3. URBAN PROCESSES

3.1. INTRODUCTION

This chapter attempts to study the different processes that have been responsible for the accelerated pace of urbanisation in West Bengal during recent decades. Studies in urban geography have suggested various causes responsible for urban growth, foremost among these being economic development. Urbanisation is seen as a result of economic specialisation and advancing technology (Lampard, 1955). Another group of causes that have been considered to be responsible for accelerated urban growth is related to political and social change. Reissman (1964) put forward a theory of urbanisation where he presented a typology of urbanisation stated in developmental terms. He argued that all countries do not move in the same way or same direction towards urbanisation. Some countries begin with industrialisation and move towards urbanisation, others experience urban growth first and then move towards industrial development. Still others begin with the rise of nationalist ideas and move towards industrial development and urbanisation. His study laid emphasis on the importance of political and social change which have often resulted in urbanisation without industrialisation especially in the developing world.

In this analysis the processes that have been selected for study as urbanising influences in the state are migration, industrialisation and commercialisation. Migration has definitely played a very important role as an urbanising process in West Bengal. It is usually accepted as an important factor behind urban growth in any region since urban areas exert a psychological pull not only because of job opportunities created by the economic specialisation found in a city but also because of the attractions of city life. In addition, urban migration in this state also reflects influence of political factors, since West Bengal as one of the border states of the country has received large inflows of population across the borders after partition of the country in 1947 and subsequently during every political disturbance across the borders. These huge numbers of displaced people have generally shown a tendency towards
settling in and around urban areas so that migration has assumed added significance in the state as an urbanising process and is often the single most important factor behind urban growth especially in the districts of the state located along the international boundary.

The degree of industrialisation and commercialisation is obviously linked with the level of economic development which in turn may be linked with an increasing pace of urbanisation. It may be noted here that there are many different ways by which economic development may be measured but economic growth with which urbanisation is associated is usually a result of intensification of industrial and commercial activities. Therefore, these two processes have been related directly with urban population growth in the state instead of going into the complexities of suitable indices of economic development.

In the following discussion urban growth has been considered in terms of percentage decadal variation of urban population. Among the variables selected to represent the three above mentioned processes percentage variation in migration to urban areas has been considered in the first place. Percentage increase in employment in industry and percentage increase in employment in trade and commerce have also been considered as they may be considered as representative of the process of industrialisation and commercialisation in the state. The establishment of large scale industries is generally known to be more important urbanising influence than that of small scale or cottage industries. Therefore a fourth variable has been introduced in this analysis, namely, percentage increase in employment in large and medium scale industry.

The time period selected for study covers the decades 1961-71 and 1971-81. In the first place the study has been conducted at district level so as to obtain a general picture of spatial variations over the state during both decades. Secondly, a detailed analysis in terms of individual urban centres has been done. However unavailability of data for individual urban centres, on migration for both decades and for workers in industrial and commercial activities during 1971-81 has restricted analysis at urban centre level to only two of the three parameters mentioned above and for the 1961-71 decade only.
3.2. METHODOLOGY

3.2.1. Correlation analysis

Correlation coefficient may be defined as an index which measures the degree to which one data set is associated or correlated with variability in another data set. In the following analysis Pearson's product - moment correlation coefficients have been used to analyse the degree of association between the following pairs of variables:

i) Percentage growth of urban population \((y)\) and percentage growth of migrants \((x_1)\)

ii) Percentage growth of urban population \((y)\) and percentage growth of industrial workers \((x_2)\)

iii) Percentage growth of urban population \((y)\) and percentage growth of workers in large and medium scale industries \((x_3)\)

iv) Percentage growth of urban population \((y)\) and percentage growth of workers in trade and commerce \((x_4)\)

Pearson's correlation coefficient is a ratio of the extent to which two variables vary together to the overall variability in the two sets of data. Mathematically this is expressed by the formula

\[
 r_{xy} = \frac{-\sum (x-x) (y-y)}{S_x S_y}
\]

= \frac{\text{Covariance of } x \text{ and } y}{\text{Product of the standard deviation of } x \text{ and standard deviation of } y}

where \(x\) is the independent variable, \(y\) is the dependent variable and \(n\) is the number of pairs of observations.

