. (294072 to 637965), forest area per lakh of population (12179 to 12462 hect.), gross value from agriculture per hectare at current prices (Rs. 125604 to 166306), gross value of agriculture output per capita at current prices (Rs. 2611 to 3310), fertilizer consumption in terms of nutrients (22237 to 28623 tons.), yield in kg/hect. of food grains (1436 to

S. No.	Districts	Indicators requiring improvements
		1647), total cattle (430750 to 499693 in hundreds), irrigation intensity (103 to 112), percentage of animal power (299 to 482), use of tractors per thousand of population (8 to 17).
17.	Jhunjhunu	Percentage of net area irrigated to net area sown (35.6 to 37.0), percentage of gross irrigated area to gross area sown (39.5 to 54.4), average size of operational holding (2.8 to 3.7), percentage of area under commercial crops to total cropped area (16.8 to 22.0) , Number of cows and buffaloes per thousand human population (300 to 489), production of food grains in thousand tons (339225 to 341833), percentage of agriculture workers to the total work force (6.4 to 10.0), forest area per lakh of population (2498 to 3097 hect), gross value from agriculture per hectare at current prices (Rs. 47451 to 117305), gross value of agriculture output per capita at current prices (Rs. 2169 to 3200), fertilizer consumption in terms of nutrients (5612 to 15249 tons), total cattle (122490 to 346936in hundred), irrigation intensity (105 to 112), percentage of animal power (286 to 369), use of pumps and oil engines per thousand of population (23 to 66), use of tractors per thousand of population (6 to 13).
18.	Jodhpur	Percentage of area sown more than once to net area sown (4.6 to 33.2), percentage of net area irrigated to net area sown (8.9 to 44.4), Percentage of forest area to total geographical area (0.3 to 11.3), percentage of gross irrigated area to gross area sown (15.7 to 50.8), percentage of area under commercial crops to total cropped area (12.0 to 20.3), number of cows and buffaloes per thousand human population (408 to 549), production of food grains in thousand (380297 to 450025), percentage of agriculture workers to the total work force (5.7 to 10.6), forest area per lakh of population (323 to 7755 hect.), gross value from agriculture per hectare at current prices (Rs. 127475 to 134117), gross value of agriculture output per capita at current prices (Rs. 2447 to 3164), fertilizer consumption in

S. No.	Districts	Indicators requiring improvements
		terms of nutrients (17127 to 20640 tons), yield in kg/hect. of food grains (412 to 1222), cropping intensity (105 to 133), percentage of animal power (302 to 395), use of pumps and oil engines per thousand of population (34 to 78), use of tractors per thousand of population (11 to 13).
19.	Kota	None
20.	Nagaur	Percentage of area sown more than once to net area sown (12.4 to 29.7), percentage of net area irrigated to net area sown (17.8 to 41.7), percentage of forest area to total geographical area (0.9 to 6.9), percentage of gross irrigated area to gross area sown (27.8 to 59.4), percentage of area under commercial crops to total cropped area (16.4 to 23.9), number of cows and buffaloes per thousand human population (431 to 563), percentage of agriculture workers to the total work force (6.8 to 10.6), forest area per lakh of population (717 to 4877 hect.), gross value from agriculture per hectare at current prices (Rs. 101171 to 123392), gross value of agricultural output per capita at current prices (Rs. 1604 to 3347), yield in kg/hect. of food grains (670 to 944), cropping intensity (112 to 129), percentage of animal power (259 to 389), use of pumps and oil engines per thousand of population (17 to 87), use of tractors per thousand of population (9 to 13).
21.	Pali	None
22.	S. Madhopur	Percentage of area sown more than once to net area sown (30.0 to 43.3), percentage of gross area sown under food grains to total cropped area (53.7 to 55), percentage of net area irrigated to net area sown (53.3 to 58.8), average size of operational holding (2.0 to 2.6 hect.), number of cows and buffaloes per thousand human population (214 to 603), percentage of agriculture workers to the total work force (6.6 to 12.6), forest area per lakh of population (12279 to 13532 hect.), yield in kg/hect (1624 to 1735), total cattle (186717 to 450183), irrigation intensity (102 to 113), cropping intensity (130 to 143), percentage of animal power (323 to 426).

S. No.	Districts	Indicators requiring improvements
23.	Sikar	Percentage of net area irrigated to net area sown (31.9 to 38.3), percentage of gross irrigated area to gross area sown (38.7 to 58.4), average size of operational holding (3.1 to 3.9 hect.), percentage of area under commercial crops to total cropped area (9.0 to 25.5), number of cows and buffaloes (365 to 520), percentage of agriculture workers to the total work force (6.5 to 11.2), gross value from agriculture per hectare at current prices (Rs. 85426 to 125275), gross value of agriculture output per capita at current prices (Rs. 2607 to 3348), fertilizer consumption in terms of nutrients (9298 to 16736 tons.), total cattle (213995 to 280171 in hundreds), percentage of animal power (338 to 376), use of pumps and oil engines per thousand of population (23 to 77), use of tractors per thousand of population (9 to 13).
24.	Sirohi	Percentage of area sown more than once to net area sown (26.8 to 46.9), percentage of gross area sown under food grains to total cropped area (48.7 to 62.4), percentage of net area irrigated to net area sown (54.7 to 55.3), percentage of gross irrigated area to gross area sown (51.5 to 64.6), number of cows and buffaloes per thousand human population (524 to 549), production of food grains (119614 to 897141 tons), gross value of agriculture output per capita at current prices (Rs. 2854 to 3539), fertilizer consumption in terms of nutrients (9609 to 38129 tons), yield in kg/hect. of food grains (1377 to 1782), Total cattle (214324 to 642377 in hundreds), cropping intensity (127 to 146), use of pumps and oil engines per thousand of population (84 to 114), use of tractors per thousand of population (16 to 17).
25.	Tonk	Percentage of forest area to total geographical area (3.3 to 6.4), percentage of gross irrigated area to gross area sown (52.1 to 66), average size of operational holding (3.4 to 3.9 hect), percentage of area under commercial crops to total cropped area (31 to 35.5), forest area per lakh of population

S. No.	Districts	Indicators requiring improvements
		(2460 to 5323 hect.), fertilizer consumption in terms of nutrients (14668 to 25883 tons), total cattle (335657 to 416034), irrigation intensity (103 to 117), percentage of animal power (258 to 449), use of tractors per thousand of population (8 to 19).
26.	Udaipur	Percentage of net area irrigated to net area sown (44.4 to 71.3), percentage of forest area to total geographical area (21.2 to 26.9), percentage of gross irrigated area to gross area sown (37.4 to 38.1), average size of operational holding (1.6 to 2.9 hect.), percentage of area under commercial crops to total cropped area (7.0 to 26.7), percentage of agriculture workers to the total work force (7.8 to 14.1), forest area per lakh of population (14075 to 16184 hect.), gross value from agriculture per hectare at current prices (Rs. 323730 to 421481), gross value of agriculture output per capita at current prices (Rs. 1820 to 4784), fertilizer consumption in terms of nutrients (21620 to 45961 tons.), yield in kg/hect. of food grains (1676 to 2011), irrigation intensity (110 to 118), use of tractors per thousand of population (8 to 19).

Figures in parentheses indicate actual values of indicators and potential targets

Table 4.35 : Improvements needed in different indicators of Industrial sector

S. No.	Districts	Indicators requiring improvements
1.	Ajmer	None
2.	Alwar	Number of workers per lakh population in working factories (1388 to 1689), percentage of manufacturing industry workers to the total work force (3.4 to 4.3), percentage of people who got industrial loan (2.9 to 5.3), percentage amoount disbursed as industrial loan (7 to 11)
3.	Banswara	Number of workers employed in working factories (2912 to 14233), number of workers per lakh population in working factories (252 to 843), percentage of manufacturing industry workers to the total work force (0.5 to 2.1), gross output in industry per capita (1730 to 3940), industrial consumption of electricity per capita (90.1 to 155 kwh), percentage of people who got industrial loan (2.6 to 2.9), percentage amount disbursed as industrial loan (2 to 5.0).
4.	Barmer	Number of workers employed in working factories (3083 to 10395), number of workers per lakh population in working factories (215 to 614), per capita value added by manufacturing in Rs. (70 to 776), percentage of manufacturing industry workers to the total work force (0.5 to 1.5), gross output in industry per capita (Rs. 529 to 3519), industrial consumption of electricity per capita (13.1 to 113 kwh), percentage amount disbursed as industrial loan (2.0 to 2.9).
5.	Bharatpur	Number of workers employed in working factories (7868 to 9668), number of workers per lakh population in working factories (328 to 614), per capita value added by manufacturing in Rs. (332 to 834), percentage of manufacturing industry workers to the total work force (1.0 to 1.5), gross output in industry per capita in Rs. (1529 to

S. No.	Districts	Indicators requiring improvements
		3403), industrial consumption of electricity per capita (27.1 to 125 kwh), percentage of people who got industrial loan (1.0 to 2.4), percentage amount disbursed as industrial loan (1.0 to 3.7).
6.	Bhilwara	None
7.	Bikaner	Number of workers employed in working factories (9173 to 18324), gross output in industry per capita (Rs. 2412 to 4531), industrial consumption of electricity per capita (43.1 to 194 kwh), percentage of people who got industrial loan (2.0 to 4.0), percentage amount disbursed as industrial loan (2.5 to 10.0).
8.	Bundi	Number of workers employed in working factories (3967 to 1449), number of workers per lakh population in working factories (515 to 657), per capita value added by manufacturing in Rs. (29 to 878), percentage of manufacturing industry workers to the total work force (1.3 to 1.7), gross gouput in industry per capita (Rs. 1386 to 3942), Industrial consumption of electricity per capita (90.8 to 120 kwh), percentage of people who got industrial loan (0.8 to 2.5), percentage amount disbursed as industrial loan (0 to 3).
9.	Chittorgarh	Number of workers employed in working factories (6937 to 18324), number of workers per lakh population in working factories (467 to 634), percentage of manufacturing industry workers to the total work force (1 to 1.5), percentage of people who got industrial loan (2.6 to 4.0), percentage amount disbursed as industrial loan (4.1 to 10.0).
10.	Churu	Number of workers employed in working factories (2187 to 8839), number of workers per lakh population in working factories (142 to 529), per capita valued added by manufacturing industry workers to the total work force (0.4

S. No.	Districts	Indicators requiring improvements
		to 1.4), gross output in industry per capita (Rs. 107 to 2878), industrial consumption of electricity per capita (20.5 to 96 kwh), percentage of people who got industrial loan (1.0 to 2.9), percentage amount disbursed as industrial loan (1.0 to 2.7).
11.	Dungarpur	Number of workers employed in working factories (922 to 9526), number of workers per lakh population in working factories (105 to 599), per capita value added by manufacturing in Rs. (181 to 703), percentage of manufacturing industry workers to the total work force (0.2 to 1.5), gross output in industry per capita (Rs. 921 to 3425), industrial consumption of electricity per capita (38.9 to 117 kwh), percentage amount disbursed as industrial loan (1.0 to 2.9).
12.	Ganganagar	Number of workers per lakh population in working factories (1009 to 1222), gross output in industry per capita (Rs. 3790 to 7918), industrial consumption of electricity per capita (54.4 to 206 kwh) percentage of people who got industrial loan (2.0 to 2.4), percentage amount disbursed as industrial loan (5 to 9.5).
13.	Jaipur	None
14.	Jaisalmer	Number of workers employed in working factories (205 to 10638), number of workers per lakh population in working factories (60 to 574), per capita value added by manufacturing industry workers to the total work force (0.6 to 1.5), gross output in industry per capita (Rs. 40 to 3160), industrial consumption of electricity per capita (9.5 to 104 kwh), percentage amount disbursed as industrial loan (1.0 to 2.8).
15.	Jalore	Number of workers employed in working factories (942 to 11449), number of workers per lakh population in working factories (82 to 574), per capita value added by

S. No.	Districts	Indicators requiring improvements
		manufacturing in Rs. (273 to 878), percentage of manufacturing industry workers to the total workforce (0.2 to 1.7), gross output in industry per capita (Rs. 87 to 3942), industrial consumption of electricity per capita (26.9 to 120 kwh).
16.	Jhalawar	Number of workers employed in working factories (2648 to 10546), number of workers per lakh population in working factories (277 to 656), per capita value added by manufacturing in Rs. (537 to 871), percentage of manufacturing industry workers to the total work force (0.8 to 1.6), gross output in industry per capita (Rs. 2735 to 3487), industrial consumption of electricity per capita (57 to 133 kwh), percentage amount disbursed as industrial loan (0 to 4.1).
17.	Jhunjhunu	None
18.	Jodhpur	Number of workers per lakh population in working factories (1076 to 1222), gross output in industry per capita (Rs. 3914 to 7918), industrial consumption of electricity per capita (90.3 to 206), percentage amount disbursed as industrial loan (0.9 to 9.5).
19.	Kota	Number of workers per lakh population in working factories (952 to 982), per capita value added by manufacturing in (169 to 1036), percentage of people who got industrial loan (0.2 to 3.6), percentage amount disbursed as industrial loan (1.0 to 5.6).
20.	Nagaur	Number of workers employed in working factories (4178 to 15227), number of workers per lakh population in working factories (195 to 859), per capita value added by manufacturing in Rs. (295 to 838), percentage of manufacturing industry workers to the total work force (0.5 to 2.1), gross output in industry per capita (Rs. 569 to 5070), industrial consumption of electricity per capita (52.1 to 151 kwh).
21.	Pali	Per capita value added by manufacturing in Rs. (21 to 148), gross output in industry per capita (Rs. 3274 to 4531), industrial consumption of electricity per capita (83.2 to 194

S. No.	Districts	Indicators requiring improvements
		kwh), percentage of people who got industrial loan (3 to 4), percentage amount disbursed as industrial loan (3.5 to 10.0)
22.	S. Madhopur	Number of workers employed in working factories (3191 to 8536), number of workers per lakh population in working factories (162 to 511), per capita value added by manufacturing in Rs. (54 to 729), percentage of manufacturing industry workers to the total work force (0.4 to 1.3), industrial consumption of electricity per capita (12.2 to 2752 kwh), percentage amount disbursed as industrial loan (0.7 to 2.9), percentage of people who got industrial loan (1 to 2.6).
23.	Sikar	Number of workers employed in working factories (2535 to 9347), number of workers per lakh population in working factories (138 to 555), per capita valued added by manufacturing in Rs. (319 to 700), percentage of manufacturing industry worked to the total work force (0.4 to 1.4) gross output in industry per capita (Rs. 353 to 3118), industrial consumption of electricity per capita (34.2 to 102 kwh), percentage of people who got industrial loan (1.9 to 2.6), percentage amount disbursed as industrial loan (1.0 to 2.8).
24.	Sirohi	Number of workers employed in working factories (5940 to 20322), number of workers per lakh population in working factories (908 to 977), per capita value added by manufacturing in Rs. (122 to 1353), percentage amount disbursed as industrial loan (3 to 6.8).
25.	Tonk	Number of workers employed in working factories (2093 to 11969), number of workers per lakh population in working factories (215 to 725), percentage of manufacturing industry workers to the total work force (0.5 to 1.8), gross output in industry per capita (Rs. 1223 to 3498), industrial consumption of electricity per capita (29.2 to 142 kwh), percentage of people who got industrial loan (1.3 to 2.8), percentage amount disbursed as industrial loan (1 to 4.4).
26.	Udaipur	None

Figures in parentheses indicate actual values of indicators and potential targets

Table 4.36 : Improvements needed in different indicators of infrastructural sector

S. No.	Districts	Indicators requiring improvements
1.	Ajmer	None
2.	Alwar	Number of hospitals per lakh of population (0.39 to 0.53), number of beds in hospitals per lakh of population (65 to 72.8), number of high/ senior secondary schools per 1000 school going children (0.48 to 0.52), number of post offices per lakh of population (21.3 to 25.72).
3.	Banswara	Number of hospitals per lakh of population (0.17 to 0.54), Number of high/ senior secondary schools per 1000 school going children (0.47 to 0.55), number of post offices per lakh of population (23.40 to 25.18), number of civil veterinary hospital (26 to 45.15).
4.	Barmer	Number of hospitals per lakh of population (0.21 to 0.52), number of beds in hospitals per lakh of human population (59 to 95.94), number of high/ senior secondary schools per thousand of school going children (0.40 to 0.55), number of civil veterinary dispensaries (3 to 13.56), road length per 100 square km of geographical area (17 to 31 km).
5.	Bharatpur	Number of hospitals per lakh of human population (0.25 to 0.50), number of beds in hospitals per lakh of human population (59 to 71.5).
6.	Bhilwara	None
7.	Bikaner	Number of post offices per lakh of population (18.2 to 25.59), number of civil veterinary hospitals (37 to 47.42), number of civil veterinary dispensaries (1 to 14.58), road length per 100 square km of geographical area (12 to 31 km.)
8.	Bundi	Number of high/ senior secondary schools per thousand of school going children (0.46 to 0.52), number of post offices per lakh of population (22.8 to 24), number of civil veterinary hospitals (22 to 47.73), number of civil

S. No.	Districts	Indicators requiring improvements
		veterinary dispensaries (1 to 10.18), road length per 100 square km of geographical area (22 to 26 km).
9.	Chittorgarh	Number of hospitals per lakh of human population (0.34 to 0.61), number of beds in hospitals per lakh of human population (71 to 83.75), number of civil veterinary dispensaries (7 to 14.5), road length per 100 square km of geographical area (23 to 30 km).
10.	Churu	Number of civil veterinary hospitals (44 to 52.33), number of civil veterinary dispensaries (8 to 14), road length per 100 square km of geographical area (15 to 30 km).
11.	Dungarpur	Number of hospitals per lakh of human population (0.23 to 0.60), number of beds in hospitals per lakh of human population (78 to 89), number of civil veterinary hospitals (25 to 55.75), number of civil veterinary dispensaries (13 to 14.5).
12.	Ganganagar	Number of hospitals per lakh of human population (0.27 to 0.53), number of beds in hospitals per lakh of human population (53 to 71.78), number of post offices per lakh of population (21.5 to 24.35), number of civil veterinary dispensaries (8 to 10.44), road length per 100 square km of geographical area (17 to 28 km).
13.	Jaipur	Number of high/ senior secondary schools per thousand of school going children (0.52 to 0.64), number of post offices per lakh of population (17.6 to 24.47), road length per 100 square km of geographical area (28 to 30 km).
14.	Jaisalmer	Number of civil veterinary hospitals (31 to 55), number of civil veterinary dispensaries (0 to 16.33), road length per 100 square km of geographical area (9 to 22 km.)
15.	Jalore	Number of hospitals per lakh of human population (0.17 to 0.51), number of beds in hospitals per lakh of human population (63 to 73), number of high/ senior secondary schools per 1000 school going children (0.40 to 0.53), number of civil veterinary hospitals (34 to 41.79), number of civil veterinary dispensaries (1 to 11.05), road length per

S. No.	Districts	Indicators requiring improvements
		100 square km of geographical area (21 to 27 km), number of post offices per lakh of human population (23 to 24.60).
16.	Jhalawar	Number of high/senior secondary schools per 1000 school going children (0.39 to 0.51), number of civil veterinary hospitals (25 to 43.47), number of civil veterinary dispensaries (2 to 11.88), road length per 100 square km of geographical area (16 to 28 km).
17.	Jhunjhunu	None
18.	Jodhpur	Number of high/senior secondary schools per 1000 school going children (0.42 to 0.58), number of post offices per lakh of population (18.30 to 24.93), number of civil veterinary dispensaries (16 to 17.28), road length per 100 square km of geographical area (22 to 31 km).
19.	Kota	Number of post offices per lakh of population (19.30 to 25.42), number of civil veterinary dispensaries (3 to 11.20), road length per 100 square km of geographical area (22 to 26 km).
20.	Nagaur	Number of hospitals per lakh of human population (0.47 to 0.54), number of beds hospitals per lakh of human population (62 to 68), number of high/ senior secondary schools per 1000 school going children (0.47 to 0.51), number of civil veterinary dispensaries (12 to 17), road length per 100 square km of geographical area (27 to 29 km).
21.	Pali	None
22.	S. Madhopur	Number of hospitals per lakh of human population (0.20 to 0.53), number of beds in hospitals per lakh of human population (47 to 77.89), number of post offices per lakh of population (23.40 to 24.75), number of civil veterinary hospitals (38 to 46.33), number of civil veterinary dispensaries (10 to 10.55), road length per 100 square km of geographical area (24 to 27 km.)
23.	Sikar	None

S. No.	Districts	Indicators requiring improvements
24.	Sirohi	Number of civil veterinary hospitals (23 to 52.33), number of civil veterinary dispensaries (6 to 14), road length per 100 square km of geographical area (26 to 30 km).
25.	Tonk	Number of beds in hospitals per lakh of human population (72 to 77), number of post offices per lakh of population (22.60 to 25.06), number of civil veterinary hospitals (30 to 43.78), number of civil veterinary dispensaries (6 to 13.07), road length per 100 square km of geographical area (20 to 30 km).
26.	Udaipur	None

Figures in parentheses indicate actual values of indicators and potential targets

Table 4.37 : Improvements needed in different indicators of Socio-economic sector

S. No.	Districts	Indicators requiring improvements
1.	Ajmer	None
2.	Alwar	None
3.	Banswara	Urban population (89194 to 379249), percentage literacy (26.0 to 39.6), different types of vehicles registered (30918 to 67175), per capita deposit in scheduled banks (Rs. 27600 to 47679), number of commercial vehicles per lakh of population (419 to 1022), number of cooperative societies per lakh of population (30 to 41), percentage of villages electrified (78 to 93).
4.	Barmer	Urban population (144166 to 333797), percentage literacy (22.98 to 37.15), different types of vehicles registered (18261 to 63772), per capita deposit in scheduled banks (Rs. 17449 to 44629), number of commercial vehicles per lakh of population (325 to 990), number of co-operative societies per lakh of population (37 to 44), percentage of villages electrified (89 to 92), average population per bank in thousand (19 to 14).
5.	Bharatpur	Density of population per sq. km area (573 to 180), urban population (469628 to 604457), percentage of main workers to total population (29.6 to 32.3), percentage literacy (39.02 to 48.50), different types of vehicles registered (71417 to 153850), per capita deposit in scheduled banks (Rs. 45702 to 89551), number of commercial vehicles per lakh of population (1372 to 1492), percentage of villages electrified (85 to 94), average population per bank in thousand (16 to 13)
6.	Bhilwara	Urban population (311141 to 518054), percentage literacy (31.65 to 41.78), different types of vehicles registered (68357 to 140894), per capita deposit in scheduled banks (Rs. 36430 to 85195), number of commercial vehicles per lakh of population (1091 to 1262), number of villages connected to metalled roads (413 to 645), average population per bank in thousand (14 to 13).

