REGIONALISATION AND IDENTIFICATION

OF LEVELS OF INTER-DISTRICT

DISPARITY
CHAPTER IV

REGIONALISATION AND IDENTIFICATION OF LEVELS OF INTER-DISTRICT DISPARITY

4.1 The concept of regionalisation represents the actual method of geographic perception of the entire special economic diversity of the country designed to uncover territorial production complexes that will then become the areal units in planning and constructive transformation of the economy. It leads to spatial elaboration of national plans, models or measures. It has got an added importance today because the State plays a leading role in the country’s economic life. "More important than the exact adhoc decisions about the reach of planning measures in time and space are the processes of timing and regionalisation".

4.1.1. The modern regional consciousness and thinking in terms of areas and regions instead of places and points began only in the beginning of the present century with the monumental work in 1903 on the 'Geography of France' by Vidal de La Blache. Regionalisation dominated all geographical literature between the two world wars. India recognised regionalisation much after the Second World War and not before the Third Five Year Plan.

4.1.2. Regionalisation is of recent origin in the field of Economics. Economic phenomena used to be elaborated and developed in a "wonder world with no spatial dimension" prior to the second decade of the twentieth century. The spatial dimension was recognised only by the second decade...
when a theory of inter-regional trade was attempted. The 'determinist understanding of the character of a region' formed the basis of the 'fortunatov' concept of regional delimitation and the same was further stressed by Kruber, Semenev-Tyan-Shanskiy etc. in the pre-revolution period of Russia which is supposed to be homeland of economic regionalisation. After Second World War, a phenomenal and dramatic rise emerged in the regional consciousness leading to conference on economic regionalisation national as in Prague in 1957, international as in Poland in 1959. This also led to application of more and more sophisticated techniques in regionalisation. Among the galaxy of the scholars who dealt with methodological issues are Kendall, Gregory, Berry, Johnston, King, McGee, Stone, Henshall, Bassetts and Downs, Tylor, Hagood, Danilevsky and Beum etc.

4.2. Techniques of Regionalisation.

Delineation of regions involves grouping of spatial units with due regard to contiguity and homogeneity. The underlying principle is "to ensure within a region that the units have similar characteristics and that between the regions the distance among the units are large." Grouping is done on the basis of a number of indicators pertaining to socio-economic dimensions. Various techniques from simple to sophisticated one have been developed in this field. In the literature of quantitative approach to regionalisation, many a techniques are available to construct composite index.
by fusing the individual sectoral indices of development levels. We review here some of the important methods used for regionalisation, in order to find an appropriate method for our study.

4.2.1. Iterative Method of Clustering.

In this method indicators chosen are classified in sub-groups and for each sub-groups composite indices are constructed based on the correlation matrix and the disparity of the indicators. These indices are made scale-free by dividing them by their respective means. The square of the distance between the 'i'th and 'j' th areal units (districts) can, then be computed as

\[ d^2_{ij} = \sum_{k=1}^{n} (x_{ik} - x_{jk})^2 \]

where, \( X \) stands for the scale free value of the 'k'th composite index for the 'i'th district.

4.2.2. Elementary Linkage Method.

This method attempts to identify region in such a way that within the regions distances are minimum. In the first iteration, two districts contiguous to each other and having lowest value in the distance square matrix \( D^2 \) are identified and merged to form a new unit. With it the districts contiguous to it and having the minimum distance with any district of the unit in the next iteration is merged. The process is repeated till an exogenously specified maximum distance criterion is satisfied or no geographically
contiguous district has a minimum distance with any district in the unit, which then becomes the first region. Other regions are identified identically from the rest of the districts. This method is associated with McQuitty. 11

4.2.3. The Method of Reciprocal Pairs.

'A reciprocal pair may be defined as a pair of geographically contiguous districts such that at least one of them has its minimum distance with the other while neither has already been paired with any other spatial unit' 12. Two districts having the lowest value in the $D^2$ matrix constitute the first reciprocal pair. The next pair consists of the two contiguous districts having the next lowest value in the matrix. In the second series of iteration, $D^2$ matrix is computed afresh for the reciprocal pairs now treated as spatial units. The second round of reciprocal pairs are then obtained. The process is continued till a reasonable number of regions have emerged or when no two of the remaining units for a reciprocal pair remain. This method is generally associated with Johnston. 13

4.2.4. Factor Analysis.

Factor analysis is supposed to be a technique for objective treatment of the data so as to reduce the possibility of inconsistency in the areas where subjective judgement must be made. In this analysis attempt is made to combine or reduce variables, which are linked to each other, into indices describing particular basic dimensions. The
indices help in retaining many relevant variables in a study as opposed to a set of key variables as is used in regression and variance analysis. For regionalisation, inter-correlation of different spatial units score on each pair of dimensions/characteristics are computed and certain generalisation made. This method was first thought of by Karl Pearson. The genesis is, however, usually associated with the name of Spearman.

