CHAPTER IV
CHAPTER IV
REGIONAL DEVELOPMENT

INTRODUCTION:

The concept of development may be taken to imply an improvement in the material and cultural well-being of the people in a region. The development of a region can be identified with the increase in the employment opportunities, availability of infrastructural facilities, amenities and services, proper distribution of resources, increased production, investment and consumption and so on (Verma, S.S, 1980). Thus the development refers to an improvement of all the sectors of economy and social and cultural pursuits.

Dirk Bronger, (1977) says that the meaning of development is controversial, so far no comprehensive definition of the basic term development exists i.e., a
definition acceptable to all the disciplines involved in this function of research. Therefore the only way is to measure the level or stage of development by a combination of quantitative and, to some extent, qualitative indicators. In short "development" is a "totality", it is to be understood as a multidimensional process (Brookefield, 1975).

Here, in this chapter, the context of removal of regional imbalances - the identification of backward areas has been done on the basis of objective criteria taking into account certain suitable indicators of development.

The process of economic growth involves not only structural changes in the economy but also concurrent changes in the economic activities over different regions. It thus has a spatial dimension. To the extent that the economic growth itself has spatial dimensions, the policy implication of planning for economic development necessarily involves certain policy decision relating to location of activities, flow of benefits and the spatial functional linkages of the economic activities. However, where the manner in which the economic space is organised affects the pace and structure of economic development, in the same way the process of growth has to take cognizance of regional aspects. It follows that it should have a scientific regional development policy. (Venugopal Reddy, 1972). The regional development is classified in terms of economic, social and
political objectives, the three of them being interrelated.

Development is seen as multi-dimensional involving changes in structure and capacity as well as output (Nancy Baster, 1972). Changes in structure in this context refer to changes in the relation between parts making up the whole, e.g., changes in the pattern of production, changes in the occupational structure of the population, changes in the social structure and pattern of distribution. In other words, the choice of components and indicators of development should reflect changes in the capacity and attain development objectives, as well as the extent to which the objectives are attained.

Development is inevitably a normative concept, almost a synonym for improvement. (Dudley Seers, 1969). As undernourishment, unemployment and inequality dwindle these educational and political aims become increasingly important objectives of development.

All development processes aim at human welfare, regional development is no exception to this. The latter however not only aims at increased welfare in aggregate terms but also at more equitable distribution of it among areas and groups of people (Misra, R.P., 1974).

When the concept of development is perceived within framework of spatial organisation of the society, it
reflects the concept of regional development. In a rural economy the development, in fact, refers to a transformation of the institutional structure of the society. Since the human society consists of multi-dimensional traits, the regional development has different connotations because it is dealt with multi-disciplinary considerations (Sharma, R.C., 1978). The approaches and techniques of regional development employed by different disciplines indicate marked differences in the advancement of the discipline itself.

Space and economy of the regions are the two basic determinants of regional development. The process of regional development within the framework of regional space and economy determines hierarchies of areas by their size and of locations based on their functional characteristics. The process of regional development, on the one hand, provides the existence to the location of either politico-administrative, economic or social importance and on the other hand, it may develop the characteristic location of growth, nodality and centrality on the other. Thus, it is apparent that space, economy, hierarchies, size of spatial units, settlement locations and their functions are the basic elements in explaining the theoretical framework of the concept of regional development (Verma S.S., 1989).

Thus, the regional development is such a process by which a region or economy develops a specific composition
and system structure of settlement locations, and physico-cultural functions in integrated form of spatial personality dealing with the top down and bottom up development processes.

Development is a historical task. It is whatever men make of it. Development like history, never utters its final word (Dennis Goulet, 1968).

P.C.Agarwal (1976) advises that any survey for the development of a region must take into consideration three aspects, the cultural and institutional setting, the population and the human, natural and capital resources of the region. The proposals for economic development should include economic and social programmes, population and workplace distribution envisaged and the establishment of financial, legal and administrative basis for the execution of the development plan.

J.D. Alden and A.W. Awang (1976) formulated plans for regional development. They are

1) To reduce excessive rural to urban migration especially migration from depressed areas and already congested core regions.
2) To revive and strengthen agriculture and industrial development in lagging regions.

3) To redirect new development and growth to less developed regions.

4) To urbanise and industrialise rural and agricultural areas.

5) To resettle and rehabilitate selected frontier areas.

6) To effect greater emphasis on urban growth which will be integrated with overall national regional development.

M.N. Pal (1971) says that the regional development efforts should include the efforts for technological improvement including the full utilisation of region's resource and labour.

The term regional development implies a balance between farm land, city and virgin nature. It is a planned co-ordination of agriculture and industries in villages and cities. The country and city life should supplement each other instead of robbing one another. Instead of over specialisation of functions in urban and rural areas there should be a
planned development of the region, reducing the wide gulf between the city and village life. Decentralisation of industries and town could move the industries into the interior of the region and thus bring closer coordination between agriculture and industry, by way of providing employment opportunities to the rural folk during the leisure. (K.S.Rama Gowda, 1972).

When a region is properly developed, there will not be heavy migration of people from rural parts to cities in search of employment. The services will be moved into the interior and every common man can enjoy the benefits of the advancement in science and technology. Such a balanced development is to be achieved in every region.

The term development is used to cover positive change in those economic and social fields defined internationally by the United Nations and its associated agencies as areas of international co-operators for development. (Donald Mcgranaham, E.Pizarro, and Richard; 1985).

Finally it has to be strictly emphasised that the major task of regional development planning to reduce the regional disparities must be incorporated in an overall concept of an integrated spatial development plan. Such development planning must include both basic development concepts of
balanced development and spatially polarized development. And the combination of these two regional planning strategies should be named as "Integrated Area Development Strategy" (Dirk Bronger, 1986).