S. No.	Districts	Indicators requiring improvements
7.	Bikaner	Percentage of main workers to total population (29.9 to 34.5), different types of vehicles registered (73185 to 126429), per capita deposit in scheduled banks (55729 to 71375), number of commercial vehicles per lakh of population (1140 to 1415), number of villages connected to metalled roads (210 to 537), percentage of villages electrified (88 to 93).
8.	Bundi	Density of population per sq km of area (139 to 129), urban population (133744 to 465251), percentage literacy (32.75 to 38.10), different types of vehicles registered (19029 to 98110), per capita deposit in scheduled banks (13407 to 61756), number of commercial vehicles per lakh of population (980 to 1190), number of co-operative socieites per lakh of population (39 to 44), number of villages connected to metalled roads (188 to 464).
9.	Chittorgarh	urban population (231627 to 466326), percentage literacy (34.28 to 39.25), different types of vehicles registered (47233 to 122760), per capita deposit in scheduled banks (37333 to 73004), number of commercial vehicles per lakh of population (940 to 1219), number of villages connected to metalled roads (477 to 587), percentage of villages electrified (88 to 92), average population per bank in thousand (14 to 13).
10.	Churu	Percentage of main workers to total population (30 to 31.3), percentage literacy (34.78 to 39.51), different types of vehicles registered (14955 to 99633), per capita deposit in scheduled banks (Rs. 38716 to 64528), number of commercial vehicles per lakh of population (471 to 1019), number of villages connected to metalled roads (284 to 532), percentage of villages electrified (90 to 92).
11.	Dungarpur	Density of population per sq. km area (232 to 159), urban population (63817 to 318036), percentage of main workers to total population (30.2 to 32.1), percentage literacy (30.55 to 35.32), different types of vehicles registered

S. No.	Districts	Indicators requiring improvements
		(14858 to 60303), per capita deposit in scheduled banks (22844 to 43246), number of commercial vehicles per lakh of population (385 to 980), number of co-operative societies per lakh of population (33 to 39), number of villages connected to metalled roads (307 to 392), average population per bank in thousand (14 to 13).
12.	Ganganagar	Urban population (552112 to 734062), percentage of main workers to total population (30.1 to 33.2), percentage literacy (41.82 to 58.59), different types of vehicles registered (136694 to 173284), per capita deposit in scheduled banks (87696 to 96085), number of co-operative societies per lakh of population (48 to 58), percentage of villages electrified (62 to 98)
13.	Jaipur	None
14.	Jaisalmer	Urban population (53600 to 339454), percentage of main workers to total population (29.5 to 32.3), percentage literacy (30.05 to 37.27), different types of vehicles registered (4977 to 63473), per capita deposit in scheduled banks (Rs. 7080 to 45251), number of commercial vehicles per lakh of population (477 to 1017), number of villages connected to metalled roads (133 to 437), percentage of villages electrified (39 to 91).
15.	Jalore	Urban population (83208 to 318119), percentage literacy (23.76 to 35.36), different types of vehicles registered (19816 to 65155), per capita deposit in scheduled banks (14430 to 42892), number of commercial vehicles per lakh of population (817 to 1135), number of villages connected to metalled roads (235 to 381), average population per bank in thousand (17 to 14).
16.	Jhalawar	Urban population (150963 to 370743), percentage literacy (32.94 to 36.93), different types of vehicles registered (17870 to 66445), per capita deposit in scheduled banks (11747 to 48291), number of commercial vehicles per lakh of population (516 to 904), number of co-operative societies per lakh of population (37 to 42), number of villages connected to metalled roads (256 to 428), percentage of villages electrified (77 to 93).

S. No.	Districts	Indicators requiring improvements
17.	Jhunjhunu	Density of population (267 to 156), urban population (325044 to 333797), percentage of main workers to total population (24.4 to 32.97), different types of vehicles registered (21549 to 63772), per capita deposit in scheduled banks (42591 to 44629), number of commercial vehicles per lakh of population (455 to 990), number of co-operative societies per lakh of population (30 to 44).
18.	Jodhpur	None
19.	Kota	None
20.	Nagaur	Urban population (342636 to 518054), percentage literacy (31.80 to 41.78), different types of vehicles registered (51453 to 140894), per capita deposit in scheduled banks (33788 to 85195), number of co-operative societies per lakh of population (34 to 41), number of villages connected to metalled roads (368 to 645), average population per bank in thousand (16 to 13).
21.	Pali	Urban population (323347 to 518054), percentage literacy (35.96 to 41.78), different types of vehicles registered (51084 to 140894), per capita deposit in scheduled banks (34673 to 85195), number of villages connected to metalled roads (312 to 645).
22.	S. Madhopur	Urban population (291274 to 407153), percentage of main workers to total population (30.2 to 31.7), percentage literacy (36.27 to 38.73), different types of vehicles registered (24398 to 120808), per capita deposit in scheduled banks (Rs. 32381 to 89124), number of commercial vehicles per lakh of population (529 to 969), number of co-operative societies per lakh of population (33 to 42), number of villages connected to metalled roads (416 to 768), average population per bank in 000 (16 to 14).
23.	Sikar	Density of population (238 to 160), Urban population (387521 to 448389), percentage of main workers to total population (25.1 to 32.6), different types of vehicles registered (24215 to 104785), per capita deposit in

S. No.	Districts	Indicators requiring improvements
		scheduled banks (Rs. 46198 to 61470), number of co-operative societies per lakh of population (29 to 44), number of villages connected to metalled roads (318 to 480), number of commercial vehicles (465 to 1267), average population per bank in 000 (17 to 14).
24.	Sirohi	Urban population (127582 to 422494), percentage literacy (31.94 to 37.74), different types of vehicles registered (22300 to 80653), per capita deposit in scheduled banks (Rs. 23463 to 56449), number of co-operative societies per lakh of population (30 to 42), number of villages connected to metalled roads (201 to 474).
25.	Tonk	Urban population (190420 to 422494), percentage literacy (33.67 to 37.74), different types of vehicles registered (26518 to 80653), per capita deposit in scheduled banks (16096 to 56449), number of commercial vehicles per lkah of population (605 to 978), number of villages connected to metalled roads (182 to 474), percentage of villages electrified (84 to 93), average population per bank (14 to 12).
26.	Udaipur	Percentage literacy (34.38 to 43.09), number of commercial vehicles per lakh of population (795 to 1143), number of co-operative societies per lakh of population (30 to 54), percentage of villages electrified (86 to 95)

Figures in parentheses indicate actual values of indicators and potential targets

needs to be evolved for different districts keeping in view their situation. Indicators causing regional imbalance and the strategy for development in each district is given below :

1. Ajmer

The district is low developed in agricultural sector (Table 4.34) and well developed in rest three sectors as it does not require improvement in any of the indicators (Table 4.35 to 4.37). It can be seen from the Table 4.34 that for enhancing gross value from agriculture per hectare and output per capita, there is need to increase, the percentage of net area irrigated to net area sown (31.7 to 34.3), percentage of gross irrigated area to gross area sown (36.7 to 66), percentage of area under commercial crops (11.8 to 35.5), fertilizer consumption (11445 to 25883 tons), use of pumps and oil engines (46 to 67) and average size of operational holding (2.3 to 3.9 hect). Improvement in number of cows and buffaloes (459 to 491) per 1000 human population and forest area per lakh of human population (2832 to 5323 hect.) is also required.

2. Alwar

Information presented in Table 4.34, 4.35 and 4.36 indicates that the district is poor in agricultural, industrial and infrastructural sectors of development. In order to ensure agriculture development, major improvement are required in the indicators i.e. percentage of forest area to total geographical area (6.5 to 19.3), forest area per lakh of human population (2165 to 13870 hect.), average size of operational holding (1.8 to 2.5 hect.), number of cows and buffaloes (422 to 584), total cattle (204628 to 455054) and percentage of animal power (315 to 457).

In order to promote industrial development in the district, there is need to increase the percentage of people who got industrial loan

from 2.9 to 5.3 and percentage amount disbursed as industrial loan from 7 to 11 per cent. Increase in the number of workers per lakh population in working factories (1388 to 1689) and percentage of manufacturing industry workers to the total work force (3.4 to 4.3) is also required (Table 4.35).

Data in Table 4.36 reveals that increase in medical facilities like number of hospitals per lakh of population (0.39 to 0.53) and number of beds in hospitals (65 to 72.8) is required for infrastructural development of the district. Communication system in the district i.e. number of post offices per lakh of population need to be increased from 21.3 to 25.72.

3. Banswara

The district is mainly inhabited by tribals and backward in all the four sectors of development (Table 4.34 to 4.37). The Table 4.34 depicts that major improvements are required in indicators like percentage of area sown (49.7 to 55.5), percentage of net area irrigated (36.3 to 55.3), percentage of gross irrigated area (28 to 63.7) average size of operational holding (1.6 to 2.3 hect.) and fertilizer consumption (17178 to 29305 tons), so that production and productivity of food grains can be increased. Increase in percentage of area under commercial crops (3.5 to 18.5), use of pumps and oil engines (97 to 124), use of tractors (3 to 11) may result in increased agriculture output. Increase in forest area (9196 to 12131 hect.) and number of cows and buffaloes (698 to 736) will also contribute to agricultural development of the district.

Information given in Table 4.35 shows that major improvements in all the indicators related to industrial development are required. It can be seen from the Table 4.36 that with regard to infrastructural development there is need to increase medical facilities for both

human and livestock population i.e. the number of hospital (0.1 to 0.54) and number of civil veterinary hospitals (26 to 45.15).

Data in Table 4.37 reveals that development of district in socio-economic sector is poor. The indicators that require improvement are urban population (89194 to 379249), different types of vehicles registered (30918 to 6717), number of commercial vehicles (419 to 1022), per capita deposits in scheduled banks (Rs. 27600 to 47679) and number of co-operative societies (30 to 41). Literacy percentage is very low in the district which requires immediate improvement from 26 to 39.60 per cent. Electrification needs to be extended from 78 to 93 per cent villages.

4. Barmer

The district lies in the desert area of western part of the state. Data presented in Table 4.34 to 4.37 depicts that district requires improvement in all the four sectors of development. It can be observed from the Table 4.34 that agricultural development in the district is very poor and it requires major improvements in all the indicators except percentage of gross area under food grains, total cattle and irrigation intensity. Similar situation exists in industrial sector (Table 4.35) where all the indicators need improvement except, the percentage of people who got industrial loan.

With regard to infrastuctural development (Table 4.36), major improvements are required in most of the indicators like number of hospitals (0.21 to 0.52), number of beds in hospitals (59 to 95.94), number of civil veterinary dispensaries (3 to 13.56) and road length (17 to 31 km). For proper socio-economic development of district, indicators which require improvement (Table 4.37) are urban population (144166 to 333797), percentage literacy (22.98 to 37.15), types of vehicles registered (18261 to 63772), number of commercial

vehicles (325 to 990), per capita deposit in schedules banks (Rs. 17449 to 44629), number of co-operative societies (37 to 44) and percentage of villages electrified (89 to 92). There is need to reduce the average population per bank from 19000 to 14000 or increase the number of banks according to the population.

5. Bharatpur

Tables 4.34 to 4.37 regarding indicators requiring improvement illustrates that the district is low developed in all the sectors of development under study. Data in Table 4.34 indicates that there is need to increase the percentage of area sown more than once (26.5 to 42.4), percentage of gross area sown under food grains (50.1 to 59), average size of operational holding (1.6 to 2.1 hect.), irrigation intensity (103 to 112) and cropping intensity (127 to 142). Increase in percentage of forest area per lakh of population (2122 to 11633 hect.), number of cows and buffaloes (402 to 555), total cattle (179720 to 536224) and percentage of animal power (252 to 487) will result in better agriculture development of the district.

For ensuring proper industrial development, major improvements are required in all the indicators of industrial sector (Table 4.35). With regard to infrastructural development of the district, increased medical facilities in terms of number of hospitals (0.25 to 0.50) and number of beds in hospitals (59 to 71.5) are required. As far as socio-economic development of the district is concerned, it needs strengthening of indicators like urban population (469628 to 604457), percentage of main workers (29.6 to 32.3), different types of vehicles registered (71417 to 153850), number of commercial vehicles (1372 to 1492), per capita deposit in scheduled banks (Rs. 45702 to 8955) and percentage of villages electrified (85 to 94). Steps should be taken to improve the literacy rate (39.02 to 48.50) and reduce population

density (573 to 180) and increase number of banks according to population requirements.

6. Bhilwara

Findings presented in Table 4.34 and Table 4.37 reveals that district is low developed in agricultural and socio-economic sectors respectively while it is well developed in industrial (Table 4.35) and infrastructural sectors (Table 4.36). It can be observed from Table 4.34 that for increasing the gross value from agriculture and agriculture output per capita there is need to increase the percentage of net area irrigated (53.5 to 73), average size of operational holding (2.05 to 2.7 hect.), percentage of area under commercial crops (14.9 to 24.8), fertilizer consumption (21568 to 36187 tons) and use of tractors (11 to 18). Increase in the percentage of forest area to total geographical area needs to be increased from 6.10 to 25.4 per cent for proper agricultural development of the district.

Data in the Table 4.37 shows that improvement in the indicators like urban population from 311141 to 518054, literacy percentage from 31.65 to 41.78 per cent, number of vehicles registered from 68357 to 140894, number of commercial vehicles from 1091 to 1262 and per capita deposit in scheduled banks from Rs. 36430 to 85195. More number of villages (413 to 645) should to connected to metalled roads and number of banks should be increased according to the existing population.

7. Bikaner

Data presented in Table 4.34 to 4.37 reveals that the district is backward in agricultural, industrial and socio-economic development whereas it is well developed in infrastructural sector. Table 4.34 depicts that major improvements are needed in most of indicators related to agriculture development except a few indicators like number

of cows and buffaloes, total cattle, percentage of animal power, average size of operational holding and fertilizer consumption with regard to industrial sector, Table 4.35 reveals that in order to increase the gross output in industry, there is need to increase number of workers employed in working factories (9173 to 18324) and industrial consumption of electricity per capita (43.1 to 194 kwh) credit facilities in terms of percentage amount disbursed as industrial loan and people who got industrial loan needs to be provided.

Progress is socio-economic sector of the district can be achieved by increasing the percentage of main workers (29.9 to 34.5) different types of vehicles registered (73185 to 126429) number of commercial vehicles (1140 to 1415) and per capita deposits in scheduled banks (Rs. 55729 to 71375). The number of villages connected to metalled roads need to be increased from 210 to 537 and electrification of village should be increased from 88 to 93 per cent.

8. Bundi

The district is well developed in agriculture sector (Table 4.34) but lacks in industrial, infrastructural and socio-economic development (Table 4.35 to 4.37). Data presented in Table 4.35 indicates that major improvements are required in all the indicators related to industrial sector as it is very backward in this sector. There is need to setup agro-based industries and generate employment opportunities. Since the district is well developed in agricultural sector, the agricultural produce may be utilized as main raw material for preparation of finished goods.

Table 4.36 reveals that major improvements are required in indicators like number of civil veterinary hospitals (22 to 47.73), dispensaries (1 to 10.18) and road length from 22 to 26 km per 100 sq. km of geographical area. In case of development in socio-economic

sector Table 4.37 depicts that density of population of Bundi district should be decreased from 139 to 129 persons per sq. km and urban population should be increased from 133744 to 465251. Other indicators that require improvement are literacy percentage (32.75 to 38.10), different types of vehicles registered (19029 to 98110), number of commercial vehicles (980 to 1196), per capita deposit in scheduled banks (Rs. 13407 to 61756), number of co-operative societies (39 to 44) and number of villages connected to metalled roads. Improvement in these indicators may lead to socio-economic development in the district.

9. Chittorgarh

The district is well developed in agricultural sector (Table 4.34) whereas it is low developed in industrial (Table 4.35), infrastructural (Table 4.36) and socio-economic sectors (Table 4.37). For ensuring the industrial development of the district, there is need to increase the number of workers in the factories and credit facilities in terms of percentage of people who got industrial loan and amount disbursed as loan (Table 4.35). Data in Table 4.36 shows that for infrastructural development of the district, there is need to improve the indicators like number of hospitals (0.34 to 0.61), number of beds in hospitals (71 to 83.75), number of civil veterinary dispensaries (7 to 14.5) and road length (23 to 30 km) per 100 sq km of geographical area. It can be seen from the Table 4.37 that increase in urban population (231627 to 466326), percentage literacy (34.28 to 39.25), different types of vehicles registered (47233 to 122760), number of commercial vehicles (940 to 1219), per capita deposits in scheduled banks (Rs. 37333 to 73004) and number of villages connected to metalled roads (477 to 587) may help the district to develop in socio-economic sector.

10. Churu

The district lies in the desert region of the state and is poorly developed in all the four sectors of development. It can be seen from the Table 4.34 that major improvements are required in most of the indicators related to agricultural development except a few indicators. Data in the Table 4.35 shows that all the indicators regarding industrial development needs major improvements. Findings related to infrastructural sector (Table 4.36) shows that there is need to increase the number of civil veterinary hospitals and dispensaries from 44 to 52.33 and 8 to 14 respectively. It was further observed that there is need to double the road length (15 to 30 km) per 100 sq. km of geographical area.

The indicators related to socio-economic sector (Table 4.37) that need major improvements are percentage literacy (34.78 to 39.51), different types of vehicles registered (14955 to 99633), number of commercial vehicles (471 to 1019), per capita deposit in scheduled banks (38716 to 64528) and number of villages connected to metalled roads (284 to 532).

11. Dungarpur

The district lies in the southern part of the state and mainly inhabited by tribals. It can be seen from the Table 4.34 to 4.37 that the district is poorly developed in all the sectors of development. With respect to agriculture development, majority of the indicators require improvement except a few indicators like area sown more than once, gross area under foodgrains, number of cows and buffaloes, animal power, irrigation and cropping intensity, use of pumps and oil engines which appear to be satisfactory (Table 4.34). In order to increase the agricultural output, major improvements are required in irrigation

facilities, cultivation of commercial crops, fertilizer consumption and use of tractors.

Data in Table 4.35 shows that per capita value added by manufacturing needs to be increased from Rs. 181 to 703 and gross output in industry per capita from Rs. 921 to 3425. For this most of the indicators depicting industrial development needs to be improved. In case of industrial sector, Table 4.36 shows that the district needs major improvement in number of hospitals per lakh of human population (0.23 to 0.60), number of beds in hospitals (78 to 89), number of civil veterinary hospitals (25 to 55.75). The district is poorly developed in socio-economic sector (Table 4.37) and improvement in all the indicators may result in proper socio-economic development.

12. Ganganagar

The district is low developed in all the four sectors of development (Table 4.34 to 4.37). Table 4.34 reveals that in case of agricultural sector, the district needs to be improved in various indicators. Indicators like gross irrigated area, size of operational holding, area under commercial crops, fertilizer consumption, cattle population and use of tractors need no improvement whereas rest of the indicators needs to be improved. In case of industrial sector (Table 4.35), for increasing gross output in industry per capita from Rs. 3790 to Rs. 7918, electricity consumption should be increased. Adequate provision of industrial loan to more number of people will help to establish and run industries. More work force (1009 to 1222) should be directed to this sector so that percentage of agricultural workers can be reduced.

