CHAPTER-1

INTRODUCTION

In recent years, balanced regional development has become the main objective of economic policies pursued in many countries. The record of social development of nations reveals marked regional differentiations, which claim to embrace both time and space in economic theory and policies. In many developing economies, discontent due to unequal development of regions has reached an alarming proportion, and is no less serious than that in the developed countries. After years of planning, though the regional problems have not been altogether overlooked, many areas of India have remained backward. In many states, India could not achieve a balanced regional development by the ambitious objectives of attaining a higher level of overall economic development in its early years of planning initiated in 1951. In the later plans emphasis was given on widespread diffusion of economic activities to less developed regions.

The objective of widespread diffusion of industries and development of agriculture, trade and commerce in backward areas to raise the standard of living of the people of backward regions remain unfulfilled. Both the inter state and intra state disparities in various dimensions of development, e.g. agriculture, industry, infrastructure, social services etc are the problems at presently in India in spite of considerable overall development over the last decade.
New agricultural strategy has made some parts of Haryana rich in agricultural production, while the benefits of heavy investment around Delhi have also developed some parts of Haryana. Thus the public and private investment as well as agricultural development has resulted in disparities in development among its districts. Thus, to achieve either of the objectives of reducing the extent of disparities or a more comprehensive balanced regional development or both, information regarding the relative positions of the development of the various districts/regions of Haryana, and the pattern of disparities between the areas overtime along with the knowledge of the causes of disparities is necessary.

Many studies have focused on such disparities among states and also among districts within the states. Problems with regional analyses covering a large number of indicators of development are acute as the question of objectivity arises in combining the selected indicators. The process of economic growth involves significant changes in economic activities over different regions along with a change in the structure of economy. This process reflects a spatial dimension in process of growth. The policy implications of planning for economic development necessarily involves certain policy decisions relating to locations of activities flow of benefits and spatial functional linkages of economics activities. Therefore, when development over different regions occurs unevenly, it becomes politically imperative to resort to corrective policy measures. This is crucial from all angles-political, economical, social and ethical considerations.

An unchecked and uncontrolled process of growth leading to regional disparities, results in numerous economic, social and cultural problems. This kind of problems takes a serious shape and subsequently
become hard to eliminate. The inequalities, lead to incomplete utilization of resources and to a growth of public cost involved in functioning of its economy. In regard to developing countries the regional factors underline many of the pressing economic and socio-problems being faced by them. Regional imbalances lead to under utilisation or even to non utilisation of economic resources both natural and human and in that process individuals are discriminated. Therefore the effect of regional disparities are always far reaching. In the words of Prof. Adarkar, “Hence, there is a case for supporting the backward parts of the state at the expense of advanced, even though the former did not promise rapid development into industrial or wealthy localities. For if these are not thus protected they might rapidly become nurseries for the bacilli of countless social evils, diseases, crime and lawlessness –whose pestilential effects on the advanced areas may cost the latter much more……”

The need to reduce regional disparities has been argued from various angles. Social justice is the subject of first argument. It is believed that income inequalities can be reduced by way of reducing regional disparities. The demand of social justice is that all citizens are treated alike and given an equal opportunity in life. And for that, it is important to bear it in mind that an individual should not be made worse off in one area and better off in another. This is possible only when inter-regional disparities in the level of development are removed off.

Reduction in regional disparities is crucial even from the point of accelerating the growth of the economy. There is a sort of complementarities between reduction in regional disparities and accelerated economic growth. It is empirically tested that the poor countries are characterised by large and growing regional disparities and
the rich countries are generally characterised by small and diminishing gaps.  

It is being increasingly realized that the national income can be increased manifold by proper utilization, exploitation and organization of resources available in the relatively backward regions.

Reduction of regional disparities is essential from the point of maintaining national integration, political stability and unity also. These disparities may sometimes assume serious dimensions and threatening the integrity of a nation if neglected and proper attention not paid in time.

1.1 Causes of Regional Disparities

An analysis of the problem of the regional disparities reveals the following factors that lead to inter regional disparities:

(a) **Historical factors**: Few regions are more developed because of the advantage enjoyed by them in terms of either proximity to Delhi as they receive the focus of various political parties or other historical factors. Such region grows at a faster pace.