REVIEW OF LITERATURE:

Lot of scholars and intellectuals have done a detailed study on regional development. "Alam and his Collegues" from the Department of Geography, Osmania University have conducted a detailed study on regional development on tahsil basis (1976). They have made use of the absolute figures. And finally the classification is done by rank correlation matrix into three different levels of development to the formulation of both investment and spatial strategies for development (Alam, M; 1976, p.1).

The level of urbanisation in a region is classically regarded as a meaningful indicator of economic development. Urban way of life is assumed to be synonymous of the desired quality of life as it enhances the per capita productivity and employment opportunity as well as ensures the basic amenities of life (Singh, J and Singh R.B., 1981). Curie (1966) supports the thesis that urbanisation is crucial for accelerating the nation's economic development.
Mc Gee, (1968) holds the urbanisation in the developing countries as pseudo because the process has not been similar to the one that occurred in the advanced countries at comparable stage of industrialization and economic growth.

So far as the study of the impact of urbanisation on the regional development in our country is concerned, several studies have been conducted, correlating the urbanization and economic development. In this regard, T.N.Dutta and R.N.Chattopadhyaya (1983) computed the level of urbanisation taking percentage of urban population to total population and urban density as the indicators and a vector of five indicators of socio-economic development have been adopted to measure the level of development of Indian States. He concluded that the states which have metropolitan cities like West Bengal, Gujarat, Tamil Nadu, Kerala, Maharashtra and Punjab have the higher degree of urbanisation as compared to others. These states have exhibited higher composite value in terms of development. Thus, one finds a direct correlation between urbanisation and regional development in India. Sharma N. (1972) has tried to identify the levels of development in Chota Nagpur Region using the above referred hypothesis.

Berry B.J.L. (1962) also did studies on Regional Development using the socio-economic indicators and analysing it with the Factor analysis and Cluster analysis.

S.S. Verma's (1989) work is an effort in the same direction. He examined the process, spatial pattern and level of urbanisation in the Rohilkhand Region of the Ganga Plain by using Taxonomic Method. On the basis of eleven indicators of urbanisation in lieu of traditional method of percentage of urban population to total population, and
regionalisation on the basis of urbanisation level is made. He also measured the level of development agricultural, industrial, infrastructural and total regional development using the same Taxonomy Method. Thereafter linear regression analysis has been carried out in order to measure the degree of relationship between urbanisation and various surrogates of regional development. The residuals from the regression have been calculated to analyse the spatial variation of correlation between the two variables (Verma, S.S., 1989, p.33-34).

Direct relationship between industrialisation and urban growth has also been established by C.R. Pathak and R.N. Chattopadhyay (1970) by correlation analysis of district-wise indices of urbanisation and industrialisation. Dirk Bronger (1986) in his paper reviews the policies and measures taken in the past by Government towards removing regional imbalance in India. He has used the qualitative techniques to identify the levels of regional development in Andhra Pradesh.

Out of the huge number of theoretically possible indicators for characterising the level of development, only the most important i.e., 30 (all India) and 36 (Andhra
Pradesh) indicators could be taken into consideration within the frame of this study.

The dimension of indicators determining the regional disparities within India were Population, Education and Health, Economic characteristics, Industry, Agriculture and Transport. Whereas the indicators used in Andhra Pradesh level were from natural prerequisites, Demographic prerequisites, Economic characteristics, Manufacturing, Agriculture, Transport and Communication, Education and Health, Living and Housing Center System. It has to be mentioned in this connection that some important indicators for the target of this study are not available in regional differentiations, such as, per capita income on regional basis, under employment and investment data especially in the industrial sector. Dirk Bronger (1986) concluded that the regional imbalances in Andhra Pradesh could be in the course of time significantly reduced.

Agarwal P.C. (1976) discusses the concept of regional development and advises that any survey for the development of a region must take into consideration three aspects the cultural and institutional setting, the population and the human, natural and capital resources of the region. The proposals for economic development should include economic
and social programmes, population and work place distribution envisaged and the establishment of financial, legal and administrative basis for the execution of the development plan. In the light of the above concept and methods of regional development planning, the author focusses attention on the existing geographical situation of the Baster district and indicates lines along which the development of the region should proceed.

Tiwari R.T. (1981) has said that regional development and regional disparities go together and was classified the districts on the basis of hierarchy of clusters.

Damodar Saur (1984) did factor analytic study to find the regional disparity in Orissa. He used 20 indicators of population, education, agriculture, industry, roads, hospitals beds, finance and he also took the percentage of votes polled to number of electorate, as the indicators for development.

S.S.Verma and S.K.Shauli (1989) did a case study of Rohil Khand plain, Uttar Pradesh on the spatial pattern of infrastructural facilities and regional development. He made an attempt to measure the existing inequality of infrastructure in the study region, to analyse the disparity on the levels of development and to measure the extent and
degree of relationship of the development with infrastructural facilities. The infrastructure include the various socio-economic, physical and institutional facilities, services, factors and conditions like transport communication, power, marketing, banking, credit societies, administration, education, health, social attitudes, technical know how and industrial skill etc. He selected 39 indicators related to agricultural infrastructure, transport and communication, energy, education, health and other infrastructure.

