2. LEVELS OF URBANISATION

2.1. INTRODUCTION

This chapter makes a preliminary study of the areal differences in the degree of urbanisation in West Bengal, considering the district as the unit of study. The main objective of this analysis is to identify the levels of urbanisation in the districts of the state during each decade and analyse its temporal variation during 1901-81. A number of different parameters may be used to measure the degree of urbanisation in a region, of which the commonest is the percentage of urban population to the total population of an area. In fact many authors consider this criteria as an adequate measure of urbanisation of a region. However, this criterion alone cannot be said to be sufficient since an area with a low rural density may show a relatively high percentage of urban population not because of its large size of urban population but because of its small size of rural population. It is, therefore, necessary to take other measures into consideration. Urban population in each district as percentage of the total urban population in the state is a variable that gives an idea of how much of the state's urban population is concentrated in each district. Another point that must be considered is the distribution of the urban population in different size-categories of towns and cities. A concentration of urban population in large sized urban centres generally indicates a higher degree of urbanisation. The population size of 20,000 may be considered as a dividing point, since urban centres with less than 20,000 population may be considered small towns. Thus, a third variable, namely, the percentage of urban population living in urban centres with a population of 20,000 or over may be identified. Other parameters such as the density of urban population, percentage of workers in secondary and tertiary sectors of economy and so on may be used to identify levels of urbanisation. However, such criteria could not be included in this analysis because such data are not available for all the districts during the entire period under review. Therefore, the following study has been restricted to the three measures mentioned above, namely:
i) percentage of urban population to total population in each district.

ii) urban population in the district as percentage of total urban population in West Bengal.

iii) percentage of urban population in each district living in urban centres with a population of 20,000 and over.

Finally an attempt has been made to combine all the three attributes to obtain a composite index of the levels of urbanisation in the districts of the state during each decade.

2.2. METHODOLOGY

In the first place each attribute mentioned above has been computed and mapped for each decade so as to give an idea of the spatio-temporal variations in that attribute in the state during the period under review.

In this context it must be mentioned that a study of variable two (that is urban population in the district as percentage of total urban population in West Bengal) becomes meaningful only if it is studied in relation to the total population in the state, since a low share of urban population may be due to a low share of total population and therefore, it does not necessarily indicate a low level of urbanisation. Therefore, percentage values of each districts' share of the state's total population have also been calculated. In order to find out whether there is any association in the areal variation of these two variables, two statistical measures have been used, namely, the coefficient of geographical association and the coefficient of medial correlation.

2.2.1. Coefficient of geographical association

The coefficient of geographical association (CGA) which was first used in industrial locational studies by Hoover (1936) is a measure of association between any two variable over a set of geographical regions.

The CGA may be found out by the formula

\[ 1 - \frac{\sum |d_i|}{200} \]
where \( d_i \) indicates positive or negative deviation between the two variables. The coefficient has a range from 0 to 1 with high values when the two distributions being compared are similar and low values when the two distributions are very unlike.

The coefficients of geographical association have been calculated between percentage shares of the district's urban populations and percentage shares of districts total populations for each decade during 1901-81 (Table 2.1).

2.1.2. Coefficient of medial correlation

The coefficient of medial correlation was first developed by Quenouille in 1952 to measure association in a bivariate distribution. This methodology was adapted from its original version by Arnold Court (1970) in order to compare two distributions mapped over the same area. The procedure involved in the computation of the coefficient of medial correlation is as follows:

i) Isopleth maps of the two variables \( x \) and \( y \) are prepared using the respective median value weighted by area so that the map is divided into two classes: above median and below median.

ii) Then the maps of the \( x \) and \( y \) variables are superimposed upon one another to give a composite map showing four categories; areas below median of both; areas below median of \( x \) and above median of \( y \); areas above median of \( x \) and below median of \( y \); and areas above median of the both \( x \) and \( y \).