The possible values of this coefficient lie between +1 (perfect positive correlation) through zero (no relationship) to -1 (perfect negative correlation).

The correlation coefficients thus calculated may be tested for significance by Student's 't', the value of \(t\) being found by the formula

\[
t = r \sqrt{\frac{n-2}{1-r^2}}
\]
The calculated $t$ is then tested with $(n-2)$ degrees of freedom, the significance level used being 0.05 that is 5% or 0.01 that is 1% as the case may be.

3.2.2. Maps of residuals

The degree to which two sets of data vary together and the direction of covariation is emphasised by correlation analysis. It does not, however, provide any information regarding the way in which the variables are related or the possible anomalies in the relationship or the spatial variations in the correspondence between the variables. Such information may be obtained by using the technique of regression analysis and a study of the residuals. Maps of residuals can be used to show the spatial distribution of positive and negative deviation from a relationship represented by a regression line. With this end in view, residuals have been calculated from a regression of $y$ on $x$ and a regression line of the form $y = a + bx$ has been fitted to each scatter. In each case values of $a$ and $b$ have been found out by solving the two normal equations simultaneously

$$
\sum_{i=1}^{n} y_i = n\cdot a + b \sum_{i=1}^{n} x_i \quad \ldots \ldots \quad (i)
$$

$$
\sum_{i=1}^{n} x_i y_i = a \sum_{i=1}^{n} x_i^2 + b \sum_{i=1}^{n} x_i \quad \ldots \ldots \quad (ii)
$$

The predicted value of $y$ ($y_C$) is calculated for each value of $x$ and residuals for each observation is obtained by $y_{res} = y - y_C$ and the values thus obtained have been plotted at the geographical centres of the corresponding districts and isopleths have been drawn.

It should be remembered, however that the use of regression analysis and residuals are of limited value unless there is a statistically significant correlation between the variables in question. Therefore, residuals have been calculated only for those sets of variables where the product-moment correlation coefficient is found to be statistically significant.
WEST BENGAL
PERCENTAGE VARIATION OF MIGRANTS IN URBAN AREAS

1961-71
1971-81

INDEX (in percent)

Figure 31
Prior to correlation analysis percentage variation figures for the different variables namely urban population, migrants in urban areas, industrial workers and workers in trade and commerce for the 1961-71 and 1971-81 decades have been calculated from the available census data. The results of correlation analysis at district level are given in table 3.1.

3.3. ANALYSIS

Before going into a detailed discussion on the results obtained from correlation and regression analysis it is necessary to obtain a general idea of the spatial variations of the various independent variables considered.

3.3.1. Percentage variation of migrants in urban areas ($x_1$)

During the 1961-71 decade high decadal variation in migrant population in urban areas is seen in Puruliya district in the western part of the state and in the districts of Maldah and West Dinajpur in the northern part. Negative variation is particularly noticeable in Calcutta and Haora districts. This is not surprising since both districts received large numbers of displaced persons in the post partition decade so that the percentage of migrant population in urban areas of these districts during 1961 was as high as 52.67% and 53.16% respectively. During 1961-71 however the rate of migration to Calcutta and Haora slowed down considerably and the proportion of migrants in the urban population declined.

During 1971-81 decade there is a considerable increase in the percentage of migrant population in the urban areas of the state. Calcutta appears to be the only district which recorded negative variation of migrant population. Most of the remaining districts show large percentage increases, the most remarkable increase having occurred in Jalpaiguri district where migrants in urban areas increased by as much as 76.97%. High decadal variation may also be seen in Barddhaman district in the west and the two border districts of Nadia
and Twentyfour Parganas. Darjiling is another northern district which shows comparatively high percentage variation.