Even in, valuable studies of Dandekar/Rath (1971) and others (Sarupria 1975), regional disparities are equated with imbalances at State level. As far as the relatively few empirical studies in developing countries are concerned, mainly dealing with disparities on regional eg., inter state level, apart from the study of Venezuela by Friedmann (19'6) one should particularly mention the study of Kenya by SOJA conducted 20 years ago. Based on the theory of modernisation the stage of development of the 36 districts is analysed by 25 key indicators using the Principal Component Analysis. In India this method too has been extensively used for measuring regional disparities in development using district as a unit of study (Pal M.N.,
Taking into consideration the above review, the present work has been done by taking 40 indicators, from all aspects of socio-economic structure. Due to the lack of availability of per capita income data, it has not been included for the analysis. List of indicators is given in the appendix. It is worthwhile here to quote Rao S.K (1973) that is to say per capita income is a poor guide as to the level of development of a region when it is very poorly correlated with various other indicators of a region's development.

**NATURE AND PURPOSE OF INDICATORS:**

A development indicator represents some aspect of development, such as industrialisation, health, equality, participation etc. It may be a direct measure of an economic or social variable or an indirect measure of some non-measurable phenomenon. Options differ as to the boundaries of indicators. Drewnowski (1969) for example argues in his paper that indicators should be limited to observable and measurable phenomenon (Refer Olson. M., 1969).
Indicators may be disaggregated, composite or representative. In first case, a complex phenomenon is broken down into a number of elements or components, and indicators are selected and they represent these different components. Ideally, these elements should be homogeneous, mutually exhaustive, and mutually exclusive. In second case, a single indicator is constructed by combining a number of indices, involving some system of weighting. In the third case, a representative indicator is selected as the best measure of a particular phenomena on the basis of some criteria such as closeness of correlation, with other indicators of some phenomena (Olson M, 1969). In all the three cases the validation of the indicator depends on its reliability, sensitivity and accuracy and on the consistency of its relation to other development indicators. In the final analysis, however, the justification for particular indicators and for particular selection process will depend on the purpose for which they are meant to be used.

Development indicators are used or needed for a number of different purposes. They may be used to describe trends and to diagnose a particular development situation, for prediction, for planning or for evaluating progress (Baster. N., 1972).
After the selection of indicators, it is analyzed through factor analysis which throws light on the interdependence between the social and political variables and the level of economic development, and to analyze the relation between various aspects of social, political and economic change and economic growth and modernization in terms of a smaller number of independent factors at three different levels of socio-economic development. Levels of socio-economic development are defined by using scores or factor loadings on a factor, representing varied aspects of socio-economic structure. It is argued that these empirical procedures may be more fruitful than hypothesis testing for the initial exploration of those wider interactions involved in economic modernisation (Adelman and Morris, 1971).

An indicator, according to Oxford and Webster is something that points out something else. When an economic and social variable is used as an indicator, it is not an indicator of itself and it is also not an operational definition of that to which its points. In other words, economic and social indicators are not simply statistics, and statistics are not ipso facto indicators—unless some theory or assumption makes them so by relating the indicator
variable to a phenomenon that is not what it directly and fully measures.

For an economic or social variable to be taken as "development indicator" commonly means that it should represent some factor that is part of the process of development (McGranahan D., 1972).

While in the economic field many factors of development are directly measurable or at least considered so, in the social development field most main goals like health, education, security, equity and other objects of social policy are not directly measurable in their totalities or even clearly defined, and indicators commonly serve as proxy or partial measures of these entities. The theoretical or assumed connections between the indicator and the entity to which it points to in these cases is usually based on a cause-effect or part-while relationship. Health indicators, represent presumed causes or instruments of good health (relative number of doctors or hospital beds) etc.

On the other hand, an indicator that has conspicuous deficiencies may nevertheless function quite well in practice (Donald McGanahan, 1972).
According to M.V.S. Rao (1975), the term "indicator" has been very much in use in statistical literature but has not apparently been defined in a precise manner. The term has a wider connotation than the index number which has been defined as a quantity which shows by its variations the changes over time or space of a magnitude which is not susceptible of direct measurement on itself or direct observation in practice.

The indicators are, without exception, in the form of averages, proportions, ratios, rates, indices or certain more synthetic functions of basic data (M.V.S. Rao; 1975).

The term "indicator" reflects the necessary modesty that must attach to statistics intended to measure one or other aspects of development. Indicators are not necessarily direct and full measures of what they are intended to indicate, but are often indirect or incomplete measures. This is perhaps true of social development indicators. An indicator is not just statistical series; it is a statistical series based on a set of assumption. It requires careful examination and testing before use (Donald Mcgranham, E. Pizarro, C. Richard; 1985).

There are two elementary aspects of indicator selection or construction in any field of socio economic development.
They are:

a) The conceptual aspect—what it is precisely that one is trying to measure and

b) The data aspect—the availability and quality of the relevant statistics.

Keeping these aspects in view the indicators are selected for the present study and taken into consideration for the analysis of Regional Development by Principle Component Analysis.

**SELECTION OF INDICATORS:**

According to Donald Mcgranaham, Pizarro, Richard, (1985), the main criteria used in the selection of indicators are:

1) Availability or obtainability of acceptable data

2) Conceptional validity i.e., An indicator should make sense conceptionally by virtue of its composition and structure and also by its performance.

3) Operational definitions.

4) Degree of association or correlation.

5) Balance among sectors and generally between economic and social indicators.
The selection is a major problem. Socio-economic indicators have two main purposes to serve in development planning. First, they help to crystallise the goals of development planning in terms of targets, second, they help to measure the progress made towards the goals in relation to the targets set. The indicators, as averages, rates, ratios, proportions, index numbers, and other synthetic functions, which reflect the relationship of the phenomenon measured to the setting or background in which it takes place. One must draw a line of distinction between basic measures and indicators (Rao M.V.S., 1975).

Isard W (1956) has said that, the greater the number of variable considered, the greater are the chances that the proportion of non-significant to significant variable may rise.