In this study, the above mentioned two variables, namely, percentage share of urban population in the districts and percentage share of total population in the state have been considered. For both variables during each decade isopleth maps have been prepared using median values weighted by area.

iii) Next a 2x2 matrix is obtained in which the values are the percentages of area of the composite map belonging to each of the four categories. The coefficient of medial correlation \( q \) is given by
\[ q = \frac{(a+b) - (b+c)}{a+b+c+d} \]

where \(a, b, c\) and \(d\) are the percentages of area of the composite map in each of the four categories mentioned above. It may be pointed out that "q displays the two properties desired of correlation coefficients: it has a range of +1 to -1 and a value of 0 indicates that the two variables are independently distributed" (Norcliff, 1977).

The significance of \(q\) may be determined by computing a critical value \(q^*\) where \(\alpha\) is the chosen level of significance. Then

\[ q^* = \frac{2}{N} + \frac{Z}{\sqrt{N}} \]

where \(N\) is the number of pairs of observations, and \(Z\) is the \(Z\) value (of a normal distribution) associated with the chosen level of \(\alpha\) in a two-tailed test.

when \(q\) is more positive or more negative than \(q^*\) the null hypothesis may be rejected.

The coefficients of medial correlation for each decade during 1901-81 have been computed (Table 2.2) and the significance of the 'q' values have been tested by computing \(q^*\) when \(\alpha = 0.01\) and \(N = 16\); \(q_{0.01}\) was computed to be 0.77.

Table 2.1 Coefficient of geographical association between percentage share of urban population in the districts and percentage share of total population in the districts

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<tbody>
<tr>
<td>Coefficient of Geographical Association</td>
<td>0.53</td>
<td>0.53</td>
<td>0.55</td>
<td>0.56</td>
<td>0.59</td>
<td>0.63</td>
<td>0.64</td>
<td>0.66</td>
<td>0.68</td>
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7.678
Table 2.2 Coefficient of medial correlation \( (q) \) between percentage share of urban population in the districts and percentage share of total population in the districts

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<tbody>
<tr>
<td>( q )</td>
<td>0.31</td>
<td>0.31</td>
<td>0.34</td>
<td>0.44</td>
<td>0.48</td>
<td>0.90*</td>
<td>0.91*</td>
<td>0.90*</td>
<td>0.84*</td>
</tr>
</tbody>
</table>

* denotes significance at 0.01 level

2.2.3. Composite index of urbanisation

The composite index of the levels of urbanisation has been obtained with respect to the three criteria discussed above by means of the following procedure:

1) Mean and standard deviation values of each attribute in the districts during each decade have been computed.

ii) Different categories were recognised for each variable in the following way and each category was given a score:

<table>
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<tr>
<th>Class</th>
<th>Score</th>
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<tr>
<td>( \bar{X} + 3S )</td>
<td>7</td>
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<tr>
<td>( \bar{X} + 2S ) to ( \bar{X} + 3S )</td>
<td>6</td>
</tr>
<tr>
<td>( \bar{X} + 1S ) to ( \bar{X} + 2S )</td>
<td>5</td>
</tr>
<tr>
<td>( \bar{X} ) to ( \bar{X} + 1S )</td>
<td>4</td>
</tr>
<tr>
<td>( \bar{X} - 1S ) to ( \bar{X} )</td>
<td>3</td>
</tr>
<tr>
<td>( \bar{X} - 2S ) to ( \bar{X} - 1S )</td>
<td>2</td>
</tr>
<tr>
<td>( \bar{X} - 2S )</td>
<td>1</td>
</tr>
</tbody>
</table>

iii) During each decade for each district, three such score values were obtained. These scores were then summed to give a composite score for each district which is thus considered the composite index of the level of urbanisation of the district.
WEST BENGAL
PERCENTAGE OF URBAN POPULATION TO TOTAL POPULATION
1901-81

CALCUTTA * entirely urban

Figure 2
2.3. ANALYSIS

2.3.1. Percentage of urban population to total population

There are significant spatio-temporal variations in the level of urbanisation as measured by this particular attribute among the different districts of West Bengal. A detailed analysis of this parameter in the different districts of the state during 1901-81 reveals the following trends.