Data in Table 4.36 shows that major improvement in number of hospitals (0.27 to 0.53), number of beds in hospitals (53 to 71.78) and road length from 17 to 28 km per 100 sq km of geographical area may

result in proper infrastructural development of the district. Regarding socio-economic sector (Table 4.37), the district need improvement in urban population, literacy, number of vehicles, deposits in banks, number of co-operative societies and electrification of villages.

13. Jaipur

Data presented in Table 4.34 to 4.37 reveals that the district is well developed in industrial and socio-economic sector but low developed in agricultural and infrastructural sectors. For proper development in the agriculture, there is need to increase percentage of area sown (38.3 to 55.5), cropping intensity (138 to 155) and use of pumps and oil engines (104 to 124). Increase in forest area, number of cows and buffaloes, total cattle and percentage of animal power will also help to develop agricultural sector. It can be seen from the Table 4.36 that the number of educational institutions and post offices are not enough for the population residing in the district which need to be increased from 0.52 to 0.64 and 17.6 to 24.47 respectively.

14. Jaisalmer

The district lies in the desert area of the state and backward in all the sectors of development. Animal husbandry forms the mainstay of the district. Data in Table 4.34 indicates that to increase the gross value of agriculture output per capita (0 to Rs. 3283) and gross value from agriculture per hectare (Rs. 0 to 167428), most of the indicators need major improvements except few indicators like number of cows and buffaloes, animal power and average size of operational holding. Table 4.35 depicts that all the indicators except percentage of people who got industrial loan need to be improved for industrial development of the district.

Infrastructural development (Table 4.36) of the district is affected by the non-existence of adequate number of veterinary

hospitals, veterinary dispensaries and roads which needs to be increased. Data in Table 4.37 reveals that majority of the indicators of socio-economic development needs improvement which includes urban population (53600 to 339454), percentage literacy (30.05 to 37.27), different types of vehicles registered (4977 to 63473), number of commercial vehicles (477 to 1017), per capita deposit in scheduled banks (Rs. 7080 to 45251), number of villages connected to metalled roads (133 to 437) and percentage of villages electrified (39 to 91).

15. Jalore

The district is poorly developed in all the sectors. Data in Table 4.34 indicates that there is need to increase gross value of agricultural output, production and productivity of foodgrains which can be done by increased fertilizer consumption (14950 to 25883 tons) and irrigation intensity (109 to 117). Covering more area under forest, cultivation of commercial crops and increased cattle population and use of animal power may contribute to agriculture development in the district. It can be observed from Table 4.35 that making improvement in all the indicators except the industrial credit will facilitate the industrial development in the district.

Data in Table 4.36 illustrates that the district does not have adequate medical facilities for both human and cattle population, educational institutions, roads and post offices. Improvements in all the indicators of infrastructural development are needed in this district. With regard to socio-economic development of the district, Table 4.37 indicates that indicators which need improvement are urban population (83208 to 318119), percentage literacy (23.76 to 35.36), different types of vehicles registered (19816 to 65155), number of commercial vehicles per lakh of population (817 to 1135), per capita deposit in scheduled banks (14430 to 42892) and number of villages

connected to metalled roads (235 to 381). There is need to reduce the population in the district or number of banks should be increased according to the population residing in this district.

16. Jhalawar

The district needs to be developed in all the four sectors of development. Findings in the Table 4.34 indicates that in order to increase the production and productivity of food grains and agricultural output, there is need to increase the fertilizer consumption (14950 to 25883 tons) and irrigation intensity (109 to 117). More coverage under forest area, animal power, use of tractors and cultivation of commercial crops may result in proper agricultural development in the district. Table 4.35 shows that adequate industrial development has not taken place in the district which can be achieved by making major improvements in all the related indicators.

In order to ensure infrastructural development of the district (Table 4.36), the indicators that need major improvement are number of high/ senior secondary schools (0.39 to 0.51), number of post offices (18.30 to 24.93) and road length (22 to 31 km). In socio-economic sector (Table 4.37), most of the indicators need improvement except density of population and number of banks according to the population. Special drive should be made for improvement of these indicators.

17. Jhunjhunu

The district is low developed in agricultural and socio-economic sectors. Data in Table 4.34 reveals that most of the indicators related to agriculture sector needs improvement except a few indicators like area sown more than once, gross area under foodgrains, yield of foodgrains, cropping intensity and area under forest which appear to be satisfactory. In socio-economic sector (Table 4.37) indicators like

density of population (267 to 156), urban population (325044 to 333797), percentage of main workers (24.4 to 32.9), different types of vehicles registered (21549 to 63772), number of commercial vehicles (455 to 990) and number of co-operative societies (30 to 44), need major improvements.

18. Jodhpur

The district is well developed in socio-economic sector but poor in agricultural, industrial and infrastructural development. Data in Table 4.34 shows that the district require major improvement in all the indicators except a few like gross area sown under foodgrains, average size of operational holding, total cattle and irrigation intensity. Data related to industrial sector (Table 4.35) depicts that gross output in industry can be increased by increasing the number of workers (1076 to 1222), industrial consumption of electricity (90.3 to 206 kwh) and percentage amount disbursed as industrial loan (0.9 to 9.5). It can be observed from the Table 4.36 that adequate number of higher secondary schools, post offices, veterinary dispensaries and development of roads may ensure the infrastructural development of the district.

19. Kota

The district is poor in industrial and infrastructural development but well developed in agricultural and socio-economic sectors. Information presented in Table 4.35 depicts that adequate credit facilities in the industrial sector may help to generate employment in working factories and raise per capita value added by manufacturing in Rs. (169 to 1036). With regard to infrastructural sector (Table 4.36), increase in number of post offices (19.30 to 25.42) civil veterinary dispensaries (3 to 11.20) and development of roads (22 to 26 km) will ensure the infrastructural development in the district.

20. Nagaur

The district is low developed in all the four sectors. In case of agriculture sector (Table 4.34) it requires major improvements in the indicators like area sown more than once, irrigated area, area under commercial crops, forest area, cropping intensity, number of cows and buffaloes, animal power and use of farm implements. Improvement in these indicators will help to ensure increased productivity of food grains, gross value from agriculture and agricultural output. Table 4.35 depicts that major improvements are required in almost all the indicators related to industrial sector.

With regard to infrastructural sector (Table 4.36) it was observed that district needs to improve indicators like number of hospitals (0.47 to 0.54), number of beds in hospital (62 to 68), number of high/ senior secondary schools (0.47 to 0.51), number of civil veterinary dispensaries (12 to 17) and road length (27 to 29 km). Improvement in urban population (51453 to 140894), percentage literacy (31.80 to 41.78), different types of vehicles registered 151453 to 140894), per capita deposit in scheduled banks (33788 to 85195), number of cooperative societies (34 to 41), number of villages connected to metalled roads (368 to 645) and number of banks according to the population of the district will develop the socio-economic sector in the district (Table 4.37).

21. Pali

The district is well developed in agricultural and infrastructural sector but low developed in industrial and socio-economic sectors (Table 4.34 to 4.37). In industrial sector, adequate credit to more number of people and increased consumption of electricity may help in increased industrial output. With regard to socio-economic development (Table 4.37) of the district it can be observed that

improvements are required in the indicators like urban population (323347 to 518054) percentage literacy (35.96 to 41.78), different types of vehicles registered (51084 to 140894), per capita deposit in banks (Rs. 34673 to 85195), and number of villages connected to metalled roads (313 to 645).

22. Sawai Madhopur

Findings of the study indicates that the district is low developed in all the four sectors. Agriculture development (Table 4.34) in the district can be brought about by improving the indicators like percentage of area sown more than once (30.0 to 43.3), percentage of net area irrigated to net area sown (53.3 to 58.8), average size of operational holding (2.0 to 2.6 hect), number of cows and buffaloes (214 to 603), total cattle (186717 to 450183), percentage of animal power (323 to 426), forest area (12279 to 13532 hect.), irrigation intensity (102 to 113), cropping intensity (130 to 143) and percentage of agriculture workers to the total work force (6.6 to 12.6). To develop the district in industrial sector, all the indicators require major improvements (Table 4.35).

Perusal of the Table 4.36 shows that medical facilities, post offices and roads are not enough. Improvements in these indicators may lead to infrastructural development of the district. In case of socio-economic sector, all the indicators except density of population and electrified villages need to be improved (Table 4.37).

23. Sikar

Findings of the study indicate that the district is developed in infrastructural sector but low developed in most of the sectors. Perusal of Table 4.34 reveals that in agricultural sector, improvement is required in the indicators like percentage of net area irrigated (31.9 to 38.3) percentage of gross area irrigated (38.7 to 58.4), average size

of operational holding (3.1 to 3.9 hect.), percentage of area under commercial crops (9.0 to 25.5), number of cows and buffaloes (365 to 520), percentage of agriculture workers to the total work force (6.5 to 11.2), fertilizer consumption (9298 to 16736 tons.), total cattle (213995 to 280171 in hundreds), percentage of animal power (338 to 376), use of pumps and oil engines (23 to 77) and use of tractors (9 to 13).

Further Table 4.35 depicts that this district needs to improve all the indicators of industrial development. In case of socio-economic sector two indicators i.e. percentage literacy and number of villages electrified are satisfactory and improvement in all the remaining indicators may lead to socio-economic development of the district.

24. Sirohi

Data in Tables 4.34 to 4.37 indicate that the district is poorly developed in all the four sectors. In order to increase the gross value of agriculture output, production and productivity of foodgrains, there is need to improve the indicators like percentage of area sown more than once (26.8 to 46.9), percentage of gross area sown under food grains (48.7 to 62.4), percentage of gross area irrigated (51.5 to 64.6), fertilizer consumption (9609 to 38129 tons), cropping intensity (127 to 146) and use of pumps and oil engines (84 to 114). Number of cows and buffaloes and total cattle is also not enough, improvement in which can contribute to agriculture development of the district. Improvement in the number of workers employed in working factories (5940 to 20322), number of workers employed in working factories (908 to 977), per capita value added by manufacturing in Rs. (122 to 1353) and percentage amount disbursed as industrial loan (3.0 to 6.8) may contribute to industrial development of the district (Table 4.35).

In case of infrastructural development of the district (Table 4.36), improvement is required only in number of civil veterinary hospitals (23 to 52.33), veterinary dispensaries (6 to 14) and road length (26 to 30 km). It can be seen from Table 4.37 that urban population, literacy, different types of vehicles registered, per capita deposits in banks, number of cooperative societies and number of villages connected to metalled roads are not enough in the district. Major improvements in these indicators will contribute to socio-economic development in the district.

25. Tonk

Findings of the study reveals that the district is low developed in all four sectors of development. For encouraging agricultural development in the district there is need to increase the irrigation facilities, fertilizer consumption, cultivation of commercial crops, area under forest, total cattle, animal power and use of tractors (Table 4.34). The district is very poor in industrial development and require major improvement in the related indicators (Table 4.35).

With respect to infrastructural development of the district (Table 4.36), it was found that district need major improvement in the indicators like number of civil veterinary hospitals and dispensaries (30 to 43.78 and 6 to 13.07) and road length (20 to 30 km). The district needs strengthening of indicators like urban population (190420 to 422494), literacy percentage (33.67 to 37.74), different types of vehicles registered (26518 to 80653), number of commercial vehicles (605 to 978), per capita deposit in banks (16096 to 56449), number of villages connected to metalled roads (182 to 474), percentage of villages electrified (84 to 93) and number of banks according to population, for socio-economic development of the district (Table 4.37).

26. Udaipur

Data in Table 4.34 to 4.37 reveals that the district is well developed in industrial and infrastructural development and low developed in agricultural and socio-economic sectors. Perusal of Table 4.34 indicates that adequate irrigation facilities, fertilizer consumption, use of tractors and increased size of operational holding may result in increased agricultural output, production and productivity of food grains. Cultivation of commercial crops and more coverage of land under forest may contribute to development of agriculture sector in the area. It can be observed from Table 4.37 that literacy percentage in the district is low which needs to be improved from 34.38 to 43.09 per cent. Increase in number of commercial vehicles (795 to 1143), number of cooperative societies (30 to 54) and per cent of villages electrified (86 to 95) is necessary for socio-economic development of the district.

The aforesaid discussion indicates that none of the districts was found to be well developed in all the four sectors. Development varied from district to districts and sector to sector. With respect to agricultural sector, the district namely, Bundi, Kota, Chittorgarh and Pali were found to be well developed where as rest of the districts were low developed. The districts like Ajmer, Bhilwara, Jaipur, Jhunjhunu and Udaipur were well developed in industrial sector as compared to other districts. In case of infrastructural sector, out of the 26 districts, Ajmer, Bhilwara, Jhunjhunu, Pali, Sikar and Udaipur districts were found to be well developed. The districts namely Ajmer, Alwar, Jaipur, Jodhpur and Kota districts were observed as well developed in socio-economic sector where as remaining districts were low developed.

As the state has been facing recurrent famines and droughts, major emphasis must be laid on the development of irrigation facilities

so that agriculture may be stabilised to a greater extent in future. There is need to give more attention to the scientific harnessing of underground water resources in the state. Cultivation of commercial crops like oilseeds, sugarcane, cotton and spices should be increased by using modern methods of cultivation which would in turn give boost to agro-processing activities as well. Use of fertilizers and modern agricultural inputs has to be enhanced for increased crop production. Livestock based agro-processing industries should be promoted to support the development of livestock. Increased forestation, livestock population and animal power would contribute to agriculture development of the low developed districts.

With respect to industrial sector, top priority should be given to development of resource based industries so that more employment opportunities might be created and industrial income may be increased substantially. Capital investment subsidy by the government should be extended to remote and backward areas so that they may attract new entrepreneurs to set up their unit, working capital facilities should be increased by public financial institutions as far as possible. Fresh industrial potential survey should be conducted to find out new thrust areas for development, particularly in backward areas of the state.

In case of infrastructural sector, medical facilities for human and cattle population, number of high/ senior secondary schools, post offices should be developed on massive scale so that growth is facilitated in other sectors of the economy. The general economic development is largely conditioned by the availability of roads. The development of roads helps to open up backward areas and breakdown the barrier of isolation and stagnation. Rajasthan suffers greatly from lack of road communication.

Education is the lifeline of society, as it enables to possess greater awareness and develop more adaptability required for bringing socio-economic changes for upliftment. Literacy percentage in most of the districts have been observed to be low (22.98 – 76.49 %) which needs immediate improvement. Most of the development endeavours taken up by government gets nullified by rapidly rising population. Density of population of most of the districts needs to be reduced. Adequate banks, co-operative societies, vehicles, connection of villages to metalled roads, electrification of villages and engaging major segment of population as main workers would contribute to socio-economic development of the low developed district.

The major thrust of planning should be on the development of all types of districts in the state. It should be seen that no district remains underdeveloped. Regional disparities are however, bound to remain, even in the most affluent country, but the extent of such disparities should be brought down by increasing the level of development of the backward districts and not by bringing down the levels of developed region. Thus, the proper balanced regional development strategy should aim at increasing the rate of growth of all the regions so that the state average keep on moving towards higher and higher levels of development and each individual region also keeps moving towards higher level and at the same time the gap between the highest and the lowest ranked district comes closer and closer.

5. SUMMARY

Development implies an improvement in the material well-being of the people in a region. Material well-being of a country or a region or a state can be identified with the increase in the real production, amenities, practice and adoption of new and modern technology and increased rate of investment and consumption. Any change for betterment in these parameters indicate development. Development in a country varies from place to place depending upon its geographical, ecological and climatic conditions. As a result, the level of development of different parts of the country may vary between the very high developed and extremely backward categories.

In India, Rajasthan is considered as an economically backward state. However, all the districts of the state are not at the same level of development in different sectors of economy. The task before the policy makers and planners is to attain alround development. If the picture of a particular sector is clear, it becomes quite easy to make plans to bring lagging districts upto the required levels. It has been the continuous endeavour of scientists and planners to measure the level of development in different regions of the country in order to identify where a given region stands in relation to others.

The impact of development in different dimensions cannot be fully measured by any single indicator. Moreover, a number of indicators when analysed individually, do not provide an integrated and comprehensible picture of reality. Hence, there is need to build up a composite index of development based on various indicators combined in an optimum manner. Very few efforts have been made to assess the level of development in Rajasthan state at district level.

Therefore, in the present study an attempt has been made to quantify the developmental efforts effected in various sectors by constructing composite index of development based on 47 indicators for each district of Rajasthan state. Hence, the present investigation was carried out with the following specific objectives :

(i) To identify the factors responsible for development in Agricultural, Industrial, Infrastructural and Socio-economic sectors.

(ii) To construct the various indices of development for each district of Rajasthan and classify the districts on the basis of their development.

(iii) To examine the significance of overall change in development indices over three points of time.

(iv) To study the relationship between the development of different sectors.

(v) To isolate possible factors causing regional imbalances and search a suitable strategy for the development.

METHODOLOGY

The present investigation was carried out in Rajasthan state of the country. The study was conducted for three points of time i.e. year 1980-81, 1990-91 and 1996-97 with the purpose of examining the significance of change and variability in development. The development was measured in terms of development in agricultural, industrial, infrastructural and socio-economic sectors. A number of indicators depicting the development in these sectors were listed and 47 relevant indicators were selected for assessing the development of each district. These indicators consisted of 21 indicators from agricultural sector, 8 from industrial sector, 7 from infrastructural sector and 11 from socio-economic sector. These indicators were used

to construct the composite indices of development for each district of Rajasthan.

For the purpose of present investigation, the district was considered as the unit of analysis. The study included 26 districts as existed in the year 1980-81 covering entire geographical area of the state as the required data were not available for newly formed districts for all the three selected points of time. Secondary data pertaining to the indicators from different sectors for all three selected points of time were collected for each district from different sources like Census of India, Statistical Abstracts Rajasthan, and Vital Agriculture Statistics for different years.

The collected information was analysed using several statistical tools and methods. Principal component analysis was employed to identify the factors responsible for development in agricultural, industrial, infrastructural and socio-economic sectors. The composite indices for various districts and for each sector were obtained through the formula suggested by Narain *et al.* (1991). For classifying different districts on the basis of their development, quantile classification from an assumed Beta distribution of the weighted mean ($\overline{Y}i$) of the composite indices for all four sectors for three selected points of time were computed.

To ascertain the overall agreement among rankings of agricultural, industrial infrastructural and socio-economic developments, Kendall's coefficient of concordance was computed. Further, Spearman's rank correlation was used to study the relationship between each pair of all the four sectors of development.

In order to examine the significance of overall change in development indices over three selected points of time, slippage test was utilized. The development distances between different districts

were computed to find out model districts in selected sectors for the low developed districts on the basis of composite index of development. The development distances between different districts were obtained using the standardised variates (Z_{ij}). The distance matrix was used for finding targets for different indicators of each district. To set the potential targets for poorly developed districts the analysis was carried out for the latest available data i.e. for the year 1996-97.

MAJOR FINDINGS

The important findings emanated out of the study are presented under the following heads :

I. Identification of the factors responsible for development in agricultural, industrial, infrastructural and socio-economic sectors

(i) Agricultural Sector

a) In the year 1980-81, six independent factors were identified crucial for agricultural development which explained 85.6 per cent of total variance. First factor explained 36.9 per cent variance and loaded significantly on six variables namely percentage of net area irrigated to net area sown, percentage of gross irrigated area to gross area sown, production of food grains, gross value of agriculture output per capita (rural) at current prices, yield in kg/hectare of food grains and use of tractors per thousand of human population.

b) In the year 1990-91, six independent factors were identified crucial which explained 83.5 per cent of total variance collectively. First factor explained 34.9 per cent variance and loaded significantly on eight variables i.e. percentage of gross area sown under food grains to total cropped area, percentage of gross irrigated area to gross

area sown, percentage of area under commercial crops to total cropped area, gross value from agriculture per hectare at current prices, gross value of agriculture output per capita (rural) at current prices, yield in kg/hect. of food grains and use of tractors per thousand of human population.

c) In the year 1996-97, five factors were identified crucial which explained 84.4 per cent of total variance. The first factor explained 39 per cent of total variance and loaded significantly on seven variables namely percentage of area sown more than once to net area sown, percentage of net area irrigated to net area sown, average size of operational holding, yield in kg/hectare of foodgrains, irrigation intensity, cropping intensity and use of pumps and oil engines.