A pioneering effort in the field of factor analysis has been made by Odum Hagood. Hagood developed single factor approach in the delineation of regions. She selected 104 characteristics—52 agricultural, grouped into 6 classes and 52 demographic, grouped into 8 classes. For each of the 14 classes a single factor analysis was pursued. Factor loading was obtained by applying standard computational procedures. Once factor loading is obtained and the expected inter-correlation can be computed by multiplying the relevant pair of loadings. Comparison of the expected data with the actual data, yields the test of the adequacy of the single factor hypothesis. If empirical results do not invalidate single factor hypothesis, an index following Hagood can be constructed.

\[ I^j = a_1 z_1^j + a_2 z_2^j + \ldots \ldots \ldots + a_n z_n^j \]

where \( z_1^j, z_2^j, \ldots \) are the ratings of the spatial unit 'j' on each of the characteristics. These values are examined for cut off points. One criterion for combining two or more spatial units into one region is that they have similar
patterns: to be evidenced for any pair of these spatial units by positive and fairly high correlations between the values for the selected characteristics.

The single factor analysis helps in the objective delineation of regions. It, nevertheless, has severe limitations. It goes quite well if all inter-correlations of the characteristics are pure, i.e., one hundred percent predictable from the single factor loadings. This purity is usually not available and hence, problem of interpretations arises. The single factor analysis can be applied when there are many factors in operation and if single factor dominates and discrepancies are small. The computational problem arises as to determine how many factors are at play if discrepancies are not small. It also poses great difficulty in interpreting results, even when the analytical framework unambiguously denotes the number of relevant factors. Two factor or more than two factor hypothesis, where inter-correlation are only partially explainable, requires more subjective judgement and initiation on the part of the analyst affecting objectivity.

4.2.5. Method of Taxonomy

The method of Taxonomy is very simple and lucid and may be used as a substitute to the sophisticated tools like the method of principal components for ranking, classifying, and comparing different regions. It does not require the knowledge of high level of statistics or mathematics. This method makes an attempt to develop a single coefficient of composite index of development even for a block or a village.
if the appropriate data are available.

The method of Taxonomy may be described as follows:\(^17\).

Let a set of points represent regions, \(R_1, R_2, \ldots, R_m\) for a group of indicators \(1, 2, 3, \ldots, m\). These can be represented by a matrix of following form:

\[
\begin{array}{cccccc}
X_{11} & X_{12} & X_{13} & \cdots & X_{1m} \\
X_{21} & X_{22} & X_{23} & \cdots & X_{2m} \\
\vdots & \vdots & \vdots & \ddots & \vdots \\
X_{R1} & X_{R2} & X_{R3} & \cdots & X_{Rm}
\end{array}
\]

The indicator values may be standardised by subtracting them from their mean and then dividing by the standard deviation.

The standardised values can be represented by a matrix as follows:

\[
\begin{array}{cccccc}
Z_{11} & Z_{12} & \cdots & Z_{1m} \\
Z_{21} & Z_{22} & \cdots & Z_{2m} \\
\vdots & \vdots & \ddots & \vdots \\
Z_{R1} & Z_{R2} & \cdots & Z_{Rm}
\end{array}
\]

By the operation of standardised values, the distance matrix can be formed:

\[
D_{ij} = \sqrt{\sum_{k=1}^{m} (Z_{ik} - Z_{jk})^2}
\]

Where \(D_{ij} = D_{ji}\) and \(D_{ii} = 0\).
In each row there will be one point with the shortest or the minimum distance \(\text{Ci}\) at the corresponding point with row, that is,

\[
\text{C}_i = \min_j (\text{D}_{ij}) \text{ and } \text{C}_i \neq \emptyset
\]

The pattern of development is obtained by the following formula:

\[
\text{C}_{io} = \sqrt{\sum_{k=1}^{m} (Z_{ik} - Z_{ok})^2}
\]

Where \(\text{C}_{io}\) denotes pattern of development \((i=1, 2\ldots R)\) and \(Z_{ok}\) is the highest or the best standardised value.