i) In almost all the districts the percentage of urban population remained either stagnant or showed a very slight growth until 1941. During 1951-81, districts like Darjiling, Jalpaiguri in the north, Barddhaman in the West and Twentyfour Parganas, Haora and Hugli in the south east showed a steady rise in the figure. The remaining districts recorded only a marginal increase in their percentages of urban population.

ii) Initially, that is during 1901 there were three districts (excluding Calcutta which is entirely urban) namely Haora, Hugli and Twentyfour Parganas which recorded percentage of urban population higher than the state average indicating a spatial concentration of highly urbanised districts around Calcutta in the southern part of the state. The situation remained more or less similar until 1971.

iii) During 1981, two other districts namely Barddhaman in the western part of the state and Darjiling in the north recorded percentages of urban population greater than the state average during the decade. This appears to be a major departure from the situation in the earlier decades indicating a trend towards increasing degree of urbanisation in the other parts of the state.

Thus on the basis of the percentage of urban population and its nature of variation during the period under review, the districts may be divided into the following categories:

i) Districts with percentage of urban population higher than the state average throughout 1901-81. These are the most urbanised districts of the state and together contain almost all the constitu-
ii) Districts with percentage of urban population higher than the state average during the last decade but which started with a much lower percentage during the initial stages. This category includes Darjiling and Barddhaman districts. Barddhaman is remarkable for its sharp increase in the proportion of urban population which may be said to bear a direct relationship with the emergence of the Durgapur - Asansol mining-industrial region as a zone of urban concentration. In Darjiling district the percentage of urban population during the last decade has been pushed up by the inclusion of three new urban centres, namely Jaldhaka Hydel Power Project town (based on a hydel power project) Cart Road and Uttar Bagdogra. The last two gained urban recognition because of their close proximity to existing larger urban centres of Kurseong and Siliguri respectively and also because of being located on trade-transport routes.

iii) Districts with percentage of urban population lower than the state average throughout the period under review. This category which includes all the remaining districts may be further subdivided into:

a) Districts with less than 10% of their population declared urban during 1901-81. These include Koch Bihar, Maldah, Murshidabad, Medinipur, Bankura, Puruliya and Birbhum. These are the least urbanised districts of the state and increase in percentage of urban population even during the post-1941 period has been very slow. It may be noted that Maldah district with less than 55% of its population being urban even during 1981, recorded the lowest percentage in the state.

b) Districts like Jalpaiguri and West Dinajpur where percentage of urban population has been increasing rapidly since 1941 and at present the figure is higher than 10%. The percentage of urban population in Jalpaiguri district has been increasing steadily since 1941 after which decade the figure increased
sharply from 3.27% in 1941 to 7.22% in 1951. The last decade also shows considerable increase over the 1971 figure. This is mainly due to the inclusion of four new urban centres including Dabgram with a population of 76402 in 1981, which pushed up the percentage of urban population from 9.6% in 1971 to 14.05% in 1981. The district of West Dinajpur was a latecomer in the field of urbanisation since this district did not contain any urban centre prior to 1941 but since then the percentage of urban population has been increasing rapidly. In 1941 only 0.83% of total population of the district was declared urban. This figure increased to 11.17% in 1981. Urban Centres in this district are mainly centres of administration like Balurghat, Raiganj and centres of trade and commerce like Kaliaganj, Hill, Dalkhola etc. Urban growth in this district especially in Balurghat and Raiganj has also been the effect of the influx of displaced persons from across the international border.

c) Nadia district cannot be included in any of the above categories, for the variations in the percentage of urban population in the district showed rather interesting deviations from the normal trend. During 1901-41, percentage of urban population increased slowly. This is only to be expected since Nadia was considered one of the most unhealthy parts of Bengal with little potential for urban growth in the pre-independence period. There was also considerable outward migration to Calcutta and the neighbouring districts. During 1941-51, however, the percentage of urban population increased from 13.84%, in 1941 to 18.18% in 1951. This remarkable increase might be said to be the direct result of the influx of refugees after the partition of the country. Again during 1951-71 there was hardly any increase in the percentage of urban population in the district which is rather surprising since the Calcutta Urban Agglomeration covers a part of the district. It is only during the last decade that the percentage of urban population in the district showed considerable increase.
WEST BENGAL
PERCENTAGE SHARE OF URBAN POPULATION
1901-81