(ii) Industrial sector

a) During the period 1980-81, two factors were identified crucial for industrial development which explained 75.7 per cent of total variance. First factor explained 55.8 per cent of total variance and loaded significantly on five variables i.e. number of workers employed in working factories, number of workers per lakh of population in working factories, per capita value added by manufacturing in Rs., gross output in industry per capita and industrial consumption of electricity per capita.

b) For the year 1990-91, three factors were identified crucial for development in industrial sector which explained 86.1 per cent of total variance collectively. The first factor which explained 56.5 per cent of total variance had significantly high loadings on three variables namely number of workers employed in working factories, number of workers per lakh population in working factories and

percentage of manufacturing industry workers to the total work force.

c) For the year 1996-97, two factors were found crucial which explained 69.8 per cent of total variance collectively. The first factor explained 56.5 per cent of total variance and loaded significantly on variables like number of workers per lakh population in working factories, percentage of manufacturing industry workers to the total work force, gross output in industry per capita, industrial consumption of electricity per capita and percentage amount disbursed as industrial loan.

(iii) Infrastructural sector :

a) For the year 1980-81, three factors were identified crucial for infrastructural development which explained 71.6 per cent of total variance collectively. The first factor which explained 39.2 per cent of total variance had significant loadings on two variables i.e. number of civil veterinary hospitals and number of civil veterinary dispensaries.

b) For the year 1990-91, two factors were identified crucial which explained 60.8 per cent of total variance collectively. First factor loaded significantly on three variables i.e. number of hospitals per lakh of population, number of civil veterinary dispensaries and road length per 100 sq. km of geographical area. This factor explained 38.5 per cent of total variance.

c) Three factors were identified crucial during the year 1996-97. These three factors explained 72.9 per cent of total variance collectively. The first factor loaded significantly on three variables namely number of hospitals per lakh of population, number of

beds in hospitals and number of high/ senior secondary schools per 1000 school going children. This factor explained 33.9 per cent of total variance.

(iv) Socio-economic sector

a) For the year 1980-81, four factors were identified crucial for development in socio-economic sector. These factors explained 83.1 per cent of total variance collectively. The first factor had significantly high loadings on six variables namely urban population, percentage of main workers to total population, different types of vehicles registered, per capita deposit in scheduled banks, number of commercial vehicles per lakh of population and number of cooperative societies. This factor explained 42.5 per cent of total variance.

b) Three factors were identified crucial during the year 1990-91 which explained 69.1 per cent of total variance collectively. The first factor had significantly high loading on variables viz., urban population, percentage literacy, different types of vehicles registered, number of commercial vehicles per lakh of population and per capita deposit in scheduled banks. This factor explained 38.6 per cent of total variance.

c) For the year 1996-97, four factors were identified crucial which explained 74.7 per cent of total variance collectively. The first factor had significantly high loadings on five variables viz., urban population, different types of vehicles registered, per capita deposit in scheduled banks, number of commercial vehicles and number of villages connected to metalled roads. This factor explained 38 per cent of total variance.

II. Construction of composite indices of development for each district of Rajasthan

(i) Year 1980-81

a) In the agricultural sector, district Chittorgarh was ranked first and Jaisalmer district was placed at the bottom in the ranking on the basis of composite index. The values of composite indices varied from 0.677 to 0.977 during this period with mean index 0.186 and CV 11.05 per cent.

b) Jaipur district was ranked first on the basis of composite indices of industrial development and Nagaur district was ranked last. Composite indices varied from 0.306 to 0.891 with mean index 0.745 and CV 18.92 per cent.

c) In the infrastructural sector, district Jaisalmer was ranked first and district Jalore was ranked last. The mean index of development in this sector was 0.702 with CV 6.79 per cent. The composite indices varied from 0.537 to 0.799.

d) Jaipur district stood first in the ranking of districts on the basis of their socio-economic development. Jaisalmer district was placed at last rank. The composite indices varied from 0.312 to 0.998 with mean index 0.765 and CV 15.647 per cent.

e) Indices of overall development revealed that district Jaipur was ranked first followed by Kota, Udaipur, Ajmer and Bhilwara while the districts Barmer, Tonk, Nagaur, Jalore and Jaisalmer obtained the last five ranks respectively. The value of composite indices varied from 0.638 to 0.950 with mean index 0.851 and CV 8.904 per cent.

(ii) Year 1990-91

a) In the agricultural sector, district Ganganagar was placed at first position while Jaisalmer obtained the last rank. The value of composite indices varied from 0.689 to 0.998 with mean index value 0.827 and CV 10.036 per cent.

b) With regard to industrial sector, Jaipur district again ranked first while Jaisalmer was found to be least developed. The value of composite indices varied from 0.414 to 0.913 with mean index 0.735 and CV 18.375 per cent.

c) Udaipur district was ranked first and district Jhalawar last in the ranking on the basis of infrastructural development. The composite indices varied from 0.567 to 0.977 with mean index value 0.790 and CV 13.536 per cent.

d) The district Jaipur was again ranked first in socio-economic development while Sawai Madhopur district obtained the last rank. The value of composite indices varied from 0.434 to 0.964 with mean index of socio-economic development as 0.771 adn CV 15.133 per cent.

e) In the ranking of overall development, Jaipur district continued to rank first followed by Alwar, Udaipur, Kota and Ajmer. The districts Churu, Sawai Madhopur, Jalore, Barmer and Jaisalmer occupied last ranks respectively. The value of composite indices varied from 0.660 to 0.997 with mean index 0.836 and CV 9.976.

(iii) Year 1996-97

a) Kota district was ranked first and Churu district last in the ranking of agricultural development. The value of composite indices varied from 0.642 to 0.996 with mean index 0.803 and CV 12.309 per cent.

b) In the industrial development, Ajmer district was ranked first and district Sawai Madhopur was placed at last during this period. The composite indices varied from 0.450 to 0.890 with mean index 0.713 and CV 20.519 per cent.

c) District Udaipur was again ranked first in infrastructural development during this period and Jalore obtained the lowest rank. The value of composite indices varied from 0.579 to 0.989 with mean index 0.782 and CV 14.073 per cent.

d) In the socio-economic development, Jaipur district was ranked first and Jaisalmer district was placed at the bottom. The value of composite indices varied from 0.490 to 0.976 with mean index 0.798 and CV 12.891 per cent.

e) In the ranking of overall development, district Jaipur again continued to rank first followed by Udaipur, Bhilwara, Ajmer and Kota during this period. The desertic districts namely Jhunjhunu, Jalore, Churu, Barmer and Jaisalmer occupied the last five rankings respectively. The value composite indices varied from 0.625 to 0.968 with mean index 0.824 and CV 10.929.

III. Classification of districts on the basis of their development

i) For the year 1980-81, none of the districts were categorised as highly developed district. Four districts i.e. Bhilwara, Udaipur, Ajmer and Jaipur were found to be developed. Districts namely Dungarpur, Banswara, Sikar, Sirohi, Bikaner, Sawai Madhopur, Bharatpur, Jodhpur, Jhunjhunu, Bundi, Chittorgarh, Alwar, Ganganagar, Kota and Jaisalmer were classified as developing districts. Jhalawar and Churu districts were observed as backward while districts Jalore, Nagaur, Pali, Barmer and Tonk were found to be very backward districts.

ii) During the year 1990-91, only one district i.e. Jaipur was found to be highly developed. Districts namely Ganganagar, Sirohi, Chittorgarh, Alwar, Kota, Ajmer and Udaipur were classified as developed districts. The districts which were observed to be in developing category were Banswara, Nagaur, Bundi, Bhilwara, Jhunjhunu, Bharatpur and Jodhpur. Six districts i.e. Jhalawar, Sawai Madhopur, Bikaner, Sikar, Dungarpur and Tonk were categorised as backward districts while Jaisalmer, Barmer, Jalore and Churu were found to be very backward districts.

iii) During the year 1996-97 again Jaipur district was found to be highly developed. Nine districts, i.e. Pali, Chittorgarh, Jodhpur, Kota, Ganganagar, Alwar, Ajmer, Bhilwara and Udaipur were categorised as developed districts. Only two districts namely Bharatpur and Sirohi were observed as developing districts. During this year ten districts viz., Jhalawar, Sawai Madhopur, Bundi, Tonk, Jhunjhunu, Sikar, Dungarpur, Banswara, Bikaner and Nagaur, were in the category of backward districts. Again in this year, Barmer, Jaisalmer, Jalore and Churu remained in the category of very backward districts.

IV. Significance of overall change in development indices over three points of time

i) The level of agricultural development was found to be significantly different over three points of time. The difference between the periods 1980-81 and 1996-97; and 1990-91 and 1996-97 was found significant whereas difference in agricultural development between the year 1980-81 and 1990-91 was observed to be non-significant. Mean value of composite index indicated that level of agricultural development has gone down

from the year 1980-81 to 1990-91 whereas it has improved from year 1990-91 to 1996-97.

ii) The level of industrial development was observed to be equal over three points of time. Mean values of composite indices indicated slight improvement in the industrial sector from the year 1980-81 to 1990-91 and 1990-91 to 1996-97 which is not significant.

iii) With regard to infrastructural sector, the level of development was found to be significantly different over three points of time. The difference in infrastructural development between the years 1980-81 and 1990-91 and period 1980-81 and 1996-97 was found significant while the difference between 1990-91 and 1996-97 was observed to be non-significant. Mean values of composite indices revealed that the level of infrastructural development has gone down from the year 1980-81 to 1990-91 whereas improvement was observed from the year 1990-91 to 1996-97.

iv) The level of socio-economic development was found to be significantly different over three points of time. The difference between the year 1980-81 and 1996-97, and 1990-91 and 1996-97 was found significant whereas the difference between socio-economic development in the period 1980-81 and 1990-91 was observed to be non-significant. Mean value of composite indices indicated that the level of socio-economic development has gone down from the year 1980-81 to 1996-97.

v) The level of overall development was found to be significantly different over three points of time. The difference between the periods 1980-81 and 1990-91, and 1980-81 and 1996-97 was found significant whereas difference in overall development

between the year 1990-91 and 1996-97 was observed to be non-significant. Mean values of composite indices indicated that level of overall development has gone up during these points of time.

V. Relationship between the development of different sectors

i) Coefficients of concordance among rankings of level of development in all four sectors were found to be highly significant which indicated good agreement among the rankings of all four sectors for three points of time.

ii) For the year 1980-81 and 1996-97, the correlation coefficients between the rankings of agricultural and industrial sector were observed to be significant. This indicates that the districts which were agriculturally developed were also developed in industrial sector.

iii) The relationship between industrial and socio-economic sector was found to be highly significant for all three points of time.

iv) In the year 1996-97, positive significant association was observed between agricultural and industrial, agricultural and socio-economic, industrial and infrastructural and industrial and socio-economic sectors.

v) Non-significant relationship was found in the pairs of agricultural and infrastructural sector and infrastructural and socio-economic sectors of development for all the three points of time.

VI. Factors causing regional imbalances and strategy for development

i) In order to reduce the disparities in the level of development, potential targets for various developmental indicators were

estimated for the low developed districts in all the four sectors. These low developed districts required improvements of various dimensions in different indicators for enhancing the levels of developments.

ii) With respect to agricultural sector, the districts namely Bundi, Kota, Chittorgarh and Pali were found to be well developed whereas rest of the districts were low developed.

iii) The districts like Ajmer, Bhilwara, Jaipur, Jhunjhunu and Udaipur were observed to be well developed in industrial sector as compared to other districts.

iv) In infrastructural sector, out of 26 districts Ajmer, Bhilwara, Jhunjhunu, Pali, Sikar and Udaipur districts were found to be well developed.

v) The districts namely Ajmer, Alwar, Jaipur, Jodhpur and Kota districts were observed to be well developed in socio-economic sector whereas remaining districts were low developed.

vi) In agricultural sector, major emphasis must be laid on development of irrigation facilities, cultivation of commercial crops, use of fertilizers, use of tractors, development of forests and livestock population as these indicators are causing the imbalances in development.

vii) With respect to industrial sector, there is need to set up more number of industries so that employment opportunities may be created and industrial income may be raised. Adequate credit facilities to more number of people is also required.

viii) In case of infrastructural sector, medical facilities, high/ senior secondary schools, post offices and development of roads needs to be given top priority.

ix) Adequate banks, cooperative societies, vehicles, connectivity of villages to metalled roads, electrification of villages, engaging major segment of population as main workers, increase in literacy percentages and population control were found essential for socio-economic development of the low developed district.

CONCLUSIONS

1. Broad and fair representation of the whole spectrum of inter-district disparities for the twenty one variables from agriculture sector was made in a simple structure of five or six orthogonal factors. In case of industrial and infrastructural sectors, two or three factors were identified crucial from eight and seven variables respectively. With regard to socio-economic sector, fair degree of representation of all the eleven considered variables was made in a simple structure of three or four orthogonal factors.

2. Wide disparities in the levels of development were observed among different districts of the state. None of the districts was found to be well-developed in all the four sectors.

3. Greater variability was observed in the level of development in socio-economic and industrial sectors in the year 1980-81 and 1990-91 as compared to agricultural and infrastructural sector. In the year 1996-97, greater variability was observed in the industrial sector as compared to rest three sectors.

4. According to the latest picture, fourteen districts were found to be in the category of very backward and backward districts covering more than half of the area and 41 per cent population of the state. Two districts were found to be in developing category while only one districts was observed to be highly developed covering 4 per cent area and 10 per cent population.

Nine districts covering more than one third area and 42 per cent population of the state were categorised as developed districts.

5. Significant change was observed in the overall development of the districts over the year 1980-81 to 1996-97.

6. The districts which were agriculturally developed were mostly developed in industrial sector also. It can be said that agriculture and industry flourish together in the state. Development in socio-economic sectors of the districts was associated with the progress in industrial sector. Infrastructural development in the districts was not found to be associated with development in agricultural and socio-economic sectors.

7. The low developed districts required improvement in various dimensions in different indicators for enhancing the level of development in the low developed sectors.

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ABSTRACT

STATISTICAL ASSESSMENT OF DEVELOPMENT IN RAJASTHAN – A SPATIAL AND INTER-TEMPORAL ANALYSIS

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Development is a multi-dimensional phenomenon and defined as a process which improves the quality of life. Development in a country varies from place to place depending upon its geographical, ecological and climatic conditions. In India, Rajasthan is considered as an economically backward state. However, all the districts of the state are not at the same level of under-development. Some districts are more developed while other are less developed or underdeveloped.

The present study on statistical assessment of development in Rajasthan was undertaken to analyse the spatial and inter-temporal variations in development. The study was conducted for three points of time i.e. year 1980-81, 1990-91 and 1996-97. For the purpose of present investigation, the district was considered as the unit of analysis and twenty six districts as existed in the year 1980-81 were included in the study which covered the entire geographical area of the state. Development was measured in terms of development in agricultural, industrial, infrastructural and socio-economic sectors. Forty seven relevant indicators depicting the development in these sectors were selected for assessing the development of each district. These indicators were used to construct the composite indices of development for each district of Rajasthan. Data pertaining to indicators from different sectors for all three selected points of time were collected for each district from different secondary sources to achieve the following objectives :

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(i) To identify the factors responsible for development in Agricultural, Industrial, Infrastructural and Socio-economic sectors.

(ii) To construct the various indices of development for each district of Rajasthan and classify the districts on the basis of their development.

(iii) To examine the significance of overall change in development indices over three points of time.

(iv) To study the relationship between the development of different sectors.

(v) To isolate possible factors causing regional imbalances and search a suitable strategy for the development.

The results of the study revealed that broad and fair representation of the whole spectrum of inter-district disparities for the twenty one variables from agricultural sector was made in a simple structure of five or six orthogonal factors. In case of industrial and infrastructural sectors, two or three factors were identified crucial from eight and seven variables respectively. With regard to socio-economic sector, fair degree of representation of all the eleven considered variables was made in a simple structure of three or four orthogonal factors.

Indices of overall development revealed that in the year 1980-81 district Jaipur was ranked first followed by Kota, Udaipur, Ajmer and Bhilwara while the desertic districts i.e. Barmer, Tonk, Nagaur, Jalore and Jaisalmer obtained the last five ranks respectively. In the year 1990-91, Jaipur district continued to rank first followed by Alwar, Udaipur, Kota and Ajmer. The district Churu, Sawai Madhopur, Jalore, Barmer and Jaisalmer occupied last five ranks respectively. In the year 1996-97 again Jaipur district was ranked first followed by

Udaipur, Bhilwara, Ajmer and Kota while desertic districts namely Jhunjhunu, Jalore, Churu, Barmer and Jaisalmer occupied the last five rankings respectively. The values of mean composite index for the year 1980-81, 1990-91 and 1996-97 were obtained as 0.851, 0.836 and 0.824 respectively.

Classification of districts on the basis of their development depicted that in the year 1996-97, Jaipur district was the only district found to be highly developed. Nine districts namely Pali, Chittorgarh, Jodhpur, Kota, Ganganagar, Alwar, Ajmer, Bhilwara and Udaipur were categorised as developed districts. Only two districts namely Bharatpur and Sirohi were observed as developing districts. During this year, ten districts viz., Jhalawar, Sawai Madhopur, Bundi, Tonk, Jhunjhunu, Sikar, Dungarpur, Banswara, Bikaner and Nagaur were in the category of backward districts where as Barmer, Jaisalmer, Jalore and Churu were found to be very backward districts.

Findings of the study indicated that the level of overall development was found to be significantly different over three points of time. The difference between the periods 1980-81 and 1990-91 and 1980-81 and 1996-97 was found significant whereas difference in overall development between the year 1990-91 and 1996-97 was observed to be non-significant. Mean values of composite indices depicted that level of overall development has gone up during these points of time.

The results depicted good agreement among the rankings of level of development in all four sectors for the selected points of time. Inter-relationship between the development of different sectors indicated that districts which were agriculturally developed were mostly developed in industrial sector also. Development in socio-economic sectors of the districts was associated with the progress in

industrial sector. Infrastructural development in the districts was not found to be associated with development in agricultural and socio-economic sectors.

Wide disparities in the levels of development were observed among different districts of the state. In order to reduce the disparities in the level of development, potential targets for various developmental indicators were estimated for the low developed districts in all the four sectors. These low developed districts required improvement of various dimensions in different indicators for enhancing the levels of development.

Findings of the study revealed that in agricultural sector, major emphasis must be laid on development of irrigation facilities, cultivations of commercial crops, use of fertilizers, use of tractors, development of forests and livestock population for the agriculture development of the low developed districts. For proper industrial development of the districts, there is need to set-up more number of industries so that employment opportunities may be created and industrial income may be raised. Adequate credit facilities to more number of people is also required. In case of infrastructural sector, medical facilities, senior secondary schools, post offices and development of roads needs to be given top priority. Adequate banks, cooperative societies, vehicles, connectivity of villages to metalled roads, electrification of villages, increase in the number of main workers, high literacy percentages and population control were found to be essential for socio-economic development of the low developed districts.