The measure of development coefficient \((d_i)\) is given by:

\[
d_i = \frac{\text{C}_{io}}{C_o} \quad \text{where } C_o = \text{C}_{ij} - 2S_{io}
\]

\[
S_{io} = \sqrt{\frac{\sum (\text{C}_{io} - \bar{c})^2}{R}}
\]

\[
\bar{c} = \frac{\sum_{i=1}^{R} \text{C}_{io}}{R}
\]

The measure of development is always non-negative. It lies between \(\emptyset\) and 1. The closer the value of development
4.2.6. The Method of Principal Components

In our study the method of principal components, first devised by H. Hotelling in 1933, has been adopted for constructing the indices for industrial development of different regions (districts) of Assam.

In contrast to other methods the principal components analysis has got certain special advantages. These are: (1) the method yields mathematical weightage in purely objective manner,

(2) this technique has the advantage to tackle the situation when the number of variable is larger than the number of observations,

and (3) this approach has been suggested as a solution to the problem of multicollinearity.

The method of principal components is a special case of the more general method of factor analysis\(^{19}\). The aim of the method of principal components is the construction out of a set of variables, \(X_j\)'s \((j=1,2,\ldots,K)\) of new variables \(P_1\)'s is called "Principal Components" which are linear combinations of the \(X\)'s.

\[
P_1 = a_{11}X_1 + a_{12}X_2 + \ldots + a_{1K}X_K
\]

\[
P_2 = a_{21}X_1 + a_{22}X_2 + \ldots + a_{2K}X_K
\]

\[
P_k = a_{k1}X_1 + a_{k2}X_2 + \ldots + a_{kk}X_k
\]
The a's called loadings, are chosen so that the constructed principal components satisfy two conditions: (a) the principal components are uncorrelated (orthogonal), and (b) the first principal component $P_1$ absorbs and accounts for the maximum possible proportion of the variation in the set of all $x$'s, the second principal component absorbs the maximum of the remaining variation in $x$'s (after allowing for the variation accounted for by the first principal component) and so on.

4.2.7. Regionalisation - Computational Procedure

As the whole approach to regionalisation has been made with the principal components analysis, it is necessary to draw the steps needed for finding out the first principal component. The method used in this section for finding factor loading has been devised by C. Burt. The method may be outlined as follows:

1. Simple correlation coefficient between $K$ explanatory variables has been estimated and these correlation coefficients were then arranged in a table in a matrix form called correlation table or correlation matrix. The main diagonal elements in this matrix are unity since the elements of these diagonals are the self-correlations, i.e., the correlation of each $X_i$ with itself ($r_{x_ix_i} = 1$ for all $i$'s). The correlation matrix is symmetrical, i.e., the elements of each row are identical to the elements of the corresponding columns, since,

$$r_{x_ix_j} = r_{x_jx_i}$$
2. Next step is the summing up of the elements of each column (or row) of the correlation matrix and obtain K sums of simple correlation coefficient.

\[ \sum_{j}^{k} r_{ixj} = \sum_{i}^{k} r_{ixj} \]

3. Subsequently the square root of the sum total of the column (or row) sums has been computed, that is,

\[ \sqrt{\sum_{i}^{k} \sum_{j}^{k} r_{ixj}} \]

4. Next, the loadings (a_{ij}'s) for the first principal component P_1 has been found out by dividing each column (or row) sum by the square root of the grand total.

\[ a_{ij} = \frac{\sum_{j}^{k} r_{ixj}}{\sqrt{\sum_{i}^{k} \sum_{j}^{k} r_{ixj}}} \]

where i refers to the i^{th} variable X.

5. The sum of the squares of the loadings of each principal component is called the latent root (or eigen value, or characteristic root) of this component and is denoted by the letter L with the subscript of the principal component to which it refers. The latent root of the first principal component has been found out in order to estimate the explained variation accounted for by the first principal component (P_1). In doing so the sum of the squares of the loadings of the first principal component is estimated.

\[ L_1 = [ \text{latent root of } P_1 ] = \sum_{i}^{k} a_{1i}^2 = a_{11}^2 + a_{12}^2 + \ldots + a_{1k}^2 \]

In general,

\[ L_m = \sum_{i}^{k} a_{mi}^2 = \text{latent root of the } m^{th} \text{ principal component} \]
The latent root of any $P_i$ provides an indication of the importance of the $P_i$ of the amount of the total variation that the particular $P_i$ has extracted from the set of the $X$'s. In effect the latent root is the actual variation extracted (accounted for) by the $P_i$ the principal component. A convenient way of presenting the latent root is to express them as a percentage of total variation in the set of $x$'s. It is clear that the sum of the latent roots of all the principal components is equal to the number of the $X$'s.