3.3.2. Percentage variation of industrial workers \((x_2)\)

During 1961-71 highest figures are seen in Barddhaman and Koch Bihar districts. However, in the latter district growth was actually in cottage and small scale sector as the figures for the next variable, namely, industrial workers in large and medium scale, shows. Negative variation is seen in Maldah, Medinipur and Bankura districts. Urban centrewise breakup of the percentage variation figures during this decade shows large variations in Darjiling, in Darjiling district and Mal in Jalpaiguri district in the north. The three urban centres of Nadia district which are constituents of Calcutta Urban Agglomeration also show high variation. Similarly high figures may also be seen in some of the urban centres of Twentyfour Parganas especially in a number of residential towns located in the periphery of the Calcutta Urban Agglomeration (Nabapally and Habra) or in the immediate neighbourhood of Calcutta (Garfa, Bansdroni and others). Within the Durgapur-Asansol region, Durgapur is the only urban centre which shows high percentage variation in industrial workers. It may be noted that older coal mining and industrial towns of the area such as Raniganj and Kulti show negative variation. Another area where negative variations are particularly noticeable is Medinipur district, where except for Mahishadai, Contai and Jhargram, all urban centres show decline in the number of industrial workers during this decade. A similar declining trend is seen over most of the western districts especially in Bankura district where all urban centres recorded negative variation, Birbhum and Puruliya districts also show negative variation in a number of urban centres. However Adra, a major transport centre in this part of the state stands out as an exception since it recorded an increase of over 129%.

It may be noted here that during this decade almost every district contains urban centres showing decline of industrial workers, showing that this was a decade of industrial recession in the state.
PERCENTAGE VARIATION OF WORKERS IN LARGE AND MEDIUM SCALE INDUSTRIES

1961-71

1971-81

INDEX (in percent)
1971-81 decade shows substantial rise in the percentage of industrial workers in the urban areas of the state. Over 100 per cent increase may be seen in a number of districts including Jalpaiguri, Malda, Murshidabad, Nadia and Medinipur. Most of the remaining districts show moderate to high growth figures indicating considerable development of industrial activities in the state during this decade.

3.3.3. Percentage variation of workers in large and medium scale industries ($x_3$)

Percentage variation figures for this variable for 1961-71 in the different district provide further evidence of limited industrial developmental in the state during this decade. Even Barddhaman district where the large public sector steel plant had been established during the Second Five Year Plan period (1956-61) recorded a rise of only 28%. Many of the remaining districts such as Medinipur, Bankura, Purulia and others show negative variations. Even Haora which is traditionally considered to be an industrialised district recorded a negative growth of -1.64%.

It may be noted in this context that the correlation coefficient obtained for urban population growth in respect to this variable was not statistically significant; therefore, an urban centre level breakup of percentage variation of this component of industrial workforce has not been provided.

Remarkable changes appeared to have occurred during 1971-81 decade when majority of the districts recorded large increase in the number of workers engaged in large and medium scale industries. This trend is in keeping with the picture provided by the previous variable. The most remarkable feature that emerges during this decade is the tremendous increase experienced by the districts of North Bengal. In comparison, southern part of the state shows spectacular increase only in Medinipur district where this growth may be associated with the development of Haldia as an industrial centre (oil refining, fertiliser and proposed petro-chemical complex) and a feeder port to Calcutta. Substantial increase is also noticeable in Murshidabad and Nadia districts in the east central parts of West Bengal.
PERCENTAGE VARIATION OF WORKERS IN TRADE AND COMMERCE

Figure 35
3.3.4. Percentage variation in workers in trade and commerce ($x_4$)

The 1961-71 decade shows highest percentage growth in workers in trade and commerce in West Dinajpur district. The adjoining Malda district and Twentyfour Parganas in the south also show comparatively large increase in this component of their workforce in urban areas showing that considerable commercial activity was being carried out in these districts. It may also be seen that least growth occurred in Medinipur and Birbhum districts.