International guidelines have emerged from United Nations and other organisations (Mc Granaham D.V. et al., 1979) with regard to the concept, scope and nature of indicators to be developed to meet the need of planning, policy, formation and evolution of progress. A variety of socio-economic indicators have been used in India for planning, assessment of progress, identification of backward areas and measurement of regional disparities (Planning
Commission, 1969). But since the Fourth Five Year Plan, better use of socio-economic indicators have been made in formulating programmes, setting targets and measuring the progress with regards to the economic aspects of development, then with regards to social aspects, presumably because the social data available in the country are not as comprehensive, accurate and up-to-date as the economic data. In the Fifth and Sixth Five year plans, more emphasis has been laid on social indicators as it was on economic indicators in development planning (Rao, M.V.S., 197c). However in development planning indicators are needed mainly to help crystallization of the goals of planning in terms of targets and to measure the progress made towards the goals in relation and the set targets (Verma, S.S., 1989).

In the present study, a set of 40 socio-economic indicators of various sectors has been chosen to measure the level of development in the districts of Andhra Pradesh. These indicators fall into eight categories such as Population characteristics, Education, Health, Agriculture, Industrial sector, Power, Transport and Communication and Finance and Recreation.
A) POPULATION SECTOR:

With the unprecedented growth of population, which has been nullifying, in part, the gains of economic development, population planning has become a crucial element in planning for economic and social development. The indicators (variables) chosen under population characteristics are as follows:

2) Percentage of urban population to total population.
4) Percentage of Schedule Caste and Schedule Tribe population to total population - 1981.
5) Sex ratio - 1981.
6) Density of population / Sq. Km.

(B) EDUCATION SECTOR:

The indicators most needed for the formulation of educational programmes and for overall development literacy and educational facilities are very vital. Hence the following variables are considered.

7) Literacy % - 1981.
8) Literacy growth 1971-81.
9) School enrolment (Number of students/10000 population -1987).
10) Number of Schools / lakh population (1987).

C) HEALTH SECTOR:

Improvement of health conditions and provisions of the requisite health services constitute an essential aspect of socio-economic development. Good health being an essential aspect of the quality of life as well as a prerequisite for high levels of productivity. The indicators used are:

12) Number of hospitals and P.H.C's per lakh population.
13) Number of hospitals beds / lakh population.
14) Number of doctors / lakh population.

D) AGRICULTURE SECTOR:

Agriculture, being a dominant occupation in Andhra Pradesh, plays an important role for regional development. The modernisation in agriculture, the production value and area of crops are the main parameters for agricultural development. Among them listed over are the selected indicators.
15) Percentage of net area sown to total geographical area.

16') Percentage of irrigated area to net area sown.

17) Percentage of multiple cropped area to total cultivated area.

18) Percentage of area under commercial crop to total cultivated area.

19) Agricultural productivity: average monetary value of all the crops/area.

20) Machinery tractors / total cropped area per 10,000 hectares.

21) Irrigation pumps / 1000 hectare.

(E) **INDUSTRIAL SECTOR:**

Industries and the workers employed under it is another important section of indicators. Industries which are concomitant to urbanisation lead to the development of a region.

The indicators used under this category are:

22) Number of factories / 000' Sq. Km..

23) Workers in small scale industry per 1000' Sq. Km.

24) Workers in medium and large industry / 000' Sq.Km.
25) Non-workers ratio to total workers.
26) Percentage of primary workers to total population.
27) Percentage of secondary and tertiary workers to total population.

(F) POWER SECTOR:

Power is the basic need for agriculture and industries. In general, the consumption of power per individual reveals the development and standard of living. The following are the variables included under this category.

28) Percentage of electrified villages and towns.
29) Percentage of consumption of electricity in domestic unit.
30) Percentage of consumption of electricity in industrial unit.

(G) TRANSPORT AND COMMUNICATION:

The roads and railways play a vital role in the development of agriculture, and industry in any region. The nature of flow of commodities, people and information is also decided by transport and communication.

The indicators taken under this category are:

31) Surfaced road Km. / 1000 Km.
32) Motor vehicals on roll/ lakh population.
33) Railway length / 1000 Km.
34) Number of post and telegraph offices / lakh population.
35) Number of long distance and public telephones per 000' Sq.Km.

(H) FINANCE AND RECREATION INDICATORS:

The other socio-economic indicators which are taken into consideration to measure regional development are:

36) Household density.
37) Number of Banks / lakh population.
38) Number of Societies / lakh population.
39) Number of Libraries / lakh population.
40) Number of Recreation Centres / 10 lakh population.

Thus in selecting the indicators, consideration has been given to the likelihood of availability and the possibilities of development of the requisite basic data. The collection and compilation of basic data required for the preparation of annual indicators is made available. Data here are available through the current sources, Statistical Abstract - 1987, or through the Census. Finally the indicators compiled are put to proper use. The indicators selected for identifying the development are given in appendix.
<table>
<thead>
<tr>
<th>Principal Components</th>
<th>Eigen Value</th>
<th>Percentage</th>
<th>Variability</th>
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<tr>
<td></td>
<td>9.2896</td>
<td>23.2241</td>
<td>23.2241</td>
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<td>2.</td>
<td>5.2483</td>
<td>13.1207</td>
<td>36.3448</td>
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<td>3.</td>
<td>4.8911</td>
<td>12.2279</td>
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<td>4.</td>
<td>4.1184</td>
<td>10.2959</td>
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<td>5.</td>
<td>3.5322</td>
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<td>1.9837</td>
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<td>8.</td>
<td>1.5592</td>
<td>3.8980</td>
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<td>9.</td>
<td>1.3822</td>
<td>3.4555</td>
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Table 22
Component Structure and Loading Pattern of variables (40 variables) (After Rotation)