सारांश

राजस्थान में विकास का सांख्यिकीय आकलन - एक स्थानिक एवं अन्तर्कालिक विश्लेषण

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मुख्य सलाहकार

विकास एक बहु--आयामी परिघटना एवं जीवन की गुणवत्ता में सुधार लाने की प्रक्रिया है। किसी भी देश में विकास एक स्थान से दूसरे स्थान से विचरित करता है जो कि वहाँ के भौगोलिक, पारिस्थितिक एवं जलवायु की परिस्थितियों पर निर्भर करता है। भारत में राजस्थान को एक पिछड़ा हुआ राज्य माना जाता है जबकि इस राज्य के सभी जिले अल्पविकास के समान स्तर पर नहीं हैं। कुछ जिले अधिक विकसित हैं जबकि कुछ कम विकसित या अल्प विकसित हैं।

राजस्थान में विकास के स्थानिक एवं अन्तर्कालिक विचरण के विश्लेषण के लिए एक सांख्यिकीय आंकलन किया गया। यह अध्ययन तीन कालों 1980–81, 1990–91 एवं 1996–97 के लिए किया गया। वर्तमान अन्वेषण के लिए जिले को विश्लेषण की इकाई माना गया। अध्ययन में राज्य के संपूर्ण भौगोलिक क्षैत्र को आवरित करते हुए 1980–81 में अवस्थित 26 जिलों को सम्मिलित किया गया। विकास को कृषि, औद्योगिक, अवस्थापना एवं सामाजिक–आर्थिक अवखण्डों में विकास के रूप में मापा गया। इन अवखण्डों में विकास को दर्शाने वाले 47 संबंधित संकेतकों का चयन प्रत्येक जिले के विकास के आकलन के लिये किया गया। इन संकेतकों का प्रयोग राजस्थान के प्रत्येक जिले के विकास के संयुक्त सूचकांक के निर्माण के लिए किया गया। निम्नलिखित उद्देश्यों की पूर्ति के लिए सभी तीन कालों व प्रत्येक जिले के लिये विभिन्न अवखण्डों से संबंधित आंकडे विभिन्न द्वितीयक स्त्रोतों से एकत्र किये गये–

i) कृषि, औद्योगिक, अवस्थापना एवं सामाजिक–आर्थिक अवखण्डों में विकास के लिए उत्तरदायी कारकों को अभिनिर्धारित करना।

ii) राजस्थान के प्रत्येक जिले के विकास के विभिन्न सूचकांकों का निर्माण करना एवं जिलों को उनके विकास के आधार पर वर्गीकृत करना।

iii) तीन कालों में विकास सूचकांकों में समग्र परिवर्तन की सार्थकता का परीक्षण करना।

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iv) विभिन्न अवखण्डों के विकास में साहचर्य का अध्ययन करना।

v) क्षेत्रीय असंतुलन के संभावित कारकों को विलग करना एवं विकास की उचित नीति का अनुसंधान करना।

अध्ययन के परिणामों से उद्घाटित हुआ कि कृषि अवखण्ड के 21 संकेतकों का 5 व 6 स्वतंत्र कारकों की सरल संरचना में अन्तर–जिला असमानता की संपूर्ण मानावली का विस्तृत व स्पष्ट प्रतिनिधित्व पाया गया। औद्योगिक एवं अवस्थापना अवखण्डों के क्रमशः 8 व 6 संकेतकों से 2 या 3 कारकों को महत्वपूर्ण अभिनिर्धारित किया गया। सामाजिक आर्थिक अवखण्ड में 11 संकेतकों के प्रतिनिधित्व की स्पष्ट तीव्रता 3 या 4 स्वतंत्र कारकों की सरल संरचना में पाई गई।

सूचकांक प्रकट करते हैं कि वर्ष 1980–81 में, जयपुर जिला समग्र विकास में सर्वोच्च स्थान पर रहा जिसके बाद कोटा, उदयपुर, अजमेर एवं भीलवाड़ा जिले क्रमशः दूसरे, तीसरे, चौथे व पाँचवे स्थान पर रहे जबकि रेगिस्तानी जिले जैसे बाड़मेर, टौंक, नागौर, जालोर व जैसलमेर क्रमशः अंतिम पाँच स्थानों पर आये। वर्ष 1990–91 में जयपुर जिला पुनः प्रथम स्थान पर रहा जिसके बाद क्रमशः अलवर, उदयपुर, कोटा और अजमेर जिले रहे। चुरू, सवाईमाधोपुर, जालोर, बाड़मेर और जैसलमेर जिलों ने क्रमशः अंतिम पाँच स्थान प्राप्त किये। वर्ष 1996–97 में लगातार जयपुर जिला प्रथम स्थान पर रहा जिसके बाद क्रमशः उदयपुर, भीलवाड़ा, अजमेर व कोटा जिले रहे जबकि रेगिस्तानी जिलों जैसे झुंझनु, जालोर, चूरू, बाड़मेर व जैसलमेर ने समग्र विकास में क्रमशः अंतिम पाँच स्थान प्राप्त किये। वर्ष 1980–81, 1990–91 एवं 1996–97 में माध्य संयुक्त सूचकांक के मूल्य क्रमशः 0.851, 0.836 व 0.824 पाये गये।

विकास के आधार पर जिलों का वर्गीकरण दर्शाता है कि वर्ष 1996–97 में केवल जयपुर जिला अत्यन्त विकसित पाया गया। नौ जिलों जैसे पाली, चित्तौड़गढ़, जोधपुर, कोटा, गंगानगर, अलवर, अजमेर, भीलवाड़ा एवं उदयपुर को विकसित जिलों की श्रेणी में वर्गीकृत किया गया। केवल दो जिले भरतपुर एवं सिरोही विकासशील जिले पाये गये। इस वर्ष में दस जिले जैसे झालावाड़, सवाईमाधोपुर, बूंदी, टौंक, झूंझनू, सीकर, डूंगरपुर, बांसवाड़ा, बीकानेर तथा नागौर पिछड़े जिलों की श्रेणी में रहे जबकि बाड़मेर, जैसलमेर, जालोर एवं चूरू अधिक पिछड़े जिले पाये गये।

अध्ययन के परिणाम इंगित करते हैं कि तीनों कालों में समग्र विकास का स्तर सार्थक रूप से भिन्न था। वर्ष 1980–81 व 1990–91 तथा वर्ष 1980–81 व 1996–97 का अन्तर

सार्थक पाया गया जबकि 1990–91 व 1996–97 में समग्र विकास का अन्तर सार्थक नहीं पाया गया। संयुक्त सूचकांक के माध्य मूल दर्शाते हैं कि समग्र विकास का स्तर इन कालों में बढ़ा।

परिणामों से प्रकट हुआ कि चयनित तीनों कालों में सभी चारों अवखण्डों के विकास के स्तर के क्रम–विन्यासों में अच्छी प्रागुक्ति थी। विभिन्न अवखण्डों के विकास में अन्तर–संबन्ध इंगित करते हैं कि जो जिले कृषि में विकसित थे वे जिले औद्योगिक अवखण्ड में भी विकसित थे। जिले के सामाजिक–आर्थिक अवखण्ड का विकास औद्योगिक अवखण्ड की प्रगति के साथ सहचारी पाया गया। जिले में अवस्थापना विकास, का कृषि व सामाजिक–आर्थिक अवखण्ड में विकास के साथ सहचारी नहीं था।

राज्य के विभिन्न जिलों के विकास के स्तर में विस्तृत असमानता देखी गयी। विकास के स्तर में असमानता को कम करने के लिये सभी चार अवखण्डों में कम विकसित जिलों के विभिन्न विकास संकेतकों के संभाव्य लक्ष्यों का आकलन किया गया। इन कम विकसित जिलों के विकास स्तर को बढ़ाने के लिये विभिन्न संकेतकों में कई आयामों में सुधार की आवश्यकता थी।

अध्ययन के निष्कर्ष बताते हैं कि कृषि अवखण्ड में कम विकसित जिलों के विकास के लिये सिंचाई सुविधाओं का विकास, वाणिज्यिक फसलों की खेती, उर्वरकों का प्रयोग, ट्रेक्टरों का उपयोग, वन विकास व पशुधन विकास पर मुख्य जोर देना चाहिये। जिलों के उचित औद्योगिक विकास के लिये अधिक संख्या में उद्योग स्थापित करने की आवश्यकता है ताकि रोजगार के अवसर पैदा किये जा सके व उद्योग से आमदनी बढायी जा सके। अधिक लोगों को पर्याप्त ऋण सुविधा देने की भी आवश्यकता है। अवस्थापना अवखण्ड में चिकित्सकीय सुविधाओं, उच्च माध्यमिक विद्यालयों व डाकघरों, व सड़कों के विकास पर सर्वोच्च प्राथमिकता देना आवश्यक है। कम विकसित जिलों के सामाजिक–आर्थिक विकास के लिये पर्याप्त बैंक, सहकारी समीतियाँ, वाहन, गाँवों का पक्की सड़कों से जुडाव, मुख्य कार्यकर्ताओं की संख्या में वृद्धि, उच्च साक्षरता प्रतिशत एवं जनसंख्या नियंत्रण आवश्यक पाये गये।

APPENDICES

APPENDIX – A

Appendix A1 : Normalised indices of development (Y_{ik}) for the year 1980-81

District	Sector				
	Agricultural	Industrial	Infra-structural	Socio-economic	Mean $\overline{Y}_i$
Ajmer	0.562	0.591	0.630	0.430	0.550
Alwar	0.825	0.347	0.259	0.307	0.399
Banswara	0.584	0.149	0.256	0.077	0.245
Barmer	0.312	0.169	0.252	0.031	0.183
Bharatpur	0.784	0.190	0.279	0.324	0.366
Bhilwara	0.934	0.451	0.527	0.246	0.509
Bikaner	0.150	0.270	0.450	0.212	0.284
Bundi	0.897	0.164	0.454	0.118	0.379
Chittorgarh	1.000	0.185	0.347	0.201	0.394
Churu	0.347	0.135	0.298	0.084	0.210
Dungarpur	0.594	0.046	0.336	0.058	0.242
Ganganagar	0.753	0.301	0.259	0.432	0.409
Jaipur	0.809	1.000	0.435	1.000	0.785
Jaisalmer	0.837	0.005	1.000	0.000	0.465
Jalore	0.000	0.014	0.000	0.036	0.013
Jhalawar	0.434	0.104	0.217	0.116	0.204
Jhunjhunu	0.622	0.314	0.397	0.241	0.377
Jodhpur	0.231	0.378	0.393	0.438	0.368
Kota	0.275	0.738	0.321	0.363	0.416
Nagaur	0.872	0.000	0.248	0.176	0.047
Pali	0.312	0.140	0.313	0.189	0.051
Sawai Madhopur	0.756	0.169	0.328	0.177	0.331
Sikar	0.259	0.109	0.466	0.159	0.258
Sirohi	0.659	0.007	0.370	0.065	0.258
Tonk	0.303	0.048	0.229	0.109	0.168
Udaipur	0.928	0.439	0.576	0.316	0.538
Mean	0.578	0.249	0.371	0.227	0.325
S.D.	0.285	0.241	0.182	0.204	0.172

Appendix A2 : Normalised indices of development (Y_{ik}) for the year 1990-91

District	Sector				
	Agricultural	Industrial	Infra-structural	Socio-economic	Mean $\overline{Y}_i$
Ajmer	0.408	0.761	0.968	0.685	0.708
Alwar	0.537	0.810	0.424	0.553	0.581
Banswara	0.511	0.214	0.585	0.183	0.365
Barmer	0.006	0.182	0.129	0.228	0.142
Bharatpur	0.589	0.198	0.546	0.549	0.477
Bhilwara	0.712	0.449	0.063	0.413	0.410
Bikaner	0.249	0.345	0.123	0.389	0.283
Bundi	0.812	0.186	0.307	0.234	0.378
Chittorgarh	0.981	0.349	0.580	0.372	0.562
Churu	0.437	0.058	0.295	0.272	0.267
Dungarpur	0.505	0.072	0.634	0.202	0.348
Ganganagar	1.000	0.287	0.244	0.555	0.525
Jaipur	0.705	1.000	0.629	1.000	0.845
Jaisalmer	0.000	0.000	0.485	0.023	0.123
Jalore	0.424	0.104	0.051	0.168	0.186
Jhalawar	0.692	0.244	0.000	0.194	0.278
Jhunjhunu	0.288	0.311	0.788	0.336	0.428
Jodhpur	0.349	0.481	0.539	0.643	0.513
Kota	0.948	0.705	0.280	0.558	0.621
Nagaur	0.427	0.282	0.478	0.324	0.377
Pali	0.634	0.381	0.666	0.351	0.502
Sawai Madhopur	0.815	0.038	0.332	0.000	0.282
Sikar	0.304	0.178	0.598	0.304	0.346
Sirohi	0.709	0.663	0.688	0.209	0.550
Tonk	0.502	0.204	0.463	0.240	0.348
Udaipur	0.864	0.757	1.000	0.483	0.764
Mean	0.554	0.356	0.457	0.364	0.431
S.D.	0.270	0.271	0.267	0.220	0.183

Appendix A3 : Normalised indices of development (Y_{ik}) for the year 1996-97

District	Sector				
	Agricultural	Industrial	Infra-structural	Socio-economic	Mean $\bar{Y}_i$
Ajmer	0.432	1.000	0.946	0.687	0.747
Alwar	0.684	0.939	0.458	0.551	0.632
Banswara	0.610	0.249	0.356	0.204	0.345
Barmer	0.099	0.104	0.254	0.169	0.159
Bharatpur	0.652	0.143	0.524	0.420	0.442
Bhilwara	0.847	0.934	0.945	0.416	0.747
Bikaner	0.297	0.372	0.466	0.358	0.370
Bundi	0.850	0.138	0.085	0.214	0.316
Chittorgarh	0.845	0.553	0.539	0.389	0.563
Churu	0.000	0.002	0.422	0.265	0.187
Dungarpur	0.491	0.122	0.561	0.202	0.341
Ganganagar	0.811	0.791	0.298	0.590	0.606
Jaipur	0.788	0.941	0.832	1.000	0.889
Jaisalmer	0.124	0.082	0.498	0.000	0.168
Jalore	0.452	0.127	0.000	0.200	0.194
Jhalawar	0.675	0.184	0.110	0.226	0.294
Jhunjhunu	0.186	0.188	0.807	0.165	0.331
Jodhpur	0.268	0.771	0.568	0.632	0.552
Kota	1.000	0.533	0.417	0.558	0.619
Nagaur	0.313	0.240	0.583	0.342	0.371
Pali	0.559	0.565	0.788	0.339	0.544
Sawai Madhopur	0.672	0.000	0.210	0.300	0.304
Sikar	0.299	0.079	0.649	0.288	0.336
Sirohi	0.746	0.578	0.485	0.218	0.478
Tonk	0.508	0.199	0.334	0.255	0.321
Udaipur	0.932	0.669	1.000	0.520	0.761
Mean	0.544	0.404	0.505	0.366	0.447
S.D.	0.279	0.333	0.268	0.212	0.203

Appendix B1 : Distance Matrix (Agricultural Sector)

Districts	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Ajmer	0	6.26	3.62	5.87	7.34	3.80	4.87	6.14	4.95	4.37	4.20	7.68	5.40	6.80	3.78	5.68	2.04	3.53	6.69	2.71	2.99	6.01	1.97	5.86	3.83	6.08
Alwar	6.26	0	6.78	9.94	3.10	5.22	7.95	5.00	4.46	8.49	7.47	6.71	3.15	11.12	4.63	5.87	5.75	7.86	6.11	6.90	5.36	2.98	5.72	6.65	4.87	8.30
Banswara	3.62	6.78	0	7.94	8.23	3.52	7.05	5.28	3.57	6.89	2.69	8.57	6.05	8.61	5.85	5.26	4.72	6.37	6.92	5.73	5.83	6.69	4.38	6.24	5.26	4.72
Barmer	5.87	9.94	7.94	0	10.56	8.30	3.61	9.01	9.16	4.11	7.96	10.52	9.10	6.14	6.94	9.60	6.84	3.93	10.41	4.87	6.89	9.75	6.16	8.58	7.75	9.85
Bharatpur	7.34	3.10	8.23	10.56	0	6.62	9.15	6.79	6.45	9.32	8.71	7.19	4.27	11.62	5.14	7.06	7.40	8.23	5.95	7.51	5.86	4.04	6.99	6.97	5.55	9.02
Bhilwara	3.80	5.22	3.52	8.30	6.62	0	6.92	4.87	3.26	7.25	4.70	6.92	4.20	8.78	5.16	5.46	5.10	6.19	5.98	5.43	5.02	6.31	4.50	6.34	4.51	4.18
Bikaner	4.87	7.95	7.05	3.61	9.15	9.15	0	7.70	7.44	3.56	7.90	7.95	7.57	5.89	5.51	8.05	5.70	2.96	8.85	3.58	4.95	7.93	4.87	7.55	5.67	8.93
Bundi	6.14	5.00	5.28	9.01	6.79	6.79	7.70	0	4.03	8.53	6.83	7.39	5.70	9.70	6.35	5.27	6.25	7.89	3.89	6.88	5.89	5.67	5.86	4.26	5.27	6.44
Chittorgarh	4.95	4.46	3.57	9.16	6.45	6.45	7.44	4.03	0	8.12	5.03	6.72	4.99	9.32	4.96	3.45	5.34	7.26	5.14	6.41	5.12	5.29	5.21	5.29	4.79	5.36
Churu	4.37	8.49	6.89	4.11	9.32	9.32	3.56	8.53	8.12	0	7.39	9.37	7.54	6.75	5.82	8.68	4.70	2.28	9.33	2.68	5.65	8.52	3.88	8.54	5.80	9.23
Dungarpur	4.20	7.47	2.69	7.96	8.71	8.71	7.90	6.83	5.03	7.39	0	9.94	7.13	8.19	6.21	5.91	5.42	6.79	8.32	6.36	6.31	7.42	5.20	6.67	6.30	5.35
Ganganagar	7.68	6.71	8.57	10.52	7.19	7.19	7.95	7.39	6.72	9.37	9.94	0	6.03	10.48	6.17	7.40	8.56	7.96	6.84	7.46	6.08	7.39	7.76	8.43	6.36	9.23
Jaipur	5.40	3.15	6.05	9.10	4.27	4.27	7.57	5.70	4.99	7.54	7.13	6.03	0	10.65	5.23	6.36	5.55	6.62	5.62	5.63	5.33	4.57	4.99	7.10	4.82	6.84
Jaisalmer	6.80	11.12	8.61	6.14	11.62	11.62	5.89	9.70	9.32	6.75	8.19	10.48	10.65	0	7.56	8.62	7.78	6.36	10.71	6.52	6.75	10.95	7.40	8.35	8.14	9.86
Jalore	3.78	4.63	5.85	6.94	5.41	5.41	5.51	6.35	4.96	5.82	6.21	6.17	5.23	7.56	0	4.43	3.95	4.79	6.66	3.95	2.05	4.72	2.63	4.66	3.45	8.02
Jhalawar	5.68	5.87	5.26	9.60	7.06	7.06	8.05	5.27	3.45	8.68	5.91	7.40	6.36	8.62	4.43	0	5.67	7.98	5.43	7.09	4.79	5.15	5.41	4.74	5.49	7.16
Jhunjhunu	2.04	5.75	4.72	6.84	7.40	7.40	5.70	6.25	5.34	4.70	5.42	8.56	5.55	7.78	3.95	5.67	0	4.87	7.42	3.48	4.19	5.92	1.62	6.32	4.33	7.73
Jodhpur	3.53	7.86	6.37	3.93	8.23	8.23	2.96	7.89	7.26	2.28	6.79	7.96	6.62	6.36	4.79	7.98	4.87	0	8.28	1.69	4.44	7.60	3.73	7.54	5.00	8.04
Kota	6.69	6.11	6.92	10.41	5.95	5.95	8.85	3.89	5.14	9.33	8.32	6.84	5.62	10.71	6.66	5.43	7.42	8.28	0	7.71	6.15	5.02	8.62	5.12	6.15	7.00
Nagaur	2.71	6.90	5.73	4.87	9.51	7.51	3.58	6.88	6.41	2.68	6.36	7.46	5.63	6.52	3.95	7.09	3.48	1.69	7.71	0	3.73	6.85	2.69	7.10	4.44	7.65
Pali	2.99	5.36	5.83	6.89	5.86	5.86	4.95	5.89	5.12	5.65	6.31	6.08	5.33	6.75	2.05	4.79	4.19	4.44	6.15	3.73	0	4.95	3.80	4.66	2.63	7.43
S.Madhopur	6.01	2.98	6.69	9.75	4.04	4.04	7.93	5.67	5.29	8.52	7.42	7.39	4.57	10.95	4.72	5.15	5.92	7.60	5.02	6.85	4.95	0	5.79	4.93	5.13	8.03
Sikar	1.97	5.72	4.38	6.16	6.99	6.99	4.87	5.86	5.21	3.88	5.20	7.76	4.99	7.40	2.63	5.41	1.62	3.73	8.62	2.69	3.80	5.79	0	6.14	3.83	7.10
Sirohi	5.86	6.65	6.24	8.58	6.97	6.97	7.55	4.26	5.29	8.54	6.67	8.43	7.10	8.35	4.66	4.74	6.32	7.54	5.12	7.10	4.66	4.93	6.14	0	5.84	7.17
Tonk	3.83	4.87	5.26	7.75	5.55	5.55	5.67	5.27	4.79	5.80	6.30	6.36	4.82	8.14	3.45	5.49	4.33	5.00	6.15	4.44	2.63	5.13	3.83	5.84	0	7.76
Udaipur	6.08	8.30	4.72	9.85	9.02	9.02	8.93	6.44	5.36	9.23	5.35	9.23	6.84	9.86	8.02	7.16	7.73	8.04	7.00	7.65	7.43	8.03	7.10	7.17	7.76	0
$\bar{d}$	4.71	6.02	5.64	7.45	6.90	6.57	6.23	6.03	5.43	6.41	6.32	7.27	5.79	8.19	4.96	6.00	5.25	5.70	6.70	5.19	4.88	6.06	4.85	6.19	5.11	7.17
σ_d	1.81	2.27	1.91	2.54	2.34	2.28	2.17	1.87	1.89	2.50	1.98	2.42	1.92	2.34	1.70	1.88	1.93	2.27	2.12	2.07	1.60	2.13	1.98	1.76	1.63	2.04
CD UL	8.33	10.57	9.47	12.53	11.58	11.14	10.58	9.78	9.22	11.42	10.27	12.11	9.63	12.87	8.35	9.76	9.12	10.24	10.95	9.33	8.09	10.33	8.81	9.72	8.37	11.26
LL	1.09	1.48	1.82	2.37	2.22	2.01	1.89	2.29	1.65	1.40	2.36	2.43	1.95	3.51	1.57	2.24	1.39	1.16	2.46	1.04	1.67	1.79	0.89	2.67	1.85	3.09

UL = Upper Limit, LL = Lower Limit

Appendix B2 : Model districts (Agricultural Sector)

S.No.	Low developed Districts	Model districts
1.	Ajmer	Pali
2.	Alwar	Sirohi, Jaipur, Chittorgarh, Bundi
3.	Banswara	Chittorgarh
4.	Barmer	Jhunjhunu, Jodhpur, Bikaner, Sikar, Nagaur, Ajmer, Jalore, Dungarpur, Tonk, Pali, Banswara, Bharatpur, S. Madhopur, Jhalawar, Alwar, Jaipur, Ganganagar, Chittorgarh, Bhilwara, Bundi, Udaipur, Kota
5.	Bharatpur	S. Madhopur, Jhalawar, Alwar, Sirohi, Jaipur, Chittorgarh, Bhilwara, Bundi, Udaipur, Kota
6.	Bhilwara	Bundi, Kota
7.	Bikaner	Sikar, Nagaur, Ajmer, Jalore, Dungarpur, Tonk, Pali, Banswara, S. Madhopur, Jhalawar, Alwar, Sirohi, Jaipur, Chittorgarh, Bundi
8.	Churu	Ajmer, Alwar, Banswara, Bhilwara, Bikaner, Bundi, Chittorgarh, Dungarpur, Jaipur, Jalore, Jhalawar, Jhunjhunu, Jodhpur, Kota, Nagaur, Pali, S. Madhopur, Sikar, Sirohi, Tonk, Udaipur
9.	Dungarpur	Tonk, Pali, Banswara, Jhalawar, Sirohi, Jaipur, Chittorgarh, Bundi
10.	Ganganagar	Chittorgarh, Bhilwara, Bundi, Udaipur, Kota
11.	Jaipur	Chittorgarh
12.	Jaisalmer	Jhunjhunu, Sikar, Nagaur, Ajmer, Jalore, Tonk, Pali, Banswara, Jodhpur, Bikaner, Bharatpur, S. Madhopur, Jhalawar, Alwar, Sirohi, Jaipur, Ganganagar, Chittorgarh, Bhilwara, Bundi, Udaipur, Kota
13.	Jalore	Pali
14.	Jhalawar	Sirohi, Jaipur, Chittorgarh
15.	Jhunjhunu	Sikar, Ajmer, Jalore, Tonk, Pali
16.	Jodhpur	Sikar, Nagaur, Ajmer, Jalore, Tonk, Pali, Banswara, Jhalawar, Sirohi, Jaipur, Chittorgarh, Bundi
17.	Nagaur	Ajmer, Jalore, Tonk, Pali, Chittorgarh
18.	S. Madhopur	Jhalawar, Sirohi, Jaipur, Chittorgarh, Bundi
19.	Sikar	Ajmer, Jalore, Tonk, Pali
20.	Sirohi	Chittorgarh, Jaipur
21.	Tonk	Pali
22.	Udaipur	Kota

Appendix B3 : Estimates of potential targets and actual achievements in Agricultural sector

S. No.	Development Indicators	Low Developed Districts										
		Ajmer	Alwar	Banswara	Barmer	Bharat-pur	Bhilwara	Bikaner	Churu	Dungar-pur	Ganga-nagar	Jaipur
1.	Percentage of area sown more than once to net area sown	15.8 (27.4)*	41.0 (45.8)*	55.5 (49.7)	33.5 (5.7)	42.4 (26.5)	41.8 (45.8)*	34.9 (6.4)	33.7 (4.8)	38.0 (48.3)*	46.2 (31.1)	55.3 (38.3)
2.	Percentage of gross area sown under food grains to total cropped area	52.6 (81.1)*	57.7 (58.8)*	58.9 (94.4)*	64.2 (71.3)*	59.0 (50.1)	46.2 (78.9)*	64.6 (52.7)	65.0 (70.5)*	60.9 (97.3)*	63.9 (47.1)	58.9 (65.9)*
3.	Percentage of net area irrigated to net area sown	34.3 (31.7)	60.0 (73.5)*	55.3 (36.3)	44.0 (4.5)	59.0 (58.9)	73.0 (53.5)	45.7 (10.2)	43.3 (2.2)	50.6 (25.5)	59.9 (54.1)	55.3 (55.4)*
4.	Percentage of forest area to total geographical area	6.4 (5.8)	19.3 (6.5)	17.4 (21.0)*	10.6 (0.9)	18.0 (6.3)	25.4 (6.10)	12.6 (2.8)	12.0 (0.4)	15.8 (15.8)	19.1 (3.1)	17.4 (6.5)
5.	Percentage of gross irrigated area to gross area sown	66.0 (36.7)	50.0 (93.4)*	63.7 (28.0)	52.1 (11.7)	58.3 (95.9)*	28.8 (53.8)*	53.4 (29.5)	48.3 (3.6)	53.5 (19.7)	42.5 (86.7)*	63.7 (65.6)*
6	Average size of operational holding	3.9 (2.3)	2.5 (1.8)	2.3 (1.6)	3.6 (12.4)*	2.1 (1.6)	2.7 (2.05)	3.0 (10.8)*	3.5 (9.5)*	2.7 (1.3)	2.3 (6.67)*	2.3 (2.8)*
7.	Percentage of area under commercial crops to total cropped area	35.5 (11.8)	26.0 (35.3)*	18.5 (3.5)	20.8 (2.0)	24.1 (44.1)*	24.8 (14.9)	21.6 (10.6)	19.6 (2.0)	23.0 (1.1)	18.0 (39.0)*	18.5 (24.6)*
8.	Number of cows and buffaloes per 1000 human population	491 (459)	584 (422)	736 (698)	526 (442)	555 (402)	615 (710)*	526 (551)	526 (347)	601 (660)	671 (641)	736 (362)
9.	Production of foodgrains (000 tons)	288533 (340769)*	597423 (795895)*	557016 (371581)	544313 (198004)	545895 (725844)*	523092 (697150)*	461906 (298422)	473368 (506498)*	468181 (190257)	605397 (1427924)*	557016 (1237266)*
10.	Percentage of agriculture workers to the total work force	14.5 (9.3)	10.3 (5.7)	8.2 (6.6)	9.0 (2.8)	10.4 (7.2)	12.3 (7.0)	9.9 (4.6)	9.2 (3.6)	11.8 (9.2)	9.5 (14.8)*	8.2 (5.2)

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S. No.	Development Indicators	Low Developed Districts										
		Ajmer	Alwar	Banswara	Barmer	Bharat-pur	Bhilwara	Bikaner	Churu	Dungar-pur	Ganga-nagar	Jaipur
11.	Forest area per lakh of population	5323 (2832)	13870 (2165)	12131 (9196)	6272 (1722)	11633 (2122)	17139 (3968)	7631 (6244)	7512 (432)	10580 (6971)	12890 (1354)	12131 (2006)
12.	Gross value from agriculture per hectare at current prices	117826 (108605)	166592 (168842)*	115860 (129731)*	165229 (58245)	217083 (380324)*	294466 (198023)	145282 (54834)	159629 (59326)	147191 (134207)	245309 (85071)	115860 (200485)*
13.	Gross value of agriculture output per capita (rural) at current prices	3013 (2347)	3761 (3939)*	3343 (2705)	3214 (728)	3559 (3829)*	4948 (3551)	3295 (3126)	3094 (2346)	3612 (1336)	3722 (4757)*	3343 (3734)*
14.	Fertilizer consumption in terms of nutrients (tons)	25883 (11445)	28070 (27579)	29305 (17178)	27751 (2734)	29721 (33934)*	36187 (21568)	21646 (30922)*	22262 (685)	24031 (3460)	28973 (118706)*	29305 (46954)*
15.	Yield in kg/hect. of foodgrains	790 (812)*	1810 (1831)*	1559 (1165)	1294 (181)	1747 (2149)*	2154 (1658)	1280 (451)	1249 (506)	1461 (1073)	1840 (1460)	1559 (2005)*
16.	Total cattle (00)	416034 (481457)*	455054 (204268)	697037 (580133)	495650 (541937)*	536224 (179720)	504640 (752200)	389657 (559709)*	472174 (328579)	447842 (401058)	747630 (1023263)*	697037 (587718)
17.	Irrigation intensity	117 (120)*	115 (109)	105 (109)*	113 (195)*	112 (103)	120 (116)	112 (162)*	115 (122)*	111 (111)	114 (99)	105 (108)
18.	Cropping intensity	116 (127)*	141 (146)*	155 (150)	133 (106)	142 (127)	142 (146)*	135 (106)	134 (105)	138 (148)*	146 (131)	155 (138)
19.	Percentage of animal power	449 (509)*	457 (315)	437 (514)*	402 (284)	487 (252)	318 (730)*	414 (211)	434 (153)	419 (822)*	584 (166)	437 (343)
20.	Use of pumps and oil engines per thousand of population	67 (46)	87 (146)*	124 (97)	79 (61)	97 (169)*	44 (56)*	85 (0)	78 (8)	93 (169)*	66 (11)	124 (104)
21.	Use of tractors per thousand of population	12 (12)	17 (31)*	11 (3)	14 (5)	16 (35)*	18 (11)	13 (4)	12 (3)	13 (5)	13 (27)*	11 (23)*

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S. No.	Development Indicators	Low Developed Districts										
		Jaisalmer	Jalore	Jhalawar	Jhun-jhunu	Jodhpur	Nagaur	S. Madho-pur	Sikar	Sirohi	Tonk	Udaipur
1.	Percentage of area sown more than once to net area sown	31.1 (3.1)	15.8 (27.4)*	40.2 (52.4)*	24.2 (40.0)*	33.3 (4.6)	29.7 (12.4)	43.3 (30.0)	23.2 (28.2)*	46.9 (26.8)	15.8 (22.4)*	40.0 (46.2)*
2.	Percentage of gross area sown under food grains to total cropped area	62.0 (54.1)	52.6 (50.7)	57.8 (44.2)	64.2 (67.8)*	63.3 (71.3)*	61.7 (68.9)*	50.0 (53.7)	62.4 (71.7)*	62.4 (48.7)	52.6 (65.3)*	35.2 (89.0)*
3.	Percentage of net area irrigated to net area sown	45.3 (5.7)	34.3 (46.8)*	55.1 (53.6)	37.0 (35.6)	44.4 (8.9)	41.7 (17.8)	58.8 (53.3)	38.3 (31.9)	55.3 (54.7)	34.3 (40.3)*	71.3 (44.4)
4.	Percentage of forest area to total geographical area	110. (0.6)	6.4 (1.8)	17.8 (18.4)*	5.0 (6.7)*	11.9 (0.3)	6.9 (0.9)	19.1 (24.0)*	4.3 (7.7)*	11.9 (29.4)*	6.4 (3.3)	26.9 (21.2)
5.	Percentage of gross irrigated area to gross area sown	53.5 (15.5)	66.0 (78.7)*	60.3 (81.9)*	54.4 (39.5)	50.8 (15.7)	59.4 (27.8)	56.4 (77.8)*	58.4 (38.7)	64.6 (51.5)	66.0 (52.1)	38.1 (37.4)
6.	Average size of operational holding	3.6 (13.1)*	3.9 (6.0)*	2.6 (2.6)	3.7 (2.8)	3.3 (8.7)*	3.6 (5.9)*	2.6 (2.0)	3.9 (3.1)	2.5 (2.7)*	3.9 (3.4)	2.9 (1.6)
7.	Percentage of area under commercial crops to total cropped area	22.4 (6.0)	35.5 (22.6)	27.0 (10.2)	22.0 (16.8)	20.3 (12.0)	23.9 (16.4)	22.8 (43.3)*	25.5 (9.0)	21.5 (37.8)*	35.5 (31.0)	26.7 (7.0)
8.	Number of cows and buffaloes per 1000 human population	520 (905)*	491 (508)*	541 (679)*	489 (300)	549 (408)	563 (431)	603 (214)	520 (365)	549 (524)	391 (602)*	516 (678)*
9.	Production of foodgrains (000 tons)	541102 (22455)	288533 (19915)	637965 (294072)	341833 (339255)	450025 (385297)	357409 (635792)*	536753 (542133)*	307508 (479134)*	897141 (119614)	288533 (401572)*	570389 (726634)*
10.	Percentage of agriculture workers to the total work force	9.4 (23.6)*	14.5 (10.6)	10.2 (22.1)*	10.0 (6.4)	10.6 (5.7)	10.6 (6.8)	12.6 (6.6)	11.2 (5.5)	6.7 (17.1)*	14.5 (10.4)	14.1 (7.8)

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S. No.	Development Indicators	Low Developed Districts										
		Jaisalmer	Jalore	Jhalawar	Jhun-jhunu	Jodhpur	Nagaur	S. Madho-pur	Sikar	Sirohi	Tonk	Udaipur
11	Forest area per lakh of population	7012 (6596)	5323 (1637)	12462 (12179)	3097 (2498)	7755 (323)	4877 (717)	13532 (12279)	3063 (3232)*	7068 (23248)*	5323 (2460)	16184 (14075)
12.	Gross value from agriculture per hectare at current prices	167428 (0)	117826 (136666)*	166306 (125604)	117305 (47451)	134117 (127475)	123392 (101171)	158395 (266777)*	125275 (85426)	158172 (182572)*	117826 (138001)*	421481 (323730)
13.	Gross value of agriculture output per capita (rural) at current prices	3283 (0)	3013 (2509)	3310 (2611)	3200 (2169)	3164 (2447)	3347 (1604)	3531 (3839)*	3348 (2607)	3539 (2854)	3013 (5524)*	4784 (1820)
14.	Fertilizer consumption in terms of nutrients (tons)	28382 (843)	25883 (14950)	28623 (22237)	15249 (5612)	20640 (17127)	19250 (19744)*	26904 (45961)*	16736 (9298)	38129 (9609)	25883 (14668)	45961 (21620)
15.	Yield in kg/hect. of foodgrains	1308 (122)	790 (500)	1647 (1436)	832 (832)	1222 (412)	944 (670)	1735 (1624)	790 (996)*	1782 (1377)	790 (1060)*	2011 (1676)
16.	Total cattle (00)	487162 (310197)	416034 (287535)	499693 (430700)	346936 (122490)	421038 (668609)*	443544 (486729)*	450183 (186717)	380171 (213995)	642377 (214324)	416034 (335657)	688144 (1279634)*
17.	Irrigation intensity	121 (152)*	117 (109)	112 (103)	112 (105)	113 (132)*	111 (121)*	113 (102)	112 (112)	106 (124)*	117 (103)	118 (110)
18.	Cropping intensity	132 (103)	116 (127)*	140 (152)*	124 (140)*	133 (105)	129 (112)	143 (130)	123 (128)*	146 (127)	116 (122)*	140 (146)
19.	Percentage of animal power	395 (737)*	449 (290)	482 (299)	369 (286)	395 (302)	389 (259)	426 (323)	376 (338)	390 (667)*	449 (258)	253 (1117)
20.	Use of pumps and oil engines per thousand of population	75 (4)	67 (104)*	104 (143)*	66 (23)	78 (34)	87 (17)	98 (165)*	77 (23)	114 (84)	67 (92)*	53 (63)
21.	Use of tractors per thousand of population	14 (3)	12 (19)*	17 (8)	13 (16)	13 (11)	13 (9)	15 (16)*	13 (9)	17 (16)	12 (11)	19 (8)

** Actual values are already higher than the potential targets*

Appendix C1 : Distance Matrix (Industrial Sector)

Districts	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Ajmer	0	3.85	4.94	5.77	5.13	3.00	4.68	5.71	5.03	6.38	5.84	4.44	3.67	5.88	5.76	5.67	5.93	3.42	4.61	5.19	2.86	6.41	6.06	3.96	6.03	3.56
Alwar	3.85	0	5.69	6.53	6.03	2.20	5.03	5.98	3.74	6.77	6.61	4.88	4.40	6.99	6.64	5.83	5.81	4.55	3.11	6.20	4.16	6.76	6.50	3.79	6.27	3.86
Banswara	4.94	5.69	0	1.18	1.86	4.14	1.88	1.68	3.09	1.61	1.64	4.71	6.74	2.28	1.43	0.82	0.99	4.16	4.15	1.66	4.11	1.73	1.04	3.44	1.70	3.15
Barmer	5.77	6.53	1.18	0	1.26	4.82	1.94	1.75	3.76	1.06	1.42	5.37	6.90	1.88	1.04	1.15	1.56	4.70	4.57	1.55	4.21	1.22	0.64	4.04	4.04	3.60
Bharatpur	5.13	6.03	1.86	1.26	0	4.45	1.47	0.97	3.58	0.91	2.50	4.87	6.69	2.99	2.21	1.05	1.34	4.75	4.04	2.59	3.87	0.84	0.98	4.21	1.89	3.16
Bhilwara	3.00	2.20	4.14	4.82	4.45	0	3.40	4.34	2.88	5.15	4.68	3.85	3.97	5.54	5.02	4.35	4.39	3.91	2.87	4.64	2.54	5.15	4.90	3.17	4.69	2.42
Bikaner	4.68	5.03	1.88	1.94	1.47	3.40	0	1.55	3.24	2.22	2.75	4.27	5.77	3.10	2.56	1.62	2.07	3.68	3.41	2.56	2.55	2.22	2.03	3.30	2.40	3.06
Bundi	5.71	5.98	1.68	1.75	0.97	4.34	1.55	0	3.25	1.37	2.79	5.16	6.86	3.29	2.67	1.31	1.35	4.86	3.71	2.90	3.65	1.38	1.48	3.82	2.39	3.75
Chittorgarh	5.03	3.74	3.09	3.76	3.58	2.88	3.24	3.25	0	3.97	3.81	4.81	6.19	4.37	3.81	3.09	2.77	4.23	3.12	3.57	4.31	4.04	3.63	2.48	3.65	2.55
Churu	6.38	6.77	1.61	1.06	0.91	5.15	2.22	1.37	3.97	0	2.35	5.60	7.34	2.82	1.98	1.38	1.52	5.39	4.76	2.55	4.58	0.23	0.68	4.67	2.15	4.18
Dungarpur	5.84	6.61	1.64	1.42	2.50	4.68	2.75	2.79	3.81	2.35	0	5.72	7.21	2.80	0.73	2.33	3.67	4.34	5.10	0.89	4.64	2.53	0.59	3.68	2.88	3.66
Ganganagar	4.44	4.88	4.71	5.37	4.87	3.85	4.27	5.16	4.81	5.60	5.72	0	6.02	6.03	5.54	4.86	4.75	3.35	5.20	5.38	4.58	5.54	5.28	3.47	3.96	2.72
Jaipur	3.67	4.40	6.74	6.90	6.69	3.97	5.77	6.86	6.19	7.34	7.21	6.02	0	7.36	7.06	6.87	5.88	6.07	5.47	6.59	4.61	7.32	7.19	5.78	7.38	4.32
Jaisalmer	5.88	6.99	2.28	1.88	2.99	5.54	3.10	3.29	4.37	2.82	2.80	6.03	7.36	0	1.15	2.41	3.08	4.41	5.72	1.13	4.75	3.01	2.30	3.90	3.40	3.97
Jalore	5.76	6.64	1.43	1.04	2.21	5.02	2.56	2.67	3.81	1.98	0.73	5.54	7.06	1.15	0	1.76	2.25	4.54	5.19	0.76	4.61	2.16	1.43	3.92	2.59	3.52
Jhalawar	5.67	5.83	0.82	1.15	1.05	4.35	1.62	1.31	3.09	1.38	2.33	4.86	6.87	2.41	1.76	0	1.10	4.29	3.89	2.08	3.99	1.45	0.95	3.62	1.78	3.57
Jhunjhunu	5.93	5.81	0.99	1.56	1.34	4.39	2.07	1.35	2.77	1.52	3.67	4.75	5.88	3.08	2.25	1.10	0	4.64	4.12	2.58	4.39	1.57	1.24	3.91	1.52	3.71
Jodhpur	3.42	4.55	4.16	4.70	4.75	3.91	3.68	4.86	4.23	5.39	4.34	3.35	6.07	4.41	4.54	4.29	4.64	0	4.74	4.07	3.58	5.44	4.86	3.51	4.43	4.42
Kota	4.61	3.11	4.15	4.57	4.04	2.87	3.41	3.71	3.12	4.76	5.10	5.20	5.47	5.72	5.19	3.89	4.12	4.74	0	5.01	3.43	4.72	4.66	3.36	4.81	3.70
Nagaur	5.19	6.20	1.66	1.55	2.59	4.64	2.56	2.90	3.57	2.55	0.89	5.38	6.59	1.13	0.76	2.08	2.58	4.07	5.01	0	4.28	2.72	1.99	3.40	2.96	3.00
Pali	2.86	4.16	4.11	4.21	3.87	2.54	2.55	3.65	4.31	4.58	4.64	4.58	4.61	4.75	4.61	3.99	4.39	3.58	3.43	4.28	0	4.58	4.43	3.26	4.80	3.43
S.Madhopur	6.41	6.76	1.73	1.22	0.84	5.15	2.22	1.38	4.04	0.23	2.53	5.54	7.32	3.01	2.16	1.45	1.57	5.44	4.72	2.72	4.58	0	0.84	4.76	2.12	4.25
Sikar	6.06	6.50	1.04	0.64	0.98	4.90	2.03	1.48	3.63	0.68	0.59	5.28	7.19	2.30	1.43	0.95	1.24	4.86	4.66	1.99	4.43	0.84	0	4.22	2.49	2.86
Sirohi	3.96	3.79	3.44	4.04	4.21	3.17	3.30	3.82	2.48	4.64	3.68	347	5.78	3.90	3.92	3.62	3.91	3.51	3.36	3.44	3.26	4.76	4.22	0	4.73	4.37
Tonk	6.03	6.27	1.70	4.04	1.89	4.69	2.40	2.89	3.65	2.15	2.88	3.96	7.38	3.40	2.59	1.78	1.52	4.43	4.81	2.96	4.80	2.12	2.49	4.73	0	4.37
Udaipur	3.56	3.86	3.15	3.60	3.16	2.42	3.06	3.75	2.55	4.18	3.66	2.72	4.32	3.97	3.52	3.57	3.71	4.42	3.70	3.00	3.43	4.25	2.86	4.37	4.37	0
$\bar{d}$	4.32	5.08	2.68	2.92	2.83	3.86	2.80	3.00	3.58	3.14	3.27	4.63	5.91	3.64	3.09	2.74	2.93	4.24	4.13	3.09	3.85	3.19	2.82	2.82	3.44	3.43
σ_d	2.45	1.64	1.66	1.96	1.76	1.20	1.21	1.70	1.07	2.10	1.84	1.23	1.62	1.79	1.92	1.77	1.67	1.05	1.13	1.66	1.00	2.07	2.06	2.06	1.65	0.89
CD UL	9.23	8.36	6.00	6.84	6.35	6.26	5.21	6.41	5.72	7.33	6.95	7.09	9.15	7.22	6.93	6.28	6.27	6.35	6.39	6.41	5.87	7.34	6.74	6.94	6.18	5.20
LL	-0.58	1.79	-0.64	-1.00	-0.69	1.46	0.38	-0.41	1.44	-1.05	-0.41	2.17	2.67	0.06	-0.75	-0.79	-0.41	2.13	1.87	-0.23	1.83	-0.95	-1.30	-1.30	0.13	1.65