A detailed urban centrewise breakup of this variable shows very high percentage increase in Balurghat in West Dinajpur district, Kalyani in Nadia district, Durgapur and Chittaranjan in Barddhaman district. Kalyani emerged as an urban centre for the first time in 1961 and was built as a planned residential satellite to Calcutta. Chittaranjan and Durgapur are both planned urban centres associated primarily with the establishment of heavy industries (Chittaranjan Locomotive Works in the former and the Durgapur Steel Plant and other industries in the latter). Both urban centres have showed remarkable development in their commercial sector probably in order to cater to the needs of the various personnel of the industrial units. Balurghat in West Dinajpur also emerged as an important commercial centre in North Bengal.

High percentage variation may also be noticed in some towns located in the periphery of Calcutta city, as for example, Garfa, Jadavpur and Bansdroni. During this decade these areas were being developed as residential suburbs as land shortage began to be an acute problem in Calcutta proper and more and more people began to move to the outskirts. Commercial activities began increasing as a result of the requirements of the increasingly large numbers of residential population.

Negative variations may be seen in some urban centres of which the most noticeable ones are Ramjibanpur, Chandrakona and Khirpai in Medinipur district. Decline of workers in trade and commerce also occurred in some of the urban centres of Barddhaman district, especially in older mining and industrial towns like Burnpur, Outer Burnpur, Kulti, Niamatpur, Dishergarh and others.
WEST BENGAL

"PERCENTAGE VARIATION
OF WORKERS IN TRADE AND COMMERCE
IN THE URBAN CENTRES
1961-71"
Within the Calcutta Urban Agglomeration negative variation may be seen in some of the urban centres of Haora district. Old urban centres like Rajpur and Jaynagar-Majilpur in the southern part of Twentyfour Parganas district also show decline of workers in trade and commerce.

During the next decade there appears to have been a substantial rise in the percentage of workforce employed in trade and commerce in the urban areas of the different districts of the state. This is especially noticeable in the districts of Northern Bengal where Darjiling, Jalpaiguri and West Dinajpur show remarkable percentage increase in this component of the urban workforce. Calcutta is the only district which show a small amount of decline in this variable. All other districts including comparatively backward ones like Puruliya and Bankura show moderate to large percentage growth.

**Table 3.1. Correlation: % Decadal variation in urban population and the different independent variables**

<table>
<thead>
<tr>
<th>Independent variables (x)</th>
<th>Dependent Variable (y)</th>
<th>Decadal Variation in Urban Population(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Decadal Variation in Migrants (X₁)</td>
<td>i)</td>
<td>+0.65</td>
</tr>
<tr>
<td></td>
<td>ii)</td>
<td>+0.79</td>
</tr>
<tr>
<td>% Decadal Variation of Industrial Workers (X₂)</td>
<td>i)</td>
<td>+0.53</td>
</tr>
<tr>
<td></td>
<td>ii)</td>
<td>+0.57</td>
</tr>
<tr>
<td>% Decadal Variation of Workers in Large &amp; Medium Scale Industries (X₃)</td>
<td>i)</td>
<td>+0.34</td>
</tr>
<tr>
<td></td>
<td>ii)</td>
<td>+0.50</td>
</tr>
<tr>
<td>% Decadal Variation of Workers in Trade and Commerce (X₄)</td>
<td>i)</td>
<td>+0.64</td>
</tr>
<tr>
<td></td>
<td>ii)</td>
<td>+0.83</td>
</tr>
</tbody>
</table>

i) denotes correlation coefficient for 1961-71
ii) denotes correlation coefficient for 1971-81
* significant at 5% level
WEST BENGAL
CORRESPONDENCE BETWEEN PERCENTAGE VARIATION OF URBAN POPULATION AND PERCENTAGE VARIATION OF URBAN MIGRANTS