<table>
<thead>
<tr>
<th>S.NO</th>
<th>Variable No:</th>
<th>Description</th>
<th>Loadings</th>
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<tbody>
<tr>
<td>1.</td>
<td>2:</td>
<td>Urban Population % to total Population</td>
<td>-7783</td>
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<td>2.</td>
<td>6:</td>
<td>Density of Population/Sq.Km.</td>
<td>-4019</td>
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<td>3.</td>
<td>7:</td>
<td>Literary % (1981)</td>
<td>-8813</td>
</tr>
<tr>
<td>4.</td>
<td>12:</td>
<td>No. of hospitals &amp; PHCs/lakh Population</td>
<td>-4712</td>
</tr>
<tr>
<td>5.</td>
<td>17:</td>
<td>Irrigated area % to net sown</td>
<td>-5932</td>
</tr>
<tr>
<td>6.</td>
<td>20:</td>
<td>Agricultural productivity Monitory Value of all crops/ area</td>
<td>-5857</td>
</tr>
<tr>
<td>7.</td>
<td>21:</td>
<td>Tractors % total Cropped area/'000 hectares</td>
<td>-5106</td>
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<td>8.</td>
<td>2&quot;</td>
<td>Non workers ratio &amp; total workers</td>
<td>-7061</td>
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<tr>
<td>9.</td>
<td>28:</td>
<td>% of consumption of electricity is domestic unit</td>
<td>-8330</td>
</tr>
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<td>10.</td>
<td>30:</td>
<td>% of Primary Workers to total population</td>
<td>6943</td>
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<tr>
<td>11.</td>
<td>33:</td>
<td>Motor Vehicles on roll/lakh population</td>
<td>-5010</td>
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<tr>
<td>12.</td>
<td>3&quot;</td>
<td>No. of long dist &amp; public telephones/ '000 sq. km</td>
<td>5553</td>
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<td>13.</td>
<td>37:</td>
<td>No. of Banks/ lakh Population</td>
<td>-7219</td>
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<td>14.</td>
<td>39:</td>
<td>No. of Libraries/ lakh Population</td>
<td>-6774</td>
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Component II

14. 19: Area under commercial crop % to total cultivated area -5032
15. 22: Agricultural irrigation pumps/ 000' hectares -4638
16. 23: Number of factories/000' Sq.Km 9199
17. 24: Workers in small scale industry/ 000' Sq.Km. 8971
18. 25: Workers in Medium & Large Industry/ 000' Sq.Km. 7993
19. 26: Non-workers ratio to total workers -4113
20. 31: Percentage of secondary & tertiary workers to total population 6006

Component III

22. 4: Percentage of SC & ST population to total population 7428
23. 6: Density of population/sq.km. -4979
24. 16: Percentage of net area sown to total geographical area. -7770
25. 32: Surfaced road Km/1000 Km 2 -6086
26. 34: Railway length/1000 Km 2 -7255
27. 38: Number of societies/lakh population. 5571
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<th>Component IV:</th>
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<tr>
<td>28. 1</td>
<td>Population growth 1971-81</td>
<td>6287</td>
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<tr>
<td>29. 3</td>
<td>Urban population growth 1971-81</td>
<td>-6158</td>
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<tr>
<td>30. 8</td>
<td>Literacy growth 1971-81</td>
<td>-8847</td>
</tr>
<tr>
<td>31. 11</td>
<td>Number of colleges University/lakh population</td>
<td>-8594</td>
</tr>
<tr>
<td>32. 30</td>
<td>Percentage of primary workers to total population</td>
<td>4061</td>
</tr>
<tr>
<td>33. 31</td>
<td>Percentage of secondary &amp; tertiary workers to total population</td>
<td>4200</td>
</tr>
<tr>
<td>34. 33</td>
<td>Motor vehicles on roll/lakh population</td>
<td>-5671</td>
</tr>
<tr>
<td>35. 39</td>
<td>Number of libraries/lakh population</td>
<td>-4240</td>
</tr>
<tr>
<td>36. 40</td>
<td>Number of recreation/10 lakh population</td>
<td>-8586</td>
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**Component V**

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<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>37. 5</td>
<td>Sex Ratio - 1981</td>
</tr>
<tr>
<td>38. 6</td>
<td>Density of population sq.km</td>
</tr>
<tr>
<td>39. 17</td>
<td>Irrigated are percentage to net area sown</td>
</tr>
<tr>
<td>40. 19</td>
<td>Area under commercial crops percentage to total cultivated area</td>
</tr>
<tr>
<td>41. 35</td>
<td>Number of P&amp;T offices/lakh population</td>
</tr>
</tbody>
</table>
### Component VI:

<table>
<thead>
<tr>
<th>No.</th>
<th>Code</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>42.</td>
<td>9</td>
<td>School Enrolment (Number of students/10,000 population)</td>
<td>6443</td>
</tr>
<tr>
<td>43.</td>
<td>10</td>
<td>Number of schools/lakh population</td>
<td>9242</td>
</tr>
<tr>
<td>44.</td>
<td>12</td>
<td>Number of hospitals &amp; PHC's/lakh population</td>
<td>4592</td>
</tr>
<tr>
<td>45.</td>
<td>29</td>
<td>Percentage of electricity consumption in industrial unit</td>
<td>-6152</td>
</tr>
</tbody>
</table>