CALCUTTA

BIRBHUM
MURSHIDABAD

PURULIA
BANKURA

MEDINIPUR
HAORA

Figure 2 2
2.3.2. Urban population as percentage of total urban population in the State

A study of the coefficients of geographical association between percentage of state's urban population in the districts and % of state's total population in the districts (Table 2.1) shows that the values of the coefficient were low in the initial period and then increased gradually indicating that the association between the two variables in gradually becoming stronger.

A glance at table 2.2 which gives the coefficients of medial correlation, shows similar trends in that there is a significant positive association between the variables during the later decades, the highest values of the coefficient being observed during 1961. Thus a comparison of the two sets of coefficients reveals similarities though in case of the coefficient of median correlation the value of the coefficient increased abruptly during 1941-51 while in case of the coefficients of geographical association the increase has been very gradual. Another point of difference is that the highest value of the former is seen in 1961 while in the latter case the highest value is seen in 1981.

However, inspite of the differences, results obtained in both cases show that there is a positive association between percentage share of urban population in the districts and percentage share of total population in the districts, especially during the latter decades. Therefore, a detailed analysis of the former variable in the different districts of West Bengal becomes meaningful.

A study of this variable again reveals significant spatio-temporal variations within the state: It is interesting to note that in 1901 the four districts of Calcutta, Twentyfour Parganas, Haora and Hugli which include almost all the constituents of Calcutta Urban Agglomeration accounted for 76.6% of the total urban population of the state. This figure has been declining over the years and has come down to 68.28% in 1981. Calcutta contained the highest share of the state's urban population until 1971. However, the figure has been declining steadily since 1941 and the figure has come down from 45.73% in 1941 to 22.88% in 1981. The share of Twentyfour Parganas has been rising steadily and in 1981 this district contained the highest proportion of the state's
urban population. The only exception to this rising trend is seen in 1941 when the figure showed a slight decline. Among the two remaining districts the share of Haora has increased over the decades but the magnitude of the increase has been very small while Hugli district which contained 7.27% of the state's urban population in 1981 shows a slight decline from the 1901 figure of 7.78%.

Nadia, another district which is located in close proximity to the Calcutta Urban Agglomeration however, contains a very low proportion of the state's urban population. An interesting feature is that this district's share shows a declining trend till 1941 after which the figure has been rising. This is obviously an effect of the inflow of displaced persons after partition.

Among the western districts of the state, Barddhaman district is remarkable for a steady increase in the percentage since 1931. Prior to this decade however, this district's share too, showed a declining trend. This is not surprising since this district suffered from floods and epidemics of Burdwan fever and malaria. In fact between 1911 and 1921 almost every part of the district except the industrial area of Asansol subdivision suffered from heavy losses of population. The share of the three districts of Bankura, Puruliya and Medinipur which may be said to comprise one of the least urbanised areas of the state shows a considerable decline during the period under review.

The share of the northern districts in the state's urban population has always been very low. In 1901 the three districts of Koch Bihar, Jalpaiguri and Darjiling together accounted for only 2.22% of the state's urban population. However, this figure has improved to 4.95% in 1981. It must be noted that the greatest improvement is noticeable in the case of Jalpaiguri district where the figure has risen from 0.50% in 1901 to 2.15% in 1981.

Among the remaining districts, West Dinajpur which did not contain any urban centre prior to 1941 shows a steady increase in its share of urban population since that decade, the figure having increased from 0.15% in 1941 to 1.86% in 1981.
Murshidabad district with its long history of urbanisation also shows a declining share in the State's urban population over the decades. In the beginning of 18th century the town of Murshidabad in this district was an important centre of trade and commerce as well as administration. De-urbanisation of the district started with the decline of this town after the transfer of the Diwani Offices to Calcutta in 1772. The adjoining town of Quasimbazar (an important trade centre) declined in importance after a shift in the course of the river Bhagirathi. In the subsequent period growth of the new urban centre of Berhampore whose development was mainly due to the fact that it is the seat of district administration, failed to check the process of declining urbanisation in the district.

Maldah district which contains only two urban centres has always showed one of the lowest figure in this respect. Birbhum, which is another district with a low proportion of West Bengal's urban population shows an increasing trend over the decades.

With respect to the above observation the districts of the state may be divided into the following categories:

i) Districts with over 20% of the urban population of the State during the recent decades. This group includes Twentyfour Parganas and Calcutta.

ii) Districts with 7-10% of the urban population of the state. These include Barddhaman, Haora and Hugli districts. Here again it may be noted that while the percentage for Barddhaman district shows considerable improvement during the period under review (from 4.20% in 1901 to 9.84% in 1981) the figures for Hugli and Haora districts remained more or less static.

iii) Districts which contain 2-5% of the urban population of the State e.g., Jalpaiguri, Murshidabad, Nadia and Medinipur. Among these districts, Medinipur shows an overall decline during 1901-81.

iv) Districts with less than 2% of the urban population of the state. This category includes the remaining districts which are either primarily rural and economically backward districts like Puruliya.
2.3.3. **Percentage of urban population living in urban centres with a population over 20,000**

A study of this variable for each decade during 1901-81 for West Bengal as a whole reveals that a very high percentage of the State's urban population lives in urban centres with over 20,000 population. Even in 1901, more than 70% of the State's urban population lived in urban centres of this category. This high percentage is primarily an effect of the overwhelming influence of the population of Calcutta city which crossed the million mark as early as 1911. In fact in 1901 the population of Calcutta city accounted for as much as 45.18% of the State's urban population. The proportion of urban population living in urban centres of over 20,000 population has also shown an overall increase during the period under review and in 1971, the figure was as high as 88.13%. During 1981, the figure recorded a slight decline to 37.03%.

If the districtwise figures for this parameter are studied than the following trends may be noted:

1) The district of Twentyfour Parganas with a high percentage of urban population generally showed that the percentage of urban population living in urban centres with over 20,000 population were far below the figures for the State as a whole during the earlier decades. During 1941-51 the figure began to catch up with the State percentage and it was during the later decades, that is 1961-81, that the percentages rose above the state average. This is partly a result of the increasing size of the urban centres in the neighbourhood of Calcutta with the intensification of commercial and industrial activities. The growth of Calcutta proper began slowing down so that the growth began to spill over to the peripheral areas. Another major reason behind the increasing percentage of urban population in larger sized urban centres in this district is influx of refugees in the post-partition period.
Figure 2.4
which caused a sharp rise in the population size of existing urban centres and created new ones.

11) In contrast Haora district had a higher percentage of its urban population residing in urban centres of over 20,000 population than the state average in the earlier decades i.e., during 1901-51 and it was only during the later decades that the percentage has been falling steadily below the state figure. In this case the earlier trend may be explained by the fact that till 1951 this district had only two urban centres namely Haora and Bally, both of which had population sizes over 20,000. It was only during 1961 that a number of other urban centres of smaller size began to emerge.

111) Hugli district again shows a different trend in that the percentage of urban population living in urban centres with population over 20,000 was normally below the state average in the earlier decades. The figure rose above that of the state as a whole since 1941 and remained so until 1971. In the last decade however the figure fell to 85.51% which is slightly less than the state average of 87.03% for the same decade. This comparatively lower percentage is primarily a result of the inclusion of 10 new urban centres all of which have a population of less than 10,000 each.

iv) In Barddhaman district where the percentage of urban population has been growing rapidly in the recent decades, the percentage of urban population residing in urban centres of over 20,000 has been below the State figure throughout the period under review. This is not surprising since the number of small urban centres has always been comparatively higher in the district. In fact during 1981 as many as 27 new urban centres were recognised all of which belong to the category of less than 20,000 population.