1961-71

1971-81

RESIDUALS

+20
+10
0
-10
-20

Figure 37
3.3.5. Correspondence between percentage growth of migrants ($x_i$) and percentage growth of urban population ($y$)

A glance at the correlation coefficients calculated for these variables (Table 3.1) shows that there is a positive relationship between percentage growth of urban population and percentage variation of migrants in the districts of the state for both 1961-71 and 1971-81, though a stronger relationship appeared to exist during the latter decade. Since both correlation coefficients are statistically significant regression analysis has been employed and regression equations computed. These are $y_c = 31.92 + 0.5x_1$ and $y_c = 14.7 + 0.64x_1$ for 1961-71 and 1971-81 respectively. Next, residuals have been calculated and maps prepared. In the maps the zero lines indicate perfect correspondence between the variables and the darker shading indicates less correspondence while lighter shading indicates more correspondence.

The map for 1961-71 shows that a number of zero lines (denoting perfect correspondence between the variables) occur over West Bengal. Three such lines are seen over the northern half of the state, one passing through the western part of Koch Bihar and south eastern part of Jalpaiguri district, another over southern part of Darjiling district and third running through Maldah district. Over the southern half of the state a zero line is seen over the central part and another over the southern part of Twentyfour Parganas district.

Over greater parts of West Bengal negative residuals predominated indicating that during this decade actual growth of urban population is less than that predicted in terms of percentage variation of migrants. The amount of negative residual, however, ranges between low to moderate. Exceptions to this are the districts of West Dinajpur and Barddhaman where large amounts of positive residual are seen.

In 1971-81, the situation appears to have changed quite dramatically. One line of perfect correspondence is seen to occur over the eastern part of West Bengal. To the east and north of this line positive residuals occur with the highest values being found over Jalpaiguri district. This is hardly surprising since this district experienced a very high rate of urban growth both in terms of increase in the number of urban centres as well as urban population and this tremendous growth
WEST BENGAL
CORRESPONDENCE BETWEEN PERCENTAGE VARIATION OF URBAN POPULATION AND PERCENTAGE VARIATION OF INDUSTRIAL WORKERS

1961-71

1971-81

RESIDUALS

+30

+20

+10

0

-10

-20

Figure 38
cannot be explained in terms of increase in migration only. To the west and south of the zero line negative residuals are seen. Highest negative residuals are found over Bankura district and may be explained by the fact that percentage of urban population growth was rather low (19.45\%) during this decade and the number of urban centres too remained static.

Another line of perfect correspondence is seen over the southern part of Medinipur district. To the south of this line there is a zone of low to moderate positive residual.

3.3.6. Correspondence between percentage growth of industrial workers ($x_2$) and percentage growth of urban population ($y$)

Correlation analysis reveals a significant positive correlation between the two variables for both decades. Residual maps have been prepared on the basis of the computed regression equations which are computed to be $y_c = 29.02 + 0.54x_2$ and $y_c = 24.54 + 0.23x_2$ for 1961-71 and 1971-81 respectively.

During 1961-71 a line of perfect correspondence is seen over the northern part of West Bengal passing through the southern parts of Darjiling, Jalpaiguri and Koch Bihar districts. To the north of this line low to moderate negative residuals are seen. Another zone of negative residuals is found over the districts of Birbhum and Murshidabad continuing in a long narrow belt over the greater part of the districts of Nadia, Hugli, Haora, the whole of Calcutta and the western part of Twentyfour Parganas. High negative values may be seen over Calcutta where percentage urban growth during this decade is only 7.57\%. Over the rest of the area positive residuals may be seen. The largest amount of positive residual occurs over the district of West Dinajpur.