### Component VII:

<table>
<thead>
<tr>
<th>No.</th>
<th>Code</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>46.</td>
<td>13</td>
<td>Number of hospital beds/lakh population</td>
<td>-8788</td>
</tr>
<tr>
<td>47.</td>
<td>14</td>
<td>Number of doctors/lakh population</td>
<td>-8125</td>
</tr>
<tr>
<td>48.</td>
<td>27</td>
<td>Percentage of electrified villages and towns</td>
<td>8068</td>
</tr>
<tr>
<td>49.</td>
<td>38</td>
<td>Number of societies/lakh population</td>
<td>5393</td>
</tr>
</tbody>
</table>
## Component VIII:

<table>
<thead>
<tr>
<th>Component Code</th>
<th>Loading</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>50.</td>
<td>18</td>
<td>Multiple cropped area percentage to total cultivated area</td>
<td>7412</td>
</tr>
<tr>
<td>51.</td>
<td>21</td>
<td>Machinery tractors/total cropped area/10000 hectares</td>
<td>6868</td>
</tr>
<tr>
<td>52.</td>
<td>22</td>
<td>Agricultural irrigation pumps/000' hectares</td>
<td>5118</td>
</tr>
<tr>
<td>53.</td>
<td>32</td>
<td>Surfaced road Km/1000 Km</td>
<td>4446</td>
</tr>
</tbody>
</table>

## Component IX:

<table>
<thead>
<tr>
<th>Component Code</th>
<th>Loading</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>54.</td>
<td>15</td>
<td>Household density</td>
<td>8609</td>
</tr>
<tr>
<td>55.</td>
<td>35</td>
<td>Number of P&amp;T offices/lakh population</td>
<td>5345</td>
</tr>
</tbody>
</table>

Decimals are omitted.

Loadings more than 400 is considered for interpretation.
RESULTS AND DISCUSSIONS:

As stated in Chapter III, the multivariate technique namely Principle Component Analysis is essentially employed to bring out the underlying dimension of regional development as contained by the 40 parameters (variables) relating to population characteristics, education, health, finance, recreation, transport and communication etc., distributed in 23 districts of Andhra Pradesh. The Principle component analysis has been employed for 140 variables to bring out the underlying dimensions. This analysis was performed by computer.

In the first stage of the analysis a correlation matrix (40x40) was obtained. This has brought out the inter-relationship among the 40 variables in 23 districts. This matrix was subjected to Principle Component Analysis. The minimum eigen value set was one. The analysis has resulted into nine factors or components or dimensions on the basis of the association among the 40 variables in 23 districts of Andhra Pradesh. The Eigen value of the first and ninth component vary from 9.28 and 1.38.
into nine factors or components or dimensions on the basis of the association among the 40 variables in 23 districts of Andhra Pradesh. The Eigen value of the first and ninth component vary from 9.28 and 1.38.

The first component is the most important dimension underlying the forty variables. The Eigen value of the first component is 9.28 and explains a total variance of 23.22 per cent. The second component Eigen value is 5.24 and accounts for a total variance of 13.12 per cent. The Eigen values of third and fourth components are 4.89 and 4.11 and explain a total variance of 12.22 per cent and 10.29 per cent respectively. The Eigen values of the rest of the components and the total variance accounted by them decreases as the component increases (Table.21). The ninth component with an Eigen value of 1.38 explains a total variance of 3.4 per cent only. The total variance explained by nine components is 85.90. This clearly establishes the fact that the parameters considered in the analysis are highly related and sound. In the earlier studies, the scholars have considered only these components that have accounted for little more than 60 per cent (Mosar, C.A. and Scott, W., 1961).
The first and the most important component with an Eigen value of 9.28 explains a total variance of 23.22 percent, i.e., little less than 25 percent of the total variance accounted by nine components. This is the most important dimension underlying in the distribution of 40 variables in 23 districts of Andhra Pradesh. This component comprises of twelve variables having a loading of more than 0.5. It is observed from the table 22 that, in this most important dimension, majority of the variables are having high negative loadings. Only the variables namely proportion of primary workers to total workers and long distance and public telephones/"oooo sq. km. have moderate to high loading. It may be inferred from the loading that the districts of Andhra Pradesh are characterised by dominant primary activities and telecommunication facilities whereas high negative loadings are associated with low Urban population, low literacy, more non-workers, less domestic consumption of electricity, lesser number of banks, libraries, motor vehicles, low proportion of irrigated area.
to net sown area, low agricultural productivity and lesser number of tractors for total cropped area. This component may be called as "Primary measure component."

The second important dimension reveals the importance of factories, industrial workers (small and medium) and proportion of tertiary workers, in the districts of Andhra Pradesh (Table 22). The workers in industries and tertiary activities and the irrigation pumpsets are also the important characteristics of the districts in the state. Negative loadings are associated with commercial cropped area and non-workers. It may be inferred that secondary activities, (small, medium and large scale industry), secondary and tertiary workers are the dominant character in the districts of Andhra Pradesh. The second component is labelled as "Industrial component."

The third component, though lesser in importance than the earlier component, is the third dimension as exhibited by 40 in 23 districts. The component structure (Table 20) reveals variables, the predominance of Schedule Caste and Schedule Tribe population, credit societies and growth of Urban population. It also indicates the proportion of net sown area, railway and road density, and population density are having moderate negative loading on this component. This component may be called as "Socially backward population component."
Decadal growth of population (1971-81), primary, secondary and tertiary workers are the variables which registered a moderate loading on the component IV (Table 22). Moderate to high negative loadings are associated with variables such as growth of literacy (1971-81), number of colleges and universities, recreation centres and urban population growth. It may be inferred that this fourth dimension is characterised by low development of educational and recreational facilities, and low urban population growth (1971-81). This component may be called as "Population growth (1971-81) component".