(b) **Unequal distribution of natural resources**: Some regions are bestowed with rich natural resources like sweet water, fertile land, good soil, forest and minerals. Because of natural advantage, with a little effort the area can be developed at a faster rate. Prosperity of northern Haryana can be attributed to that. Of course, human effort along with natural beauty is a pre-requisite.

(c) **Man made factors**: Social, economic and political factors are responsible for causing regional disparities. Even if a region
is rich in natural resources, due to lack of conscious effort at development regions languish and without an initial impetus towards economic growth they continue to lag behind in development. Lack of entrepreneurship, lack of efforts at acquiring skill and lack of motivation lead to regional disparities as some regions continue to remain backward due to lack of human efforts. Socio-economic factors which are man-made are also responsible for inter-regional disparities.

(d) Other factors It is a well known fact that the regions which are already developed attract more activities on account of the obvious advantages and natural attraction, which the activities will receive by virtue of their location in developed area, which lead to unequal growth. Once the unequal rate of growth develops they will tend perpetuate themselves due to the economies of concentration. Thus even though regions get developed initially due to natural advantages or historical reasons, the regions will keep on growing because of the advantage of concentration. During the process of growth due to the concentration effect the growing region also spreads some of its dynamism to other areas and lead to centrifugal effect. But such effects are rare. Thus the developed areas grow faster at the cost of less developed areas. If the situation is such that the centripetal forces are getting accentuated, equity considerations demand government intervention and government action to reduce regional disparities and to check the centripetal forces exerted by the developed regions.
1.2 Concept of A Region

We have been using the term ‘region’, ‘regional disparity’, ‘balanced regional development’, etc. We will now examine what is crucial to the term ‘Region’.

The term ‘region’ is closely associated with the concept of area or space. The term region is used to mean different spatial units by different persons. Thus it has been used to mean a resource region, programme region, metropolitan region, depressed region, planning region and so on. The region can also mean an agronomic region, drought prone region, and likewise depending upon the particular feature of the area.

Traditionally, there are three ways to define a region. One deals with the homogeneous characteristics, usually a combination of a spatial and economic aspects of a region, second analysis is the polarization around the market or urban place within the region and the third works out a coherent relationship between the existing administrative and political set up and policy decisions.³

A careful examination of the above concepts reveals that there are not completely independent but a certain amount of dependency exists. The programming regions do have homogeneity and also possesses some nodal points. For policy and planning purposes, it is the third definition which appears to be more accepted. An ideal region is one with the following characteristics:-

i. May be sub-divided into natural boundaries like plain, hilly but geographically it should be a contiguous unit.

ii. The people of the region should have social and cultural cohesion.
iii. The region should be a separate unit for data collection and analysis.

iv. The region should have an economic existence which can be assessed from statistical records.

v. It should be under one administrative agency.

vi. It should have a fairly homogeneous structure, i.e., variation in local proportion of employment and output in agriculture, industry and services and should also be within a narrow range. It should be more or less homogeneous in topography also. It must have one or more growth points.

vii. There should be common appreciation of local problems and aspirations and approaches to their solution. It should permit and encourage competition but not rivalry apathy between each other.

If we examine the above characteristics, administrative units, whether at national, state or district level, appear to satisfy most of the characteristics of a region. Thus for planning purposes, administrative should be considered as a region. Therefore a district can be taken as a region for purposes of planning at micro level. From various criteria of ‘planning region’ district appears to be an ideal unit for micro level plans.

1.3 Reduction in Regional Disparities

Minimization of regional disparities does not mean a straight transfer of the fruits of prosperity from a ‘resources rich’ area to an area poor in resources or from a developed region to a backward region. Similarly reduction of regional disparities doesn’t mean establishing manufacturing or other activities in those areas where there is no
adequate resources base. It also doesn’t mean that regions which do not have facilities for accommodating production activities are permanently deprived of benefits of prosperity arising from industrial production. In fact there is an apparent conflict between the goals of growth on one hand and social justice on the other. Reduction in disparities requires a balance between the two goals. Regional disparities can be brought down in the real sense, when all regions are encouraged to exploit their own resources and development potential and formulate development plans suitable to their needs, potential and aspirations. If backward regions are helped in this way they will have an opportunity to overcome their inherent weakness and achieve higher growth. What is necessary is the organisation of economic activities at all levels and sectors interacting upon one another so as to produce an aggregate growth rate which will help to remove the bottlenecks in the backward regions. There are various economic strategies that can be adopted for the development of backward regions. The backward development strategies that can be followed in a federal country are:-

i. **Inter Government Financial Transfers:** In a country where structure of the government is federal, the problem of regional disparities can be resolved through financial transfers. Resources can be transferred from one region to the other through taxes, duties, grants, loans and subsidies to equalize development in various regions.

ii. **Various policies of financial institutions:** Financial institutions can channel financial resources towards the backward regions through various policies by differentiating in the rate of interest, mode of payments and other credit policies.
iii. **Licensing policies:** To develop the backward regions it is indispensable to give the license to private entrepreneurs to mobilize the resources in an optimum and economical methods. Private capital can be flowed to by providing incentives to entrepreneurs.

iv. **Direct Investment by the Government:** Fourth strategy is the direct investment by the government in backward regions by adopting specific programmes specially suited for that area.

v. **Regional planning:** Regional disparities can also be brought down by adequate planning by the government. Regional planning is more conducive to the development of backward regions.

It is argued that in view of regional disparities in natural endowments attained level of development and potential, a common strategy of development will not be suitable for each and every region and each individual region must have its own unique development strategy particularly suited to its requirements. It is also argued that detailed regional planning at centralised level would be unmanageable.\(^4\)

Participation of local governments or Panchayats is helpful in formulation of plans to reduce the imbalance among various regions. Thus regional planning as a concept derives its basic principles from the well known arguments that planning in order to be effective must be related to local resources, potentials, needs, aspirations of the local people and that better use can be made of local resources if planning is done at the local level.
1.4 **Need for the study**

Regional disparities in the level of economic development have been a well known phenomenon. Many studies have focused on such disparities among various regions of a country or a state. Economic development of a country or a region is much needed aspect today and existing disparities in various regions of Haryana justified undertaking such a study. No such study has so far been done for the period from 1967 to 2000 on the all around economic development. A study which is undertaken by considering the indicators from all the three sectors would give the true picture of inter-regional/districts disparities. Kulwinder Kaur studied only the industrial structure of Haryana from 1966-1978. Jandhyala BG Tilak and GK Bhatt highlighted the inter-district educational disparities in Haryana from 1966-1980. Few other studies regarding measuring level of disparities are incomplete in their self either because of not including all the sectors or for the period from existence of state to year 2000-01. In view of these facts it became imperative to study the regional disparities from all points of view in the economic development of Haryana. Varying geographical areas and climatic conditions which are also considered a cause of regional disparities also prompted such a study. Neighborhood of National Capital Territory (Delhi) and other historical and political factors which help in mobilizing the entrepreneurship in particular areas to create disparities in economic development further make it indispensable to carry out such a study. Existing difference in the economic development makes the need to know the level of disparities all the more important. As Haryana is a fast developing state, a study on the development level of various regions was justified. Existing differences shown by some indicators of development in the various regions also strengthen the need to carry out
the study. All these reasons together make it essential to carry out the study of overall economic development of Haryana and to suggest remedial measures to narrow down the existing disparities among the various regions of state.

1.5 Present Study

For the purpose of present study, it is essential to identify the backward regions and a measure of the extent of backwardness to reduce the imbalance in the backwardness. Any strategy adopted for backward region development begins with the identifications of the regions according to their differing levels of development. Thus in order to achieve the said objective and to reduce regional inequalities regions according to the divergent realized level of development and to assess the relative position of the regions and to delineate homogenous regions should be identified so that for different types of regions different strategies may be adopted.

In spite of the increasing awareness of their aspects and growing importance of micro-level plans, very little has been done in the field of regional planning in India. Systematic attempts in identification of backward regions and a study of physiographic and socio-economic structure and typology of development has not been done significantly. Only a few studies have been done on district levels taking only agricultural sector or any other sector.