That is, \[ \sum_{i=1}^{k} L_i = k \] (where $k$ is the number of explanatory variables)

Thus the percentage variance accounted for by $P_i$ is

\[ \frac{L_i}{k} \times 100 \]

4.3 Regionalisation in Assam - Methodology and Data Base

Coming to methodology of regionalisation, first it is felt necessary to determine and select the indicators of industrial development in order to identify the levels of development of different districts. In the present study six indicators of industrial development have been worked out. These are: industrial production per worker, bank loan per industrial worker, percentage share of labour force in secondary activities, number of registered factories per thousand square kilometers, percentage share of industrial employee to total population, and electricity consumption per industrial worker. Index of industrial development for different districts of Assam have been worked out with the
help of first principal component using the six indicators stated above.

One point should be noted here that although the state of Assam has eighteen administrative districts (of them six are newly created), the present study takes into account the ten old districts. The main reason behind this is that statistics required for measuring development levels at relative scales and at a point of time are not available for the newly created districts.

The statistical data of the present work relate to the year 1984-85, which are compiled directly from appropriate sources or estimated for the particular year. The sources of data are (i) Directorate of Economics & Statistics, Assam (ii) Directorate of Industries, Assam.

4.4 Application of the Principal Components Analysis Model for Assam

For finding out the level of Industrial development of each district of Assam and in order to identify the backward districts, the following six indicators are chosen:

- \( X_1 \) = Per capita Industrial Production (in '000 Rs.).
- \( X_2 \) = Bank Loan per Industrial Worker (in Rupees)
- \( X_3 \) = Percentage share of Labour Force in Secondary Sector
- \( X_4 \) = Number of Registered Factories per Thousand Sq. Kms.
- \( X_5 \) = Percentage share of Industrial Employees to Total Population
- \( X_6 \) = Electricity Consumption per Industrial Worker (in Kwh).
Details of these indicators are given district wise in the following table 4.1.

**TABLE 4.1**

District Wise Values of Different Indicators

<table>
<thead>
<tr>
<th>Districts</th>
<th>X1</th>
<th>X2</th>
<th>X3</th>
<th>X4</th>
<th>X5</th>
<th>X6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goalpara</td>
<td>768.10</td>
<td>567.00</td>
<td>4.0</td>
<td>15.0</td>
<td>0.67</td>
<td>465.00</td>
</tr>
<tr>
<td>Kamrup</td>
<td>1944.70</td>
<td>814.00</td>
<td>6.0</td>
<td>34.0</td>
<td>0.98</td>
<td>1375.00</td>
</tr>
<tr>
<td>Darrang</td>
<td>3698.30</td>
<td>370.00</td>
<td>4.0</td>
<td>25.0</td>
<td>0.78</td>
<td>630.00</td>
</tr>
<tr>
<td>N. Lakhimpur</td>
<td>991.50</td>
<td>133.00</td>
<td>2.0</td>
<td>7.6</td>
<td>0.30</td>
<td>046.00</td>
</tr>
<tr>
<td>Dibrugarh</td>
<td>9174.50</td>
<td>907.00</td>
<td>6.0</td>
<td>77.0</td>
<td>1.10</td>
<td>9500.00</td>
</tr>
<tr>
<td>Sibsagar</td>
<td>4005.60</td>
<td>852.00</td>
<td>4.0</td>
<td>48.0</td>
<td>0.67</td>
<td>1782.00</td>
</tr>
<tr>
<td>Nowgong</td>
<td>554.20</td>
<td>543.00</td>
<td>3.0</td>
<td>24.0</td>
<td>0.53</td>
<td>261.00</td>
</tr>
<tr>
<td>Cachar</td>
<td>1542.70</td>
<td>820.00</td>
<td>4.0</td>
<td>12.0</td>
<td>0.67</td>
<td>200.00</td>
</tr>
<tr>
<td>K. Anglong</td>
<td>1890.10</td>
<td>913.00</td>
<td>1.8</td>
<td>3.5</td>
<td>0.37</td>
<td>1616.00</td>
</tr>
<tr>
<td>N. C. Hills</td>
<td>92.00</td>
<td>310.00</td>
<td>0.9</td>
<td>0.8</td>
<td>0.20</td>
<td>1110.00</td>
</tr>
</tbody>
</table>