UL = Upper Limit, LL = Lower Limit

Appendix C2 : Model districts (Industrial Sector)

S.No.	Low developed Districts	Model districts
1.	Alwar	Ajmer
2.	Banswara	Bikaner, Chittorgarh, Pali, Udaipur
3.	Barmer	Bundi, Bharatpur, Jhalawar, Jhunjhunu, Tonk, Nagaur, Banswara, Bikaner, Kota, Chittorgarh, Pali, Udaipur, Jodhpur, Bhilwara
4.	Bharatpur	Jhalawar, Jhunjhunu, Tonk, Banswara, Bikaner, Chittorgarh, Pali, Udaipur, Bhilwara
5.	Bikaner	Udaipur
6.	Bundi	Bharatpur, Jhalawar, Jhunjhunu, Tonk, Banswara, Bikaner, Kota, Chittorgarh, Pali, Udaipur, Jodhpur, Bhilwara
7.	Chittorgarh	Udaipur
8.	Churu	Sikar, Jaisalmer, Barmer, Dungarpur, Jalore, Bundi, Bharatpur, Jhalawar, Jhunjhunu, Tonk, Nagaur, Banswara, Bikaner, Kota, Chittorgarh, Pali, Sirohi, Udaipur, Jodhpur, Ganganagar, Bhilwara
9.	Dungarpur	Jalore, Bundi, Bharatpur, Jhalawar, Jhunjhunu, Tonk, Nagaur, Banswara, Bikaner, Kota, Chittorgarh, Pali, Sirohi, Udaipur, Jodhpur, Bhilwara
10.	Ganganagar	Bhilwara
11.	Jaisalmer	Barmer, Dungarpur, Jalore, Bundi, Bharatpur, Jhalawar, Jhunjhunu, Tonk, Nagaur, Banswara, Bikaner, Kota, Chittorgarh, Pali, Sirohi, Udaipur, Jodhpur, Ganganagar, Bhilwara
12.	Jalore	Bharatpur, Jhalawar, Jhunjhunu, Tonk, Banswara, Bikaner, Kota, Chittorgarh, Pali, Udaipur, Jodhpur, Bhilwara
13.	Jhalawar	Jhunjhunu, Tonk, Banswara, Bikaner, Chittorgarh, Pali, Udaipur, Bhilwara
14.	Jodhpur	Bhilwara
15.	Kota	Chittorgarh, Pali, Udaipur, Jodhpur, Bhilwara
16.	Nagaur	Banswara, Bikaner, Kota, Chittorgarh, Pali, Udaipur, Jodhpur, Bhilwara
17.	Pali	Udaipur
18.	S. Madhopur	Banswara, Barmer, Bharatpur, Bhilwara, Bikaner, Bundi, Chittorgarh, Churu, Dungarpur, Ganganagar, Jaisalmer, Jalore, Jhalawar, Jhunjhunu, Jodhpur, Kota, Nagaur, Pali, Sikar, Sirohi, Tonk, Udaipur
19.	Sikar	Banswara, Barmer, Bharatpur, Bhilwara, Bikaner, Bundi, Chittorgarh, Jalore, Jhalawar, Jhunjhunu, Jodhpur, Kota, Nagaur, Pali, Tonk, Udaipur
20.	Sirohi	Udaipur, Jodhpur, Bhilwara
21.	Tonk	Banswara, Bikaner, Chittorgarh, Pali, Udaipur

Appendix C3 : Estimates of potential targets and actual achievements in Industrial sector

S. No.	Development Indicators	Low Developed Districts										
		Alwar	Banswara	BARMER	BHARAT-PUR	BIKANER	Bundi	Chittor-garh	Churu	Dungar-pur	Ganga-nagar	Jaisalmer
1.	Number of workers employed in working factories	29210 (31876)*	14233 (2912)	10395 (3083)	9668 (7868)	18324 (9173)	11449 (3967)	18324 (6937)	8839 (2187)	9526 (922)	19475 (26458)*	10638 (205)
2.	Number of workers per lakh population in working factories	1689 (1388)	843 (252)	614 (215)	614 (328)	634 (757)*	657 (515)	634 (467)	529 (142)	599 (105)	1222 (1009)	574 (60)
3.	Per capita value added by manufacturing in Rs.	1314 (1532)*	460 (782)*	776 (70)	834 (332)	148 (513)*	878 (29)	148 (1100)*	764 (5)	703 (181)	1380 (4201)*	827 (16)
4.	Percentage of manufact-uring industry workers to the total work force	4.3 (3.4)	2.1 (0.5)	1.5 (0.5)	1.5 (1.0)	1.5 (2.1)*	1.7 (1.3)	1.5 (1.0)	1.4 (0.4)	1.5 (0.2)	2.6 (2.7)*	1.5 (0.6)
5.	Gross output in industry per capita	3466 (10960)*	3940 (1730)	3519 (529)	3403 (1529)	4531 (2412)	3942 (1386)	4531 (5545)*	2878 (107)	3425 (921)	7918 (3790)	3160 (40)
6.	Industrial consumption of electricity per capita (kwh)	126 (337.8)*	155 (90.1)	113 (13.1)	125 (27.1)	194 (43.1)	120 (90.8)	194 (300.2)*	96 (20.5)	117 (38.9)	206 (54.4)	104 (9.5)
7.	Percentage of people who got industrial loan	5.3 (2.9)	2.9 (2.6)	2.5 (2.6)*	2.4 (1.0)	4.0 (2.0)	2.5 (0.8)	4.0 (2.6)	2.9 (1.0)	2.8 (4.7)*	2.4 (2.0)	2.8 (5.5)*
8.	Percentage amount disbursed as industrial loan	11.0 (7.0)	5.0 (2.0)	2.9 (2.0)	3.7 (1.0)	10.0 (2.5)	3.0 (0.0)	10.0 (4.0)	2.7 (1.0)	2.9 (1.0)	9.5 (5.0)	2.8 (1.0)

S. No.	Development Indicators	Low Developed Districts									
		Jalore	Jhalawar	Jodhpur	Kota	Nagaur	Pali	S. Madho-pur	Sikar	Sirohi	Tonk
1.	Number of workers employed in working factories	11449 (942)	10546 (2648)	19475 (23166)*	18080 (19332)*	15227 (4178)	18324 (22499)*	8536 (3191)	9345 (2535)	20322 (5940)	11969 (2093)
2.	Number of workers per lakh population in working factories	657 (82)	656 (277)	1222 (1076)	982 (952)	859 (195)	634 (1513)*	511 (162)	555 (138)	977 (908)	725 (215)
3.	Per capita value added by manufacturing in Rs.	828 (273)	871 (537)	1380 (2531)*	1036 (169)	838 (295)	148 (21)	729 (54)	700 (319)	1353 (122)	525 (2032)*
4.	Percentage of manufact-uring industry workers to the total work force	1.7 (0.2)	1.6 (0.8)	2.6 (2.9)	2.4 (2.6)	2.1 (0.5)	1.5 (4.0)*	1.3 (0.4)	1.4 (0.4)	2.3 (2.4)*	1.8 (0.5
5.	Gross output in industry per capita	3982 (87)	3487 (2735)	7918 (3914)	5036 (11237)*	5070 (569)	4531 (3274)	27 (333)*	3118 (353)	5454 (5444)	3498 (1223)
6.	Industrial consumption of electricity per capita	120 (26.9)	133 (57.0)	206 (90.3)	175 (203.4)*	151 (52.1)	194 (83.2)	2752 (12.2)	102 (34.1)	163 (255.5)*	142 (29.2)
7.	Percentage of people who got industrial loan	2.5 (4.0)*	2. 4 (2. 2)	2.4 (6.2)*	3.6 (1.2)	3.0 (4.8)*	4.0 (3.0)	2.9 (0.7)	2.6 (1.9)	4.2 (5.3)*	2.8 (1.3)
8.	Percentage amount disbursed as industrial loan	3.0 (3.0)	4.1 (0.0)	9.5 (0.9)	5.6 (1.0)	4.2 (4.0)	10.0 (3.5)	2.6 (1.0)	2.8 (1.0)	6.8 (3.0)	4.4 (1.0)

** Actual values are already higher than the potential targets*

Appendix D1 : Distance Matrix (Infrastructural Sector)

Districts	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Ajmer	0	3.83	4.37	5.57	4.11	2.15	2.81	4.39	3.47	3.54	4.25	4.58	3.99	5.33	5.35	4.62	2.13	3.67	2.78	3.73	2.78	4.49	2.94	2.63	3.08	3.13
Alwar	3.83	0	3.19	2.85	1.28	2.76	4.20	3.18	2.62	3.77	2.78	3.30	4.43	6.38	3.31	4.18	2.96	4.40	3.48	1.92	1.92	2.44	1.69	3.04	2.96	3.74
Banswara	4.37	3.19	0	4.31	2.51	4.28	4.98	3.82	3.28	4.50	2.42	4.08	5.12	6.35	3.59	4.69	4.13	4.89	4.66	3.17	3.38	2.78	2.54	3.78	4.10	3.70
Barmer	5.57	2.85	4.31	0	3.26	5.29	6.18	3.15	2.55	3.52	3.32	2.62	6.22	4.07	2.18	3.32	5.27	5.45	4.49	2.80	4.04	2.80	3.53	4.03	3.92	5.21
Bharatpur	4.11	1.28	2.51	3.26	0	2.89	4.62	3.28	1.95	3.80	2.69	2.57	4.62	5.82	2.93	4.30	3.18	4.78	3.67	1.57	2.36	1.84	1.85	3.30	3.54	3.53
Bhilwara	2.15	2.76	4.28	5.29	2.89	0	3.74	4.46	3.05	4.03	3.65	3.86	3.80	6.00	5.13	5.21	1.39	4.54	3.31	3.03	2.53	3.67	2.29	3.04	3.57	2.41
Bikaner	2.81	4.20	4.98	6.18	4.62	3.74	0	4.45	4.16	3.82	4.78	5.20	5.06	6.43	5.29	5.26	3.65	4.32	3.26	4.65	3.75	5.00	4.25	3.48	3.96	4.78
Bundi	4.39	3.18	3.82	3.15	3.28	4.46	4.45	0	2.39	2.31	3.37	3.28	5.96	4.77	1.09	1.72	4.00	4.71	2.63	2.71	3.16	2.45	2.66	2.17	1.67	5.26
Chittorgarh	3.47	2.62	3.28	2.55	1.95	3.05	4.16	2.39	0	2.61	2.67	1.77	4.76	6.35	2.47	3.30	3.07	4.51	2.54	1.61	2.60	1.58	1.89	4.89	2.36	3.47
Churu	3.54	3.77	4.50	3.52	3.80	4.03	3.82	2.31	2.61	0	4.23	3.16	4.81	4.27	3.51	1.79	3.74	3.60	2.03	2.43	2.74	3.38	2.45	2.56	1.42	4.01
Dungarpur	4.25	2.78	2.42	3.32	2.69	3.65	4.78	3.37	2.67	4.23	0	4.17	5.99	4.70	3.34	4.17	3.69	5.50	4.50	3.05	3.19	2.76	2.63	2.96	3.87	4.51
Ganganagar	4.58	3.30	4.08	2.62	2.57	3.86	5.20	3.28	1.77	3.16	4.17	0	4.64	5.50	2.86	4.08	4.07	4.71	3.07	2.08	3.56	1.99	2.83	3.62	3.23	3.66
Jaipur	3.99	4.43	5.12	6.22	4.62	3.80	5.06	5.96	4.76	4.81	5.99	4.64	0	7.55	6.14	6.12	4.75	2.70	4.45	4.06	3.70	5.53	4.14	5.57	5.20	2.45
Jaisalmer	5.33	6.38	6.35	4.07	5.82	6.00	6.43	4.77	6.35	4.27	4.70	5.50	7.55	0	5.29	4.33	5.65	6.48	5.19	5.16	5.44	5.35	5.13	4.17	4.56	6.23
Jalore	5.35	3.31	3.59	2.18	2.93	5.13	5.29	1.09	2.47	3.51	3.34	2.86	6.14	5.29	0	3.00	5.07	5.11	3.89	2.79	3.86	2.04	3.30	3.62	3.35	5.34
Jhalawar	4.62	4.18	4.69	3.32	4.30	5.21	5.26	1.72	3.30	1.79	4.17	4.08	6.12	4.33	3.00	0	4.77	4.40	3.14	3.22	3.48	3.69	3.26	3.01	2.12	5.67
Jhunjhunu	2.13	2.96	4.13	5.27	3.18	1.39	3.65	4.00	3.07	3.74	3.69	4.07	4.75	5.65	5.07	4.77	0	5.02	2.91	3.15	2.53	3.71	2.40	2.39	3.04	3.63
Jodhpur	3.67	4.40	4.89	5.45	4.78	4.54	4.32	4.71	4.51	3.60	5.50	4.71	2.70	6.48	5.11	4.40	5.02	0	3.63	3.86	3.27	5.26	3.88	4.75	4.11	3.77
Kota	2.78	3.48	4.66	4.49	3.67	3.31	3.26	2.63	2.54	2.03	4.50	3.07	4.45	5.19	3.89	3.14	2.91	3.63	0	2.79	2.69	3.44	2.69	2.22	1.48	4.09
Nagaur	3.73	1.92	3.17	2.80	1.57	3.03	4.65	2.71	1.61	2.43	3.05	2.08	4.06	5.16	2.79	3.22	3.15	3.86	2.79	0	1.73	2.10	1.29	2.94	2.64	3.33
Pali	2.78	1.92	3.38	4.04	2.36	2.53	3.75	3.16	2.60	2.74	3.19	3.56	3.70	5.44	3.86	3.48	2.53	3.27	2.69	1.73	0	3.34	1.48	2.81	2.72	3.39
S.Madhopur	4.49	2.44	2.78	2.80	1.84	3.67	5.00	2.45	1.58	3.38	2.76	1.99	5.53	5.35	2.04	3.69	3.71	5.26	3.44	2.10	3.34	0	2.24	2.87	2.93	4.19
Sikar	2.94	1.69	2.54	3.53	1.85	2.29	4.25	2.66	1.89	2.45	2.63	2.83	4.14	5.13	3.30	3.26	2.40	3.88	2.69	1.29	1.48	2.24	0	2.28	2.24	3.09
Sirohi	2.63	3.04	3.78	4.03	3.30	3.04	3.48	2.17	4.89	2.56	2.96	3.62	5.57	4.17	3.62	3.01	2.39	4.75	2.22	2.94	2.81	2.87	2.28	0	1.48	4.37
Tonk	3.08	2.96	4.10	3.92	3.54	3.57	3.96	1.67	2.36	1.42	3.87	3.23	5.20	4.56	3.35	2.12	3.04	4.11	1.48	2.64	2.72	2.93	2.24	1.48	0	5.24
Udaipur	3.13	3.74	3.70	5.21	3.53	2.41	4.78	5.26	3.47	4.01	4.51	3.66	2.45	6.23	5.34	5.67	3.63	3.77	4.09	3.33	3.39	4.19	3.09	4.38	6.24	0
$\bar{d}$	3.60	3.10	3.79	3.84	3.09	3.46	4.31	3.19	2.92	3.15	3.58	3.40	4.68	5.25	3.61	3.72	3.47	4.28	3.19	2.76	2.94	3.15	2.65	3.15	3.07	3.97
σ_d	1.17	1.19	1.17	1.37	1.23	1.27	1.19	1.32	1.25	1.06	1.15	1.15	1.44	1.34	1.42	1.32	1.24	1.16	1.08	1.07	0.98	1.28	1.03	1.12	1.29	1.28
CD UL	5.95	5.48	6.13	6.58	5.55	6.00	6.69	5.83	5.42	5.27	5.88	5.71	7.56	7.94	6.45	6.35	5.95	6.60	5.34	4.89	4.91	5.70	4.70	5.39	6.36	6.54
LL	1.26	0.72	1.45	1.10	0.63	0.92	1.93	0.55	0.42	1.03	1.28	1.10	1.80	2.57	0.77	1.08	0.99	1.96	1.03	0.62	0.97	0.59	0.59	0.91	0.49	1.41

UL = Upper Limit, LL = Lower Limit

Appendix D2 : Model districts (Infrastructural Sector)

S. No.	Districts	Indicators requiring improvements
1.	Alwar	Chittorgarh, Nagaur, Pali, Sikar, Sirohi
2.	Banswara	Ajmer, Alwar, Bharatpur, Bhilwara, Chittorgarh, Churu, Dungarpur, Jhunjhunu, Kota, Nagaur, Pali, Sikar, Sirohi
3.	Barmer	Ajmer, Alwar, Banswara, Bharatpur, Bhilwara, Chittorgarh, Churu, Dungarpur, Jhunjhunu, Kota, Nagaur, Pali, Sikar, Sirohi, Tonk, Udaipur
4.	Bharatpur	Chittorgarh, Nagaur, Pali, Sikar
5.	Bikaner	Ajmer, Alwar, Bharatpur, Bhilwara, Chittorgarh, Dungarpur, Jhunjhunu, Nagaur, Pali, Sikar, Sirohi, Udaipur
6.	Bundi	Alwar, Bharatpur, Chittorgarh, Churu, Ganganagar, Kota, Nagaur, Pali, S. Madhopur, Sikar, Sirohi
7.	Chittorgarh	Ajmer, Nagaur, Pali, Sikar
8.	Churu	Nagaur, Pali, Sikar
9.	Dungarpur	Jodhpur, Nagaur, Pali, Sikar
10.	Ganganagar	Alwar, Bharatpur, Chittorgarh, Churu, Kota, Nagaur, Pali, Sikar, Sirohi
11.	Jaipur	Ajmer, Bhilwara, Udiapur
12.	Jaisalmer	Ajmer, Bharatpur, Bhilwara, Chittorgarh, Dungarpur, Jaipur, Jhunjhunu, Jodhpur, Nagaur, Pali, Sikar, Udaipur
13.	Jalore	Ajmer, Alwar, Banswara, Bharatpur, Bhilwara, Bundi, Chittorgarh, Churu, Dungarpur, Ganganagar, Jhalawar, Jhunjhunu, Kota, Nagaur, Pali, S. Madhopur, Sikar, Sirohi, Tonk
14.	Jhalawar	Ajmer, Alwar, Banswara, Bharatpur, Bhilwara, Bundi, Chittorgarh, Churu, Dungarpur, Ganganagar, Jhunjhunu, Kota, Nagaur, Pali, S. Madhopur, Sikar, Sirohi
15.	Jodhpur	Ajmer, Bhilwara, Jhunjhunu, Nagaur, Pali, Sikar, Udaipur
16.	Kota	Churu, Nagaur, Pali, Sikar, Sirohi
17.	Nagaur	Sikar
18.	S. Madhopur	Alwar, Bharatpur, Chittorgarh, Churu, Kota, Nagaur, Pali, Sikar, Sirohi
19.	Sirohi	Nagaur, Pali, Sikar
20.	Tonk	Ajmer, Alwar, Banswara, Bharatpur, Bhilwara, Chittorgarh, Churu, Dungarpur, Jhunjhunu, Kota Pali, Sikar, Sirohi, Nagaur