In component V, area under commercial crops and number of post and telegraph offices per lakh population are having positive loading (Table 22). Variables such as sex ratio, density of population and proportion of irrigated area to netwown area are having negative loadings. Hence this component is named as "Commercial agricultural component".

From component VI it is observed that high positive loadings are associated with number of schools and school enrolment (Table 22). Number of hospitals has a moderate positive loading on this component. Consumption of electricity by industrial units registered a high negative loading on this component signifying the fact that the industrial
development in the district is low. Therefore this component is labelled as" Educational component".

Component VII structure reveals the high loading on electrified villages and towns and number of societies (Table 22). It is observed the negative loading is rather high, on number of beds and number of doctors for lakh population. It may be inferred that the districts in Andhra Pradesh is characterised by more electrified villages and towns and number of societies and on the contrary poor development in the medical facilities in terms of beds and doctors for the given population. So this component is named as" Power component".

The eighth dimension underlying the parameters in the district reveal that these districts are characterised by multiple cropped area to total cultivated area, tractors per cropped are, irrigation pumpsets and density of suffaced roads (Table 22). Hence this component is called is called as" Intensive agriculture and Mechanisation component".

The last and the least important dimension (Component IX) of high loading are on household density and number of Post and Telegraph Offices per lakh population (Table 22). This component may be called as" Household density component".
different dimensions and the associated variables characterised by the parameters found in the districts of Andhra Pradesh.

The communaties (h) of the variables used with study have very high values (more than 70). Hence it may be concluded that variables considered are pure variables and they have brought out the underlying dimensions more clearly.

In order to identify the different levels of development in the districts of Andhra Pradesh factor scores have been computed and the same was subjected to Cluster Analysis. The Cluster Analysis was performed by the computer and the dendrogram (Linkage tree) was also drawn by it. (Fig. 42). The dendrogram grouped the districts which are similar in term of the 40 developmental parameters considered for 22 districts. This procedure is based on Sokal and Sneath method (1963). Hyderabad district, hundred percent urbanised district, with lesser area (217 Sq.km.) and being the State Capital is not included in this analysis on the assumption that it is highly developed.

The cluster methods are agglomerative method in which each sub-group in a hierarchical classification is built up. Four cut-off lines are drawn across the dendrogram and five

groups have been identified as done by scholars earlier in their research studies (Sankaran, V. 1972; Swaminathan, E. 1974). On the basis of hierarchical grouping five levels of development have been identified (Fig. 42). They are very high development districts, high development districts, moderate development districts, low development districts and very low development districts.

It has been observed that a very high development is confined to Hyderabad, Rangareddy and Visakapatnam districts of Andhra Pradesh. Very high development in Hyderabad and Rangareddy districts of Telengana region might be due to the location of a large number of industries located in and around Hyderabad, apart from the fact that it is the State capital, a metropolis and its development in tertiary sector. Industries like Engineering, Chemical, Forest based, Agro based etc are found in this region.

Since Rangareddy district is found encircling Hyderabad district, it not only enjoyed nearness to Hyderabad but also got benefited by the location of a number of industries like Electrical and Electronics, Engineering and Chemical etc and mineral Quartz also is present in large quantity. Very high development in Visakapatnam district could be attributed to a number of industries such as Ship building, Iron and Steel
and Engineering industries, from the fact that Visakapatnam is a port. It is also gifted with a number of minerals like Monazite, Graphite, Apatite etc.

Guntur, East Godavari, Chittoor and Nizambad districts show high level development (Fig 43). The development in the coastal districts of Guntur and East Godavari could be attributed to fertile deltas, well developed irrigation and modernisation in agriculture, a number of agro-based industries, high urbanisation and so on. In Guntur limestone and in East Godavari Clay and Oil and Gas are mostly found. In Chittoor district (of Rayalaseema region) the development may be due to developed agriculture and due to higher urbanisation, agro-based industries and other industries. Asbestos and Talc are the important minerals found here. Nizamabad of Telengana region is in this category because of its nearness to the Hyderabad Metropolis. And due to location of industries like Agro based, Engineering and Forest based ones.

Nellore, Krishna, West Godavari, Vijayanagaram and Srikakulam and Prakasam districts of Coastal region, Cuddapah and Warangal districts of Rayalaseema and Telangana region respectively qualify themselves as moderately developed districts. Though agriculture is well developed
in these districts due to less number of industries, they have moderate development.

Nellore is famous for Radioactive minerals and Mica, Electrical and Electronics and Forest based industries are present in less numbers. In Krishna district minerals are less but Agro-based, Forest based and Engineering industries are distributed all over the region. West-Godavari has Agro-based and Chemical industry. Where as Vizianagaram has minerals like Fenstones and Apatite and Srikakulam has Graphite and Manganese other than Agro based industries in both the districts. Prakasam district has Monozite in good quantity. And it is seen that of the total 9 Coastal districts six of them lie in this moderate category. The other 2 districts which show moderate development are Warangal which has more Iron minerals and Cuddapah having large quantities of minerals like Barytes, Base metals and Radio-active minerals (Fig.43).

Low level of development is observed in Kurnool and Anantapur districts, both of the Rayalaseema region. which is a chronic drought prone area. This region is industrially backward even though it is benefited by mineral resources. Anantapur has some quantities of Asbestos and
ANDHRA PRADESH

LEVELS OF REGIONAL DEVELOPMENT
1987

LEGEND

- VERY LOW

- LOW

- MODERATE

- HIGH

- VERY HIGH

FIG- 43
Diamonds and even Kurnool have some minerals but it is not properly utilised and traced out.