Calculated from the sources below:
1. Directorate of Industries, Assam
2. Directorate of Economics & Statistics, Assam

The variables in table 4.1 are found to be mutually correlated (all positively) and the corresponding correlation matrix is given in the table 4.2.
TABLE 4.2

Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>X1</th>
<th>X2</th>
<th>X3</th>
<th>X4</th>
<th>X5</th>
<th>X6</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X2</td>
<td>0.474</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X3</td>
<td>0.635</td>
<td>0.548</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X4</td>
<td>0.896</td>
<td>0.501</td>
<td>0.784</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X5</td>
<td>0.722</td>
<td>0.521</td>
<td>0.987</td>
<td>0.820</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>X6</td>
<td>0.907</td>
<td>0.437</td>
<td>0.498</td>
<td>0.810</td>
<td>0.577</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Thus the first principal component $P_{11}$ is

$$P_{11} = 0.905Z_1 + 0.679Z_2 + 0.869Z_3 + 0.939Z_4 + 0.903Z_5 + 0.826Z_6 \ldots \ldots \ldots \ldots (1)$$

Z’s are the standardised values of X’s and they are obtained by subtracting the X’s from their respective means and dividing them by the respective standard deviation.

The latent root of $P_1 = 4.450$ and in our study the first principal component accounts for (extracts) 74 percent of the total variance in the set of standardized X’s. Standardisation has been done to make the variable unit free.

The index of industrial development has been estimated with equation (1). These are given district wise with their respective classes of occurrence (Table 4.4). The classification of indices has been done in the way as given in Table 4.3. Inter-district disparity through industrial index of development has also been illustrated in Map No. 4.1.
Table No. 4.3.
Classification of indices.

<table>
<thead>
<tr>
<th>Class interval</th>
<th>Status</th>
<th>Symbols</th>
</tr>
</thead>
<tbody>
<tr>
<td>below (-3)</td>
<td>Very low</td>
<td>V. L</td>
</tr>
<tr>
<td>(-) 3 to (-) 2</td>
<td>Low</td>
<td>L</td>
</tr>
<tr>
<td>(-) 2 to 0</td>
<td>Moderate</td>
<td>M</td>
</tr>
<tr>
<td>0 to 1</td>
<td>High</td>
<td>H</td>
</tr>
<tr>
<td>above 1</td>
<td>Very high</td>
<td>V. H</td>
</tr>
</tbody>
</table>

Table No. 4.4 Values of indices and classes of their occurrence

<table>
<thead>
<tr>
<th>Districts</th>
<th>Value of index</th>
<th>Ranking</th>
<th>Symbols</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goalpara</td>
<td>-1.227760</td>
<td>VI</td>
<td>M</td>
</tr>
<tr>
<td>Kamrup</td>
<td>+3.057058</td>
<td>II</td>
<td>V. H</td>
</tr>
<tr>
<td>Darrang</td>
<td>+0.179242</td>
<td>IV</td>
<td>H</td>
</tr>
<tr>
<td>N.Lakhimpur</td>
<td>-4.621072</td>
<td>IX</td>
<td>V. L</td>
</tr>
<tr>
<td>Dibrugarh</td>
<td>+10.645272</td>
<td>I</td>
<td>V. H</td>
</tr>
<tr>
<td>Sibsagar</td>
<td>+2.458929</td>
<td>III</td>
<td>V. H</td>
</tr>
<tr>
<td>Nowgong</td>
<td>-2.070816</td>
<td>VII</td>
<td>L</td>
</tr>
<tr>
<td>Cachar</td>
<td>-0.490592</td>
<td>V</td>
<td>M</td>
</tr>
<tr>
<td>Karbi Anglong</td>
<td>-2.278497</td>
<td>VIII</td>
<td>L</td>
</tr>
<tr>
<td>N.C.Hills</td>
<td>-5.846773</td>
<td>X</td>
<td>V. L</td>
</tr>
</tbody>
</table>

It should be noted that minus sign in the indices does not mean negative industrialisation. It shows the relative distances in the industrial development.