v) In districts with a low proportion of urban population like Murshidabad, Purulia, Bankura and Medinipur the percentages of urban population living in urban centres over 20,000 were generally very low throughout the decades and always below the state figure. A similar trend may also be observed in Birbhum
Figure 25

WEST BENGAL
LEVELS OF URBANISATION

1941
1951
1961
1971

COMPOSITE INDEX

- above 17 (most urbanised)
- 14 to 17
- 11 to 14
- less than 11 (least urbanised)
district until 1971. In 1981 however the figure for this district rose to 91.21%. This was a reflection of the fact that 5 out of a total of 7 urban centres in the district had population sizes of over 20,000.

vi) Out of the three northern districts Koch Bihar recorded a very low percentage of urban population living in urban centres with over 20,000 population. Darjiling shows a similar trend except during 1961 and 1971 when the percentage rose above the State figure. Jalpaiguri district showed high percentages in 1941 and 1951. The figure declined steadily in the two subsequent decades but showed a considerable increase during 1981.

vii) In West Dinajpur the figure has been rising steadily in the recent decades and in 1981 the percentage was considerably above the State figure. In Maldah district the percentage has been quite high, though in the last decade it fell below the State figure. This is mainly due to the fact that there were only two urban centres in this district until 1971, one of which was considerably larger in population strength than the other and thus contained the major share of the district's urban population.

2.3.4. Composite index of urbanisation

The three parameters of urbanisation discussed above show varying spatio-temporal patterns in the state. In addition it must be remembered that a district may not show the same rank in all the criteria. While it is true that Calcutta shows a consistently high rank in all three, there are also districts like Barddhaman which ranks high in the first two out of the three criteria. Therefore a composite index of urbanisation has been developed so as to obtain an overall idea of the combined effect of all the three parameters considered above.

Analysis of the maps showing the composite index of the level of urbanisation in the districts of West Bengal during 1901-81 clearly reveals the following distinct level of urbanisation in the state:

1) Very high level of urbanisation throughout 1901-81, Calcutta with its entirely urban population falls within this category.
11) High level of urbanisation is seen in the district of Twentyfour Parganas during the last two decades.

111) Moderate level of urbanisation is seen in the Haora and Hugli districts throughout the period under review. Twentyfour Parganas also showed a moderate level of urbanisation prior to 1971. Another district which falls within this category since 1961 is Barddhaman. Among the northern districts Darjiling and West Dinajpur appear to be moderately urbanised. Jalpaiguri district showed a similar level of urbanisation during 1941-51.

iv) A low of very low level of urbanisation is seen in the remaining districts of the state and especially in Koch Bihar in the north, Birbhum, Murshidabad and Malda in the centre and Puruliya, Medinipur and Bankura in the West. It may be noted that Nadia district inspite of its close proximity to the Calcutta Urban Agglomeration showed a consistently low level of urbanisation throughout 1901-81.

2.4. CONCLUSION

A spatio-temporal analysis of the levels of urbanisation with respect to the above mentioned parameters in the districts of West Bengal reveals that there are wide disparities in the level of urbanisation over different parts of the state. The findings of the above analysis may be summarised as follows:

1) High levels of urbanisation are seen in Calcutta and in its peripheral districts. A study of the composite index of urbanisation also shows that the value of the index for Calcutta is much higher than in the rest of the districts indicating a significant breakpoint between Calcutta and the other districts. Even districts like Twenty four Parganas, Haora and Hugli with a comparatively high level of urbanisation have not been able to catch up with Calcutta during the period under review, indicating that the metropolises of Calcutta has exercised the dominant influence on the urban scene of West Bengal even towards the end of the 20th century.
ii) Barddhaman, which contains the mining-industrial region of Asansol-Durgapur, is another district which exhibits signs of rapid urbanisation and may fall within the category of highly urbanised districts in the near future.

iii) There appears to have been little change in the level of urbanisation in the remaining districts which have consistently shown low levels of urbanisation throughout 1901-81. It is only during the last decade that the districts of Darjiling and West Dinajpur seems to have moved up to a moderately urbanised category.

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