District level study lacks on many counts. In the name of identification of backward regions very crude and partial indicators of development are used to identify the regions at the district level. A comprehensive district plan should be formulated on the basis of an
assessment of growth potential of a region, on the basis of national and human resources available, the immediate need and aspirations of the local people, with the help of knowledgeable local people. Such an attempt at the district level planning is very much conspicuous by its absence. This needs to be based on proper identification of different developing regions having a differing typology.

The present study is a modest attempt to reveal the present imbalance among various regions of the state and suggest various remedial measures to bridge the gap existing among various regions. The task of suggesting proper formulation of various policies, programmes and plans based on the regional character, their requirements and their individual capacities would also be undertaken. An honest attempt to study the growth, pattern and effort of public investment and other factors that cause these disparities in economic development will be made. The study will also examine as to what extent the public investment is responsible for imbalance in various regions and to what extent it help in narrowing down these disparities.

Thus the main objective of the study conducted was as follows:-
(a) To identify the backward regions / districts both at sectoral and aggregate level of development. The sectoral and aggregate level of development may in turn be measured in terms of various physical indicators of development. Combining them together after assigning proper weights, a composite measure will be arrived at.
(b) To know the cause of this disparities and role of government in curbing the gap.
(c) To present the topology of backwardness / development and to delineate homogenous regions.
(d) To study the relationship between public investment and economic developments.
(e) To study the relationship existing resources and economic disparities.
(f) To study the pattern and extent of disparities in economic development in various regions of the state.
(g) To suggest remedial measures to reduce the existing disparities in economic development.

This type of study is advantageous on theoretical as well as practical side. On the theoretical the study provides a method to measure development and disparities in quantitative terms which can later on be used to identify differentially developed regions. The study also provides a method to delineate the homogenous regions based on their topological similarities. On the practical side the study provides useful policy guidance at the time of formulation plans and backward area development strategies.

Physiographic, demographic, agrarian and various other types of structures which are essential for preparing any development plan will be studied. Identification of backward regions is pre requisite of any strategy of developments. The study will thus be quite useful for preparation of plans at micro level. To understand the usefulness of any specific plan, it is essential to understand the structure of the region, its relative position in terms of development and its natural and human
resources. Thus the study will provide the relative positions of districts in terms of economic development and help on preparation of plans at the district level.

1.6 Scope of Study

The proposed study is an attempt to catch the extent of backwardness in various districts of Haryana. Thus the study will cover all the 16 districts of the state. Owing to the growing importance of micro level planning and objective of our planners to reduce regional disparities at grass root level, it is deemed fit to concentrate the study at the district level. The 16 districts of Haryana form the universe of the study. The study covers all the important socio-economic aspects and sectors that are listed below:-

1. Agricultural Sector:
   (a) Land Utilization
   (b) Cropping Pattern
   (c) Agricultural Development.

2. Industrial Sector
   (a) Both large and small scale industries
   (b) Industrial Development
   (c) Workers engaged in industrial sector

3. Infrastructure sector
   (a) Road & Transport Development
   (b) Education Development
   (c) Banking Development
   (d) Health Development
Few sectors like power, mines and minerals though important for economic development but could not be covered due to non-availability of data. The study will cover the period from 1967-68 to 2000-01. To examine the trend in disparities, level of development will be measured at four points of time i.e., 1967–68, 1978–79, 1990-91 and 2000-01. Newly created district Panchkula, Jhajjar, Fatehabad and Mewat are clubbed with erstwhile districts since data on the new districts is presently not available.

1.7 Plan Of Study

The study is divided in 07 chapters. The first chapter will be of introductory nature. The scope and coverage, basic concepts, indicators used for measurement of development methodology will be part of first chapter. Second chapter will highlight the studies done by various eminent scholars and related literature will be reviewed. Brief description of the economy of Haryana forms the subject matter of the third chapter. In the fourth chapter intra-sectoral comparison will be assessed. This chapter will undertake the disparities measured at sectoral level of each region. Relative positions of each sector in various sectors will be analysed. In the fifth chapter composite index of development will be constructed in inter-regional disparities in terms of overall level of development will be measured. Trend and extent of disparities in economic development in different periods will be examined. Public investment determines the direction and level of economic development in a region. Pattern of public investment affects the overall development of a region. The sixth chapter will undertake the study of growth and pattern of public investment and its effect on economic development. The role of the government to bridge the gap among various regions will
also be discussed. The seventh chapter will summarise the study. The main findings of the study will be highlighted in a nutshell. Measures which are helpful in curbing the disparities will be suggested.

1.8 Methodology

In view of the considerable diversity between regions, and the consequent inadequacy of any single measure of development various composite structures have been put forward. The basic principle of these measures is to combine a number of economic, social and cultural factors in order to produce an overall picture of a region. If broad measure of development like consumption of fertilizers, irrigation, and consumption of electricity, transport facilities and so on are clearly correlated among themselves, then in this case any one of the measure will be as good an indicator as any other. If on the other hand some regions have low level of per capita income but a large proportion of population receiving education, high mortality rate and so on, the basic difficulty remains, how to combine measures by giving ‘weights’ to the various indicators and yet avoid making value judgments such as whether fertilizers consumption is less important than agricultural credit but more important than rural transport.

For this purpose of providing weights various studies have developed various methods.

An important advance in producing a measure of economic welfare as distinct from total welfare has been suggested by Wilfred Becker man and Robert Bacon\(^5\). They re-estimate 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 these 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 estimate the real level of per capita consumption of as many countries as have data on these non-monetary indicators.

Jan Drewnowski made another important study in the direction of constructing a weighted index. His study relates to the problem of measuring levels of living and welfare. In this study, he has made use of the concept of sliding weight systems, which consists 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 weight 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.

D.V McGranahan et al., later on, in their study on 'Contents and Measurements of Socio-Economic Development', tried to develop a weighted composite index of development. The weights were supposed to reflect the degree of importance that each indicator is considered to have in the measurement of the whole. The whole problem of giving weights revolves around the concept of 'importance'. Importance of an indicator is assessed on the basis of its co-efficient of correlation with other indicators. "We consider that development is an inter-related
phenomenon in which the different factors change and grow together over the long run; that the empirical evidence fully support this assumption of inter-related growth; and the degree of inter-relatedness of an indicator with the whole—its average correlation with the other indicators- is the best available criterion of the weight that should be assigned to it in a general index.” All that is meant by the use of correlation as a basis of weighting is that the more heavily weighted indicator is the one, which is most closely associated with, and will best predict the others. Conversely a general index constructed on such a weighting principle will best correlate with and best predict the scores on the individual indicators.

The above method of deriving weights from average correlation coefficients, do not completely solve the problem. Sometime a highly indicator may turn out to be a very weak indicator of development. Similarly while one indicator may be very important in one type of countries the same may be least important in others. Thus the high average correlation may not always reflect the importance of a variable as an indicator of development and hence the weight based on this value may be subjected to criticism.

A number of studies have been carried out to identify the backward regions of India. Ashok Mitra⁸ used some 35 indicators in an attempt to classify districts in India. Mr. Nanjappa⁹ used an approach based on ranking of the districts and chooses fifteen variables and a simple aggregation of the different ranks so obtained.

The above system of giving weightings lacks objectivity and rationality. The plan outlay in the past may well be guided by the non-
economic factors and may be completely uncorrelated with the indicators selected for measuring development. Thus the above method is very much riddled with subjectivity and arbitrariness.

Nanjappa and Sudarshan also tried to develop a composite index of development. They selected some 13 indicators and for 19 districts of Karnataka 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 represents the growth factor \( Y_{jd} \). The composite index then is:

\[
Y_d = \sum_{j=1}^{13} W_j Y_{jd}
\]

Where

\( W_j \) is the weight of the \( j^{th} \) indicator. The author themselves admit, “These weights are arbitrary and often depend upon value judgement.” These weights are assumed to be inversely proportional to the corresponding co-efficient of variation. In another study also the authors adapt similar weights.

In order to arrive at a composite index of development it is desirable to assign weightings to indicators. However, the weightings should not be given arbitrarily or should not be based on subjective valuation or should not be derived unscientifically. If the ‘weights’ were not properly derived, the resultant index of development would be more dangerous than an unweighted index or an index based on proxy variable. Hence, it is important to concentrate on the method of deriving weights. Realizing the importance of a scientific and less subjective
index of development, in the recent time, the sophisticated statistical technique called the ‘Factor Analysis’ is being very widely used by the regional planners, economists and geographers. ‘Factor Analysis’ technique provides factor loadings for each variable and these ‘loadings’ are nothing but the co-efficient of correlation between the observed variables and the unknown derived factor.

The credit for developing a composite index with the help of ‘Principal Component Analysis’, which is a method of factor analysis, goes to Hagwood\textsuperscript{11}, who used his technique in regional analysis to delineate major regions of relatively greater homogeneity.

Subsequently, Berry\textsuperscript{12} in a comprehensive study covering 95 countries each characterized by 43 proposed indices, however, employed Direct Factor Analysis, where the first and the second factors are derived to identify less developed regions. There are many other studies like by Irma Adlman and S. Moriss Taft, where Full Fledged Factor Analysis technique is used for the regionalisation purposes.

Pal at the district level in India made one important study using principal component analysis. Pal initially chose 17 variables, classified them into four specific groups and again he sub-divided them into agricultural and non-agricultural sectors and finally constructed a composite index by using the following formula.

\[ I = W_1 (1A) + W_2 (2N) \]

Where:

\[ I = \text{Composite index} \]
\[ W_1 \& W_2 \] = Weights = the variable weights in proportion of labour force engaged in agricultural sector (A) and non-agricultural sector (N). \( 1 \& 2 \) are the constant ratio of agricultural and non-agricultural labour productivities to the general labour productivities of India in the respective sector.

Pal \(^1\), though started with Factor Analysis, assigned weights in terms of factor loadings to the sectoral indicators, while combining or pooling together the sectoral indices, he did not use ‘Factor Analysis’ and used subjective weights. Thus the whole objectivity with which he began in his exercise lost with the use of arbitrary and value loaded weights.

In a study on identification of backward regions at state level, Hemlata Rao followed the method of Principal Component Analysis on the lines developed by Hagwood and partially adopted by Pal. She chose 24 indicators, grouped into four sectors-Agriculture, Industry, Education and Banking. First –sectoral indices were constructed and than the four indices were pooled together after assigning weights in terms of factor-loadings. Finally a composite index of development at state level was constructed. In the present study, we have followed the same method. Sectoral indices for 16 districts have been constructed by using Principal Component Analysis. The following sectors have been considered in our study.

(a) Agriculture sector
(b) Industrial sector
(c) Infrastructure sector

The following section explains the model.
1.9 The Model

A full-fledged Principal Component Model may be put as follows:

\[ Z_j = a_{jl} P1 + a_{j2} P2 + \ldots + a_{jm} P_m \ldots \ldots (1) \]

Where:

\[ X_j = \frac{X}{\delta X_j} \]
\[ Z_j = \frac{X_j}{\delta X_j} \], a standardized variable.
\[ P_i = (i=1,2 \ldots m) \] are the principal components
\[ a_{ji} = (j=1,2 \ldots n) \] are the coefficients or factor loadings of
\[ i=1,2 \ldots m \] the \( j^{th} \) variable relating to \( i^{th} \) component.

Thus each component explains certain portion of variance of \( i^{th} \) variable. To put it other way, each Principal component is a linear combination of weighted variables. This can also be written as:

\[ P_i = \sum^n a_j X_j \text{ where } a_j = \text{factor loading of 'j' variables} \]
\[ J = 1, 2 \ldots n \text{ or} \]
\[ P_i = a_{1j} x 1 + a_{2j} x 2 + a_{3j} x 3 + \ldots \ldots an_j x n \ldots \ldots (2) \]
\[ P_i = 1, 2 \ldots \ldots m \text{ (components), } a_{ji} = \text{Factor loading of } j^{th} \text{ variable} \]

on \( i^{th} \text{ component, } X_j = \text{variables.} \)

It is this model, we have used to delineate homogenous regions and to identify typological dimensions. The total variance is thus explained here in terms of \( 'm' \) components.
For purposes of constructing a composite index of development, we have taken only the First Principal Component into consideration. By definition, First Principal Component is that linear combination of weighted variables which explains the maximum variance. Then:

\[ P_I = a_{11}X_1 + a_{21}X_2 + \ldots + a_{n1}X_n \]

The measure of the first Principal Component can also be written in the following way.

\[ P_I = \frac{a_{ji}X_j}{\lambda_1} \]

Where \( a_{ji} \) \( (j=1, 2, \ldots, n) \) are the factor loading.

\[ Z_j = \text{standardized variable } i.e. = \frac{X_i - \bar{X}}{\delta x_i} \]

\( \lambda_i \) = eigen value (largest characteristic root)

The Composite Index ‘I’ either at the sectoral level or at the aggregate level is nothing but the First Principal Component itself. Thus:

\[ I_{Ik} = P_{Ik} \quad k = 1, 2, \ldots, K \text{ observations} \]

A simpler measure adopted to arrive at \( I_{Ik} \) or \( P_{Ik} \) in the study is:

\[ I_{Ik} = a_{jl} x \frac{X_{jk} - \bar{X}}{\delta x_j} \]
Thus \( I_{jk} \) = Composite index value of \( k^{th} \) observation

\( A_{ji} \) = Factor loading of \( j^{th} \) variable

\( X_{jk} \) = \( j^{th} \) variable on \( k^{th} \) observation and

\( \delta x_j \) = standard deviation of \( j^{th} \) variable.

In a socio-economic analysis, when the purpose is to make an inter-regional comparison of relative levels of development or any other aspect, the first Principal Component method at two stages is preferable. At the first stage, the initial variables relating to particular sectors are taken into consideration, and the first principal component of each group is derived separately. At the second, all the First Principal Component of different groups are taken as the raw data and again the first principal component of these variables are derived and this is taken into as the representative index of all the initial variables.

1.10 Selection of Indicators

There are two major problems in the construction of general index, the first is related to methodology for deriving the weights, which is discussed above, and the second but very important problem is the selection of indicators. It is easy to load the concept of development with arbitrary, capricious or contradictory variables. The proper choice of indicators constitute the crux of the methodology, for it is through this that the pertinent questions that need to be asked as the data, are identified.

While selecting variables it is important to bear in mind the differences in the meaning of the concepts like diversity and disparity, which are quite often used in the same sense. Disparity arises as a result of failure to exploit the hidden development potentials of a region’s
"initial resource endowments, its latent comparative and absolute resource advantages, relative to another comparable region and is therefore, comprised of factors which are not natural or physiographic but human, institutional and historical – socio political and/or economic technological.  

Choice of indicators is not noted in any defined analytical frame and is highly arbitrary and adhoc based on the objective of study. Output and input indicator should not be taken together as it will be a duplication of information. Only those indicators should be included in study which is related to the level of development.

While selecting the indicators one should try to avoid selection of those indicators which are irrelevant to the study. The indicators should be selected rationally and looking into its impact on development. Pooling of large number of indicators without examining the economic sense of data sometimes leads to paradoxical results. It is clear that the following variables like income, literacy, manufacturing, electricity, road, irrigation, and population are positively related with level of development.

Therefore, while selecting the indicators one has to be very much cautious and judicious. Indicators should be understood and correctly perceived before using them in analysis. While selecting indicators one should also avoid duplication of information. Also selected indicators should not overlay with each other. One more point need very much attention while selecting indicators is that no sector should be given over emphasis otherwise it may sometimes distort the results. No doubt selection of indicator is most typical task but it should be done
judiciously to reach to fruitful conclusions. Though in practice one faces a major constraint of non-availability of reliable and desirable data for one’s analysis purposes. This in a nutshell, the indicators selected for identifying level of development should be fairly comprehensive. Since the level of overall development cannot be measured from one or two indicators therefore maximum possible number of indicators should be included in the study.

Following is the list of indicators, which are included in the present study to construct the index of development of each region.

a. **Agricultural sector**

   A 1 Food grain production in tons per Lakh of Population
   A 2 Food grain production per 10 lakh hectares
   A 3 Non food grain production in tons per Lakh of Population
   A 4 Non food grain production per 10 lakh hectares
   A 5 Use of fertilizer in Kgs per Hectares
   A 6 Net area irrigated in Hectares
   A 7 Area under HYV in Hectares
   A 8 Area sown more than once in Hectares
   A 9 Number of tractors per 1000 hectares
   A 10 Number of livestock per sq. Km
   A 11 Number of tube wells per sq. km

b. **Industrial Sector**

   I 1 Number of registered manufacturing factories per lakh of population.
   I 2 Number of RMF per 100 sq km.
   I 3 Number of workers in RMF per lakh of population.
   I 4 Number of workers in RMF per 100 sq km.
   I 5 Workers engaged in secondary sector
c. **Infrastructure Sector**

<table>
<thead>
<tr>
<th>T1</th>
<th>Number of bank offices per lakh of population</th>
</tr>
</thead>
<tbody>
<tr>
<td>T2</td>
<td>Number of bank offices per hundred sq. km.</td>
</tr>
<tr>
<td>T3</td>
<td>Number of scholars in colleges per lakh of population</td>
</tr>
<tr>
<td>T4</td>
<td>Number of scholars in colleges per hundred sq. km.</td>
</tr>
<tr>
<td>T5</td>
<td>Number of recognized schools per lakh of population</td>
</tr>
<tr>
<td>T6</td>
<td>Number of recognized schools per hundred sq. km.</td>
</tr>
<tr>
<td>T7</td>
<td>Number of students in recognized schools per lakh of population</td>
</tr>
<tr>
<td>T8</td>
<td>Number of students in recognized schools per hundred sq. km.</td>
</tr>
<tr>
<td>T9</td>
<td>Literacy rate</td>
</tr>
<tr>
<td>T10</td>
<td>Length of surface roads in km per lakh of population</td>
</tr>
<tr>
<td>T11</td>
<td>Length of surface roads in km per 100 sq km of area.</td>
</tr>
<tr>
<td>T12</td>
<td>Number of vehicles per lakh of population</td>
</tr>
<tr>
<td>T13</td>
<td>Number of vehicles per hundred sq. km.</td>
</tr>
<tr>
<td>T14</td>
<td>Number of dispensaries, hospitals, CHC’s per lakh of population</td>
</tr>
<tr>
<td>T15</td>
<td>Number of dispensaries, hospitals, CHC’s per hundred sq. km.</td>
</tr>
<tr>
<td>T16</td>
<td>Medical staff per lakh of population</td>
</tr>
<tr>
<td>T17</td>
<td>Medical staff per hundred sq. km.</td>
</tr>
<tr>
<td>T18</td>
<td>Number of seats in technical institutions per lakh of population</td>
</tr>
<tr>
<td>T19</td>
<td>Number of seats in technical institutions per hundred sq. km.</td>
</tr>
<tr>
<td>T20</td>
<td>Number of seats in ITI’s per lakh of population.</td>
</tr>
<tr>
<td>T21</td>
<td>Number of seats in ITI’s per hundred sq. km.</td>
</tr>
</tbody>
</table>
1.11 **Sources Of Data**

The data used for this study are Secondary in nature. District-wise data on production, road lengths transport, RMF, no. of workers, population literacy rate, electricity, fertilizers and labour force have been collected from a number of authentic sources like Statistical Abstract of Haryana, District rural development agencies, Census Department Haryana, Director of Land Records Haryana, Director General Of Health Services, Haryana, Director of Education, Haryana, Economic and Statistical Services Haryana, Director of Agriculture, Haryana, Labour Commissioner Haryana, Vidyut Prasaran Nigam Ltd., State Transport Commissioner, Haryana, Haryana Financial Corporation and other published data pertaining to Haryana State. Relevant material for the present study has been extracted from library research.
NOTES AND REFERENCES

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