4.5. Identification of the levels of industrial development of the districts.

Following the table 4.4, the levels of industrial development of the districts of Assam can be identified by arranging the districts in the following manner:

(a) Advanced districts - Dibrugarh, Kamrup and Sibsagar.
(b) Developing districts - Goalpara, Darrang and Cachar.
(c) Backward districts - N. Lakhimpur, Nowgong, Karbi Anglong and N. C. Hills.

4.5.1 Coming to the levels of industrial development of advanced districts, it is found that the districts like Kamrup, Dibrugarh and Sibsagar have a sound industrial base. Darrang district's industrial base is more or less satisfactory. The high rate of industrial development in case of Sibsagar and Dibrugarh is mainly due to four factors.

(i) the rich natural resource base (refer table 5.4.a)
(ii) sound infrastructural builds (refer table 5.5)
(iii) existence of healthy external economies.
(iv) larger investment from both private and public sources in the industrial sector (Table 4.5)

Table No. 4.5

Industrial Investment upto 1985 (Private and Public) in Large Scale and Medium Scale Sector. (Rs. in Lakhs)

<table>
<thead>
<tr>
<th>Districts</th>
<th>Private Investment</th>
<th>Public Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goalpara</td>
<td>511</td>
<td>10683</td>
</tr>
<tr>
<td>Kamrup</td>
<td>2288</td>
<td>39095</td>
</tr>
<tr>
<td>Darrang</td>
<td>440</td>
<td>-</td>
</tr>
<tr>
<td>N. Lakhimpur</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dibrugarh</td>
<td>2051</td>
<td>49372</td>
</tr>
<tr>
<td>Sibsagar</td>
<td>622</td>
<td>40000</td>
</tr>
<tr>
<td>Nowgong</td>
<td>25</td>
<td>27951</td>
</tr>
<tr>
<td>Cachar</td>
<td>57</td>
<td>11000</td>
</tr>
<tr>
<td>Karbi Anglong</td>
<td>50</td>
<td>757</td>
</tr>
<tr>
<td>N. C. Hills</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: Investment here means total investment in block capital calculated from the source below.

Source: Directory of Large and Medium Scale Industries (1984-85) Govt. of Assam.

101
INTER-REGIONAL DISPARITY THROUGH INDUSTRIAL INDEX OF DEVELOPMENT

INDEX

VERY HIGH

HIGH

MODERATE

LOW

VERY LOW

SCALE

0 20 40 60 Km

INTER-REGIONAL DISPARITY
THROUGH INDUSTRIAL INDEX
OF DEVELOPMENT

MAP No. 4.1
Ph.D. Thesis:
M.K. CHOWDHURY
GAUHATI UNIVERSITY.

102
4.5.2. Considering Kamrup, the capital district of Assam having the city of Guwahati, the largest trading centre of North-East India on its lap, it is found that this district is functionally the central place of the State and as such it has inherited a large number of functions which add to its potentiality and status to have an edge over other districts. In case of Darrang, it is observed that this district has improved much over the years and achieved a good industrial base.

4.5.3. The districts like Goalpara, Nowgong and Cachar could not show satisfactory progress in industrial development, although a few large-scale and medium-scale industries have been set-up in these districts. These industries could not produce strong spread effect. The reason may be the absence of external economies, poor infrastructural builds, weak industrial base and under-utilisation of natural resources.

4.5.4. Examining the most backward districts like Karbi Anglong, North Cachar Hills and North Lakhimpur, it is found that all these districts are purely agricultural. Districts of N. Lakhimpur and N. C. Hills have been declared to be 'No-industry' districts. The two hills districts are constrained by their very geographic location with mountainous terrain which makes many parts of these districts inaccessible. These three districts are also extremely poor in their other infrastructural builds and amenities. Moreover, except Karbi Anglong, the natural resource base of other two districts are not very sound.
4.5.5. Now if we try to analyze the inter district disparity in industrial development of Assam with the help of existing theories of regional development as discussed in Chapter 3, then we find that none of the theories alone is capable of explaining the situation of Assam.

The neo-classical model of Heckscher-Ohlin can partly explain that disparity in industrial development in different districts of Assam is mainly due to different factor endowment. The advanced districts like Dibrugarh, Sibsagar and Kamrup have rich natural resources base (refer table 5.4a) and good infrastructural build (refer table 5.5). Industrial activities in these districts have advanced mainly because of rich factor endowment. Moreover because of advancement in industrial activities the productive factors like capital and skilled and semi-skilled labourers have migrated to these districts. This study tried to find out the extent of inter-district trade and factor mobility but statistics relating to this is absolutely not available because such data are not collect and maintained by government or any other agencies. But in this study one thing has come to light that convergence of regional per capita income, as predicted by neo-classical growth model, has not taken place in Assam even after almost a century of industrialisation based on tea and petroleum. For example, two neighbouring districts, Dibrugarh and North Lakhimpur, while former one is very rich the latter one is the poorest
The Cumulative Causation model of Myrdal can explain better the cause of increasing inter-district disparity in Assam. The industrial scenario of different districts in Assam proves that the "back wash effect" is much stronger than "spread effect" here and that is why labour, capital, goods and services have flowed from poor districts to rich districts and thus inhibited the process of industrialisation and distorted the pattern of production in the poor districts.

The situation of disparity of Assam even cannot be explained by Growth Pole theory and Hirschman's theory of Geographical Incidence and Transmission of Economic Development. Both these theories predict ultimate equality through unbalanced growth. But it seems that in Assam "polarization effect" is stronger than "trickling down effect".

The rich districts, especially Dibrugarh and Sibsagar, got the advantage of initial huge investment in oil and tea industry. Because of this the infrastructure facilities developed and gradually other industries also started growing in these two districts. Moreover because of vast forest resources, the plywood and other related industries flourished in Dibrugarh district. Although the natural
The infrastructure base is very good in Kamrup district also, but it has developed industrially basically because of good infrastructure facilities and Guwahati, its district headquarter, being the main trading centre of Assam and entire north east.

It may be seen from the table 4.5 that the total investment in the rich districts such as Kamrup, Sibsagar and Dibrugarh has always been much higher than that of backward districts. This has happened inspite of various plans of both central and state governments to reduce imbalance between regions. India is an underdeveloped and capital poor country and Assam is perhaps one of the poorest states in India in capital resource. So whatever private investments are made, they are made in those areas where quick return is ensured. Thus the rich districts with good infrastructure facilities and other amenities are always attracting capital and labour from poor regions. So if the market forces alone are let to determine the fate of the backward regions then the result will be quite obvious -- not a single penny will be invested in backward regions and entire industrial development will take place only in few pockets.

So in Assam, it must be the solemn and prime duty of the planners and the government to develop the infrastructure facilities of backward districts and to create an environment of industrialisation through public investment.
In case of capital and labour mobility, there is no control and restriction even in inter-state level, not to speak of inter-district level. Moreover the trade unions in Assam are not so organised to prevent inter-district labour migration. Government taxes are uniform all over the state and only recently some tax concessions have been announced to motivate people to set up industries in poor areas. But due to lack of natural resources, lack of basic infrastructure, transport and communication, the desired results have not been achieved and private investments are still being made in rich districts like Kamrup, Sibsagar and Dibrugarh. Few public sector industries have been established in backward regions such as cement factory at Karbi Anglong district and paper mill at Nagaon district, but they have not been able to generate the industrial environment in these areas.

The local Assamese people are mainly employed in agriculture and others are employed either in public sector enterprises or government offices. The construction and trading are dominated by people from out the state. Construction business is mainly dominated by the migrated labour from Bihar and West Bengal, and even from neighbouring country like Bangle Desh. Trading in Assam is mainly dominated by people from Rajasthan, Punjab and Uttar Pradesh. The exact statistics relating to inter-state migration and employment pattern in the state are not collected and maintained by any agency and hence this study suffers seriously due to lack of data.
To sum up, it is found that the industrial development of the State of Assam has been very much lopsided. While a few regions have been advancing because of their all-round healthy base, others are found to be lagging behind, inspite of their rich natural resource endowments and the rest are just eking out partly because of their poor natural resources base and partly because of lack of entrepreneurship and governmental investment.

It would not be irrelevant if one recalls, in this connection, the findings of M.N.Pal made in 1975. Though a comparative study between ours and that of Pal's has not been drawn, it could be safely concluded that the situation has not changed much from what it had been ten years back.

Thus, it is high time that the Government of Assam puts all its efforts to restore the health of its sick regions by setting well thought approaches in order to make Assam one of the prosperous State of the country.
REFERENCES


12. Kundu, A.: op. cit. no. 6, p. 121.


20. Ibid. p.426.