A detailed picture of the correlation between these two variables is provided by an urban centre level analysis. The value of the correlation coefficient is worked out to be +0.47. Student's 't' has been computed and found to be 7.104 and therefore the coefficient is significant at 0.01 level. The regression equation has therefore been computed and is $y_c = 27.12 + 0.43x$. Residuals have been computed and a study of these residuals shows extremely high positive values in some of the urban centres including Durgapur in Barddhaman district, Kalyani
WEST BENGAL
CORRESPONDENCE BETWEEN PERCENTAGE GROWTH OF URBAN POPULATION AND PERCENTAGE GROWTH OF INDUSTRIAL WORKERS 1961-71

RESIDUALS
above +100
+50 to +100
+25 to +50
0 to -25
-25 to 0
less than -25

Figure 39
in Nadia district and Jadavpur in Twentyfour Parganas. The last two are constituents of Calcutta Urban Agglomeration and recorded rapid growth as residential towns while the former city showed tremendous growth after the establishment of the steel plant and allied industries there. Interestingly enough this city shows positive residuals with respect to percentage variation of industrial workers showing that industrial development has been outpaced by population growth.

High positive residuals are noticeable in Balurghat in West Dinajpur district and Mahisadal in Medinipur district. In the three northern districts most of the urban centres show low residuals. Dhupguri in Jalpaiguri district is the only exception with comparatively high positive residual. Darjiling district shows negative residuals (indicating less than expected population growth in respect to this variable) in all urban centres except Siliguri which, however, shows more than expected population growth.

Interestingly enough, high negative residuals are seen in two urban centres of Barddhaman, a district which, as has been shown earlier, is characterised by high positive residual with respect to this variable. Low residuals may also be seen in a number of urban centres of Haora district where urban growth has obviously not kept pace with industrial growth.

During 1971-81 the trend of the zero lines appears to have changed quite substantially. Two such lines pass through the southern parts of the state enclosing a zone of positive residual over Barddhaman district and the greater part of Hugli district. The amount of positive residual over this part of Barddhaman ranged to over +20 compared to less than -10 with respect to percentage variation in the number of migrants during the same decade. Two other lines of perfect correspondence are found, one passing through southern part of West Dinajpur and the other through Koch Bihar. These two lines enclose a zone of positive residuals with highest values occurring over Jalpaiguri district. It may be remembered that a very similar picture is seen in figure 3.7 where urban growth has been related to migration.
WEST BENGAL
CORRESPONDENCE BETWEEN
PERCENTAGE VARIATION OF
URBAN POPULATION AND
PERCENTAGE VARIATION OF
WORKERS IN LARGE AND
MEDIUM SCALE INDUSTRIES
1971-81

Figure 3.10
Over the rest of the state low to moderate negative residual are seen. Calcutta and its immediate neighbourhood are the only exceptions. Here value of the negative residuals ranges to over -20, a situation very similar to that in 1961-71.

Correlation coefficients have also been calculated for percentage growth of workers in large and medium scale industries (x₃) and percentage growth of urban population (y). Table 3.1 shows that while positive correlations have been obtained for both decades, only the coefficient for 1971-81 is statistically significant at 5% level. Therefore, the residual map has been prepared for the latter decade only. The regression equation obtained is \( y = 29.48 + 0.1x_3 \). A glance at figure 3.10 shows that the picture is more or less similar to that obtained with respect to the earlier independent variable (x₂). The only notable difference is the presence of large amount of negative residuals over parts of Bankura and Murshidabad districts showing that among the variables considered large scale industrialisation has the least influence on the growth of urban population in these two districts.

3.3.7. Correspondence between percentage growth of workers in trade and commerce (x₄) and percentage growth of urban population (y)

Statistically significant correlation coefficients have been obtained for the variables for both decades, showing positive relationship between them. The regression equations are computed to be \( y = 16.39 + 0.83x_4 \) for 1961-71 and \( y = 11.84 + 0.66x_4 \) for 1971-81.

The residual map for 1961-71 shows that there are three zero lines in the southern half of the state, one passing through Medinipur district, another though Twentyfour Parganas and the third enclosing a zone of positive residuals over the districts of Birbhum