Appendix D3 : Estimates of potential targets and actual achievements in infrastructural sector

S. No.	Development Indicators	Low Developed Districts									
		Alwar	Banswara	Barmer	Bharatpur	Bikaner	Bundi	Chittorgarh	Churu	Dungarpur	Ganga-nagar
1.	Number of hospitals per lakh of human population	0.53 (0.39)	0.54 (0.17)	0.52 (0.21)	0.50 (0.25)	0.49 (0.58)*	0.48 (0.52)*	0.61 (0.34)	0.56 (0.78)*	0.60 (0.23)	0.53 (0.27)
2.	Number of beds in hospitals per lakh of human population	72.80 (65.0)	76.60 (82.0)*	95.94 (59.0)	71.50 (59.0)	78.58 (139)*	63.54 (64)*	83.75 (71)	71.67 (74)*	89 (78)	71.78 (53)
3.	Number of high/senior secondary schools per 1000 school going children	0.52 (0.48)	0.55 (0.47)	0.55 (0.40)	0.50 (0.50)	0.56 (0.64)*	0.52 (0.46)	0.53 (0.55)*	0.48 (0.48)	0.47 (0.50)*	0.52 (0.54)*
4.	Number of post offices per lakh of population	25.72 (21.30)	25.18 (23.40)	24.84 (33.20)*	25.50 (25)	25.59 (18.2)	24.00 (22.8)	25.1 (26.5)*	25.12 (25)	23.45 (33.2)*	24.35 (21.5)
5.	Number of civil veterinary hospitals	45.80 (46)*	45.15 (26)	44.80 (50)*	51.5 (54)*	47.42 (37)	47.73 (22)	49.75 (49)	52.33 (44)	55.75 (25)	46.78 (66)*
6.	Number of civil veterinary dispensaries	11 (15)*	12.15 (25)*	13.56 (3)	12.25 (13)*	14.58 (1)	10.18 (1)	14.5 (7)	14 (8)	14.5 (13)	10.44 (8)
7.	Road length per 100 sq. km of geographical area (in km)	28 (39)*	30 (33)*	31 (17)	28 (35)*	31 (12)	26 (22)	30 (23)	30 (15)	28 (35)*	28 (17)

S. No.	Development Indicators	Low Developed Districts									
		Jaipur	Jaisalmer	Jalore	Jhalawar	Jodhpur	Kota	Nagaur	S. Madho-pur	Sirohi	Tonk
1.	Number of hospitals per lakh of human population	0.57 (0.63)*	0.52 (0.58)*	0.51 (0.17)	0.48 (0.73)*	0.59 (0.74)*	0.61 (0.74)*	0.54 (0.47)	0.53 (0.20)	0.56 (0.61)*	0.51 (0.72)*
2.	Number of beds in hospitals per lakh of human population	02.67 (123)	88.67 (96)*	73 (63)	70.29 (73)*	84.57 (141)*	73.40 (84)*	68 (62)	77.89 (47)	71.67 (78)*	77 (72)
3.	Number of high/senior secondary schools per 1000 school going children	0.64 (0.52)	0.54 (0.56)*	0.53 (0.40)	0.51 (0.39)	0.58 (0.42)	0.51 (0.58)*	0.51 (0.47)	0.53 (0.52)	0.49 (0.60)*	0.54 (0.54)
4.	Number of post offices per lakh of population	24.47 (17.6)	24.59 (44.7)*	24.60 (23.10)	24.62 (26.10)*	24.93 (18.30)	25.42 (19.30)	25.1 (25.20)*	24.75 (23.40)	25.17 (26.60)*	25.06 (22.60)
5.	Number of civil veterinary hospitals	56.67 (94)*	55 (31)	41.79 (34)	43.47 (25)	53.14 (66)*	44.80 (48)*	44 (59)*	46.33 (38)	52.33 (23)	43.78 (30)
6.	Number of civil veterinary dispensaries	21.67 (26)*	16.33 (0)	11.05 (1)	11.88 (2)	17.28 (16)	11.20 (3)	17 (12)	10.55 (10)	14.00 (6)	13.07 (6)
7.	Road length per 100 sq. km of geographical area (in km)	30 (28)	22 (09)	27 (21)	28 (16)	31 (22)	26 (22)	29 (27)	27 (24)	30 (26)	30 (20)

** Actual values are already higher than the potential targets*

Appendix E1 : Distance Matrix (Socio-economic Sector)

Districts	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Ajmer	0	3.96	6.04	6.73	6.66	4.89	4.80	5.12	4.90	4.91	5.73	6.40	7.60	7.28	6.35	5.37	5.48	4.88	3.68	5.25	4.51	5.20	5.47	5.67	5.07	5.04
Alwar	3.96	0	3.24	4.60	4.38	3.17	3.89	3.06	3.43	2.67	2.82	4.99	7.70	5.74	3.33	3.65	4.19	3.68	2.85	2.73	2.13	2.47	3.04	3.34	3.09	2.77
Banswara	6.04	3.24	0	3.00	4.41	3.73	5.29	2.29	3.35	2.51	1.08	6.12	9.17	4.87	2.72	1.96	4.39	5.71	4.30	2.71	2.91	1.99	3.46	3.23	2.03	2.97
Barmer	6.73	4.60	3.00	0	6.02	3.46	5.77	3.70	3.43	3.05	3.03	6.96	10.08	5.83	1.62	3.11	6.52	5.82	5.42	2.42	3.30	2.10	3.71	4.12	2.62	3.79
Bharatpur	6.66	4.38	4.41	6.02	0	5.85	7.90	5.48	5.88	5.68	4.39	6.70	8.74	8.41	5.65	5.50	5.64	6.51	5.16	4.85	5.71	4.29	4.19	5.19	5.46	4.59
Bhilwara	4.89	3.17	3.73	3.46	5.85	0	2.13	2.42	1.06	3.23	3.44	6.26	9.02	6.05	2.90	2.40	5.81	4.41	3.89	2.33	2.48	3.32	4.75	3.35	2.10	3.44
Bikaner	4.80	3.89	5.29	5.77	7.90	2.13	0	4.15	4.77	3.45	5.05	6.35	8.50	4.27	4.79	4.93	5.36	4.21	4.21	4.85	3.08	4.98	5.66	4.81	4.31	5.33
Bundi	5.12	3.06	2.29	3.70	5.48	2.42	4.15	0	2.56	2.06	2.34	6.39	9.50	5.06	2.60	1.99	3.97	4.72	3.47	2.25	1.83	2.60	3.86	1.92	1.61	3.59
Chittorgarh	4.90	3.43	3.35	3.43	5.88	1.06	4.77	2.56	0	3.26	3.45	6.04	9.08	5.62	3.14	1.81	5.94	4.91	4.10	2.63	2.89	3.31	4.94	3.66	1.89	3.38
Churu	4.91	2.67	2.51	3.05	5.98	3.23	3.45	2.06	3.26	0	2.07	6.11	8.77	4.48	2.34	2.69	3.98	4.56	3.52	2.36	1.22	1.89	2.94	3.00	1.95	3.23
Dungarpur	5.73	2.82	1.08	3.03	4.39	3.44	5.05	2.34	3.45	2.07	0	6.55	9.43	5.31	2.18	2.48	3.98	5.48	4.22	2.37	2.36	1.29	2.44	2.93	2.04	3.27
Ganganagar	6.40	4.99	6.12	6.96	6.70	6.26	6.35	6.39	6.04	6.11	6.55	0	7.39	7.01	6.79	6.49	7.46	5.19	4.84	5.90	6.05	6.07	6.85	6.07	6.47	4.50
Jaipur	7.60	7.70	9.17	10.08	8.74	9.02	8.50	9.50	9.08	8.77	9.43	7.39	0	9.56	9.88	9.48	9.22	7.07	6.84	8.99	8.77	8.94	9.07	9.07	9.31	7.08
Jaisalmer	7.28	5.74	4.87	5.83	8.41	6.05	4.27	5.06	5.62	4.48	5.31	7.01	9.56	0	5.45	4.74	6.49	6.96	6.19	6.00	4.99	5.57	6.67	5.98	4.67	6.23
Jalore	6.35	3.33	2.72	1.62	5.65	2.90	4.79	2.60	3.14	2.34	2.18	6.79	9.88	5.45	0	2.89	5.63	4.93	4.65	1.73	2.25	1.89	3.09	2.97	1.76	3.83
Jhalawar	5.37	3.65	1.96	3.11	5.50	2.40	4.93	1.99	1.81	2.69	2.48	6.49	9.48	4.74	2.89	0	5.18	5.62	4.27	2.73	2.86	2.55	4.38	3.04	1.03	3.54
Jhunjhunu	5.48	4.19	4.39	6.52	5.64	5.81	5.36	3.97	5.94	3.98	3.98	7.46	9.22	6.49	5.63	5.18	0	6.23	4.28	5.15	4.16	4.41	4.28	4.34	4.96	4.94
Jodhpur	4.88	3.68	5.71	5.82	6.51	4.41	4.21	4.72	4.91	4.56	5.48	5.19	7.07	6.96	4.93	5.62	6.23	0	2.60	3.95	3.96	4.95	5.34	4.03	5.00	4.37
Kota	3.68	2.85	4.30	5.42	5.16	3.89	4.21	3.47	4.10	3.52	4.22	4.84	6.84	6.19	4.65	4.27	4.28	2.60	0	3.37	3.37	3.82	4.33	3.22	3.91	3.15
Nagaur	5.25	2.73	2.71	2.42	4.85	2.33	4.85	2.25	2.63	2.36	2.37	5.90	8.99	6.00	1.73	2.73	5.15	3.95	3.37	0	2.14	1.79	2.64	2.02	1.17	2.49
Pali	4.51	2.13	2.91	3.30	5.71	2.48	3.08	1.83	2.89	1.22	2.36	6.05	8.77	4.99	2.25	2.86	4.16	3.96	3.37	2.14	0	1.58	3.23	2.72	2.22	3.30
S.Madhopur	5.20	2.47	1.99	2.10	4.29	3.32	4.98	2.60	3.31	1.89	1.29	6.07	8.94	5.57	1.89	2.55	4.41	4.95	3.82	1.79	1.58	0	1.41	3.05	1.87	2.75
Sikar	5.47	3.04	3.46	3.71	4.19	4.75	5.66	3.86	4.94	2.94	2.44	6.85	9.07	6.67	3.09	4.38	4.28	5.34	4.33	2.64	3.23	1.41	0	3.84	3.72	3.78
Sirohi	5.67	3.34	3.23	4.12	5.19	3.35	4.81	1.92	3.66	3.00	2.93	6.07	9.07	5.98	2.97	3.04	4.34	4.03	3.22	2.02	2.72	3.05	3.84	0	2.97	3.40
Tonk	5.07	3.09	2.03	2.62	5.46	2.10	4.31	1.61	1.89	1.95	2.04	6.47	9.31	4.67	1.76	1.03	4.96	5.00	3.21	1.17	2.22	1.87	3.72	2.97	0	3.40
Udaipur	5.04	2.77	2.97	3.79	4.59	3.44	5.33	3.59	3.38	3.23	3.27	4.50	7.08	6.23	3.83	3.54	4.94	4.37	3.15	2.49	3.30	2.75	3.78	3.40	3.40	0
$\bar{d}$	5.27	3.50	3.59	4.24	5.51	3.69	4.72	3.40	3.82	3.30	3.45	6.00	8.39	5.75	3.67	3.64	5.08	4.81	3.99	3.26	3.23	3.23	4.12	3.77	3.25	3.77
σ_d	1.39	1.34	1.83	2.05	1.61	1.82	1.62	1.85	1.81	1.70	1.93	1.39	1.89	1.64	2.05	1.91	1.57	1.39	1.24	1.85	1.71	1.87	1.75	1.66	1.97	1.30
CD UL	8.06	6.17	7.25	8.33	8.73	7.34	7.96	7.10	7.43	6.70	7.30	8.78	12.18	9.04	7.76	7.47	8.22	7.59	6.47	6.96	6.66	6.46	7.63	7.10	7.19	6.38
LL	2.49	0.82	-0.05	0.14	2.29	-0.05	1.48	-0.30	0.2	-0.10	-0.41	3.21	4.60	2.47	-0.43	-0.18	1.94	2.03	1.51	-0.44	-0.19	-0.51	0.62	0.44	-0.69	1.16

UL = Upper Limit, LL = Lower Limit

Appendix E2 : Model districts (Socio-economic Sector)

S.No.	Low developed Districts	Model districts
1.	Banswara	Bundi, Sirohi, Tonk, Churu, S. Madhopur, Pali, Nagaur, Udaipur, Alwar, Kota
2.	Barmer	Jalore, Dungarpur, Banswara, Bundi, Sirohi, Jhalawar, Tonk, Churu, Sikar, S. Madhopur, Pali, Nagaur, Bikaner, Chittorgarh, Bhilwara, Udaipur, Alwar, Kota, Jodhpur, Ajmer
3.	Bharatpur	Udaipur, Alwar, Kota, Jodhpur, Ajmer
4.	Bhilwara	Udaipur, Alwar, Kota
5.	Bikaner	Chittorgarh, Bhilwara, Udaipur, Alwar, Kota, Jodhpur
6.	Bundi	Churu, S. Madhopur, Pali, Nagaur, Udaipur, Alwar, Kota, Jodhpur
7.	Chittorgarh	Bhilwara, Udaipur, Alwar, Kota
8.	Churu	S. Madhopur, Pali, Udaipur, Alwar, Kota
9.	Dungarpur	Banswara, Bundi, Sirohi, Tonk, Churu, S. Madhopur, Pali, Nagaur, Udaipur, Alwar, Kota
10.	Ganganagar	Jodhpur, Ajmer
11.	Jaisalmer	Ajmer, Alwar, Banswara, Barmer, Bharatpur, Bhilwara, Bikaner, Bundi, Chittorgarh, Churu, Dungarpur, Ganganagar, Jalore, Jhalawar, Jhunjhunu, Jodhpur, Kota, Nagaur, Pali, S. Madhopur, Sikar, Sirohi, Tonk, Udaipur
12.	Jalore	Dungarpur, Banswara, Bundi, Sirohi, Jhalawar, Tonk, Churu, Sikar, S. Madhopur, Pali, Nagaur, Chittorgarh, Bhilwara, Udaipur, Alwar, Kota, Jodhpur
13.	Jhalawar	Tonk, Churu, Sikar, S. Madhopur, Pali, Nagaur, Chittorgarh, Bhilwara, Udaipur, Alwar, Kota
14.	Jhunjhunu	Ajmer, Alwar, Banswara, Bhilwara, Bikaner, Bundi, Chittorgarh, Churu, Dungarpur, Jalore, Jhalawar, Jodhpur, Kota, Nagaur, Pali, S. Madhopur, Sikar, Sirohi, Tonk, Udaipur
15.	Nagaur	Udaipur, Alwar, Kota
16.	Pali	Udaipur Alwar, Kota
17.	S. Madhopur	Udaipur, Alwar
18.	Sikar	S. Madhopur, Pali, Nagaur, Bhilwara, Udaipur, Alwar, Kota, Jodhpur
19.	Sirohi	Churu, S. Madhopur, Pali, Nagaur, Udaipur, Alwar, Kota
20.	Tonk	Churu, Sawai Madhopur, Pali, Nagaur, Udaipur, Alwar, Kota
21.	Udaipur	Alwar

Appendix E3 : Estimates of potential targets and actual achievements in socio-economic sector

S. No.	Development Indicators	Low Developed Districts										
		Banswara	Barmer	Bharat-pur	Bhilwara	Bikaner	Bundi	Chittor-garh	Churu	Dungar-pur	Ganga-nagar	Jaisalmer
1.	Density of population per square km. of area	153 (229)*	156 (51)	180 (573)*	201 (152)	165 (44)	129 (139)*	189 (137)*	182 (92)	159 (232)*	149 (127)	179 (9)
2.	Urban population	379249 (89194)	333797 (144166)	604457 (469628)	518054 (311144)	466914 (481142)*	465251 (133744)	466326 (231627)	433756 (446039)*	318036 (63817)	734062 (552112)	339454 (53600)
3.	Percentage of main workers to total population	32.7 (32.5)	32.9 (33.6)*	32.3 (29.6)	31.6 (40.4)*	34.5 (29.6)	31.3 (34.2)*	33.8 (41.4)*	31.3 (30.0)	32.1 (30.2)	33.2 (30.1)	32.3 (29.5)
4.	Percentage literacy	39.60 (26.00)	37.15 (22.98)	48.50 (39.02)	41.78 (31.65)	38.66 (41.75)*	38.10 (32.75)	39.25 (34.28)	39.51 (34.78)	35.32 (30.55)	58.59. (41.82)	37.27. (30.05)
5.	Different types of vehicles registered	67175 (30918)	63722 (18261)	153850 (71417)	140894 (68357)	126429 (73185)	98110 (19029)	122760 (47233)	99633 (14955)	60303 (14858)	173284 (136694)	63473 (4977)
6.	Per capita deposit in scheduled banks	47679 (27600)	44629 (17449)	89551 (45702)	85195 (36430)	71375 (55729)	61756 (13407)	730043 (37333)	64528 (38716)	43246 (22844)	96085 (87696)	45251 (7080)
7.	Number of commercial vehicles per lakh of population	1022 (419)	990 (325)	1492 (1372)	1262 (1091)	1415 (1140)	1190 (980)	1219 (940)	1019 (471)	980 (385)	1836 (2449)*	1017 (477)
8.	Number of co-operative societies per lakh of population	41 (30)	44 (37)	48 (49)*	41 (50)*	47 (89)*	44 (39)	43 (47)*	42 (48)*	39 (33)	58 (48)	44 (74)*
9.	Number of villages connected to metalled roads	366 (430)*	367 (428)*	547 (636)*	645 (413)	537 (210)	464 (188)	587 (477)	532 (284)	392 (307)	401 (1715)*	437 (133)
10.	Percentage of villages electrified	93 (78)	92 (89)	94 (85)	90 (100)*	93 (88)	94 (95)*	93 (88)	92 (90)	91 (90)	98 (62)	91 (39)
11.	Average population per bank ('000)	13 (13)	14 (19)*	13 (16)*	13 (14)*	14 (10)	14 (11)	13 (14)*	13 (13)	13 (14)*	13 (12)	13 (10)

S. No.	Development Indicators	Low Developed Districts									
		Jalore	Jhalawar	Jhun-jhunu	Nagaur	Pali	S. Madho-pur	Sikar	Sirohi	Tonk	Udaipur
1.	Density of population per square km. of area	162 (107)	162 (154)	156 (267)*	201 (121)	201 (120)	220 (186)	160 (238)*	160 (127)	160 (136)	274 (167)
2.	Urban population	318119 (83208)	370743 (150963)	333797 (325044)	518054 (342636)	518054 (323347)	407153 (291274)	448389 (387521)	422494 (127582)	422494 (190420)	320287 (494019)*
3.	Percentage of main workers to total population	33.0 (32.0)	33.0 (38.2)*	32.9 (24.4)	31.6 (33.4)*	31.6 (31.5)	31.7 (30.2)	32.6 (25.1)	31.4 (31.2)	31.4 (35.9)*	30.4 (33.0)*
4.	Percentage literacy	35.56 (23.76)	36.93 (32.94)	37.15 (47.60)*	41.78 (31.80)	41.78 (35.96)	38.73 (36.27)	37.71 (42.49)*	37.74 (31.91)	37.74 (33.67)	43.09 (34.38)
5.	Different types of vehicles registered	65155 (19816)	66445 (17870)	63772 (21549)	140894 (51453)	140894 (51084)	120808 (24398)	104785 (24215)	80653 (22300)	80653 (26518)	86935 (154681)*
6.	Per capita deposit in scheduled banks	42892 (14430)	48291 (11747)	44629 (42591)	85195 (33788)	85195 (34673)	89124 (32381)	61470 (46198)	56449 (23463)	56449 (16096)	64588 (113660)*
7.	Number of commercial vehicles per lakh of population	1135 (817)	904 (516)	990 (455)	1262 (1280)*	1262 (780)	969 (529)	1267 (465)	978 (1933)*	978 (605)	1143 (795)
8.	Number of co-operative societies per lakh of population	41 (45)*	42 (37)	44 (30)	41 (34)	41 (55)*	42 (33)	44 (29)	42 (30)	42 (43)*	54 (30)
9.	Number of villages connected to metalled roads	381 (235)	428 (256)	367 (366)	645 (368)	645 (312)	768 (416)	480 (318)	474 (201)	474 (182)	636 (900)*
10.	Percentage of villages electrified	92 (96)*	93 (77)	92 (100)	90 (98)*	90 (100)*	90 (90)	95 (100)*	93 (100)*	93 (84)	95 (86)
11.	Average population per bank ('000)	14 (17)*	14 (13)	14 (6)	13 (16)*	13 (13)	14 (16)*	14 (17)*	12 (12)	12 (14)*	14 (14)

** Actual values are already higher than the potential targets*