Nalgonda, Mahabubnagar, Khammam, Adilabad, Karimnagar and Medak districts show very low level of development. All these districts are in the Telangana region. The urban population in these districts is generally low (less than 15 per cent). These districts have tribal areas and poor transport facilities. Thus agriculturally and industrially it is very backward. No proper development has taken place and these districts thus have very low level of development even though few districts like Medak, Mahabubnagar and Nalgonda have deposits of minerals. The main reason for this may be attributed to the poor transportation facilities and backwardness of the people.

It may be concluded that industries and urbanisation are responsible to bring out better development in terms of various infrastructure facilities and in improving the living standards of the population.
INDICATORS EMPLOYED USED TO IDENTIFY FOR REGIONAL DEVELOPMENT IN ANDHRA PRADESH

1. Population decadal growth - 1971-81
2. Urban population % to total population.
7. Literacy 1981.
9. School enrolment (No. of students / 10,000 population)
10. No. of schools / lakh population.
11. No. of Colleges and universities / lakh population.
13. No. of hospital beds / lakh population.
14. No. of doctors / lakh population.
15. No. of households over houses.
16. Net area sown % to total geographical area.
17. Irrigated area % to Net area sown.
18. Multiple cropped are % to total cultivated area.
19. Area under commercial crops % to total cultivated area.
20. Agricultural productivity : Average monetary value of all crops / area.
22. Agricultural irrigation pumps/ '000 hectares.
23. No. of factories / '000 sq.km.
24. Workers in small scale industries / '000 sq.Km.
25. Workers in medium and large industry / '000 sq.Km.
27. % of electrified villages and towns.
28. % of consumption of electricity in domestic unit.
29. % of consumption of electricity in industrial unit.
30. % of primary workers to total population.
31. % of secondary and tertiary workers to total population.
32. Surfaced road in Km. / '000 Km
33. Motor vehicles on roll/lakh population.
34. Railway length / '000 Km.
35. No. of P&T offices / lakh population.
36. No. of long distance and public telephones/000 sq.Km.
37. No. of banks / lakh population.
38. No. of societies /lakh population.
39. No. of libraries/lakh population.
40. No. of recreation centres / 10 lakh population.

-------------
|       | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | 11    | 12    | 13    | 14    | 15    | 16    | 17    | 18    | 19    | 20    |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1     | 1.000 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 2     | 0.304 | 1.000 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 3     | -0.156| -0.162| 1.000 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 4     | 0.111 | -0.130| 0.263 | 1.000 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 5     | 0.108 | -0.331| -0.322| -0.820| 1.000 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 6     | -0.223| 0.317 | -0.358| -0.281| 0.484 | 1.000 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 7     | -0.144| 0.680 | -0.238| -0.289| -0.359| -0.493| 1.000 |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 8     | -0.346| 0.271 | 0.152 | -0.074| -0.467| -0.141| 0.166| 1.000 |       |       |       |       |       |       |       |       |       |       |       |       |
| 9     | -0.459| 0.114 | 0.059 | -0.128| 0.089 | -0.101| -0.099| -0.098| 1.000 |       |       |       |       |       |       |       |       |       |       |       |
| 10    | 0.096 | -0.128| -0.303| 0.194 | 0.059 | -0.149| 0.171 | 0.211 | 0.529 | 1.000 |       |       |       |       |       |       |       |       |       |       |
| 11    | 0.065 | -0.295| -0.486| -0.175| -0.442| 0.812 | 0.568 | -0.204| -0.846| 0.163 | -0.151| 1.000 |       |       |       |       |       |       |       |       |
| 12    | 0.103 | 0.198 | 0.081 | -0.277| -0.212| -0.379| 0.422 | 0.468 | 0.521 | 0.458| 1.000 |       |       |       |       |       |       |       |       |       |
| 13    | -0.182| 0.062| 0.063 | -0.236| -0.249| 0.163 | 0.048 | 0.204 | 0.155| 0.120| -0.178| 0.845 | 1.000 |       |       |       |       |       |       |       |
| 14    | -0.152| 0.396 | -0.318| -0.187| -0.168| -0.023| 0.142 | -0.693| -0.219| -0.108| -0.805| -0.139| -0.839| 1.000 |       |       |       |       |       |       |
| 15    | 0.011 | -0.299| -0.297| -0.846| -0.250| 0.469 | 0.096| 0.393 | 0.194| 0.094| 0.102 | -0.131| -0.386| 0.100 |       |       |       |       |       |       |
| 16    | -0.127| 0.132 | -0.396| -0.394| -0.247| -0.631| 0.234 | -0.257| 0.855 | -0.183| -0.144| -0.243| -0.359| -0.136| -0.229| 1.000 |       |       |       |       |
| 17    | -0.059| 0.295 | -0.462| -0.175| -0.442| 0.812 | 0.568 | -0.204| -0.846| 0.163 | -0.151| 0.118 | -0.179| -0.068| -0.336| 0.395 | 1.000 |       |       |
| 18    | 0.022 | 0.094 | 0.091 | -0.218| -0.005| 0.322 | 0.393 | -0.363| -0.276| 0.212| -0.111| 0.024 | -0.135| 0.164 | 0.315 | 0.180 |       |       |       |
| 19    | -0.159| -0.095| -0.205| -0.204| -0.425| 0.466 | 0.004 | -0.189| -0.177| 0.494| -0.118| 0.112 | -0.099| 0.228 | 0.096 | -0.167| 0.288 | 1.000 |       |
| 20    | -0.014| 0.590 | -0.372| -0.359| 0.103 | 0.465 | 0.668 | -0.176| 0.058| 0.292 | -0.058| 0.212 | -0.896| 0.003 | 0.459 | -0.239| 0.618 | 0.019 | 0.926 | 1.000 |       |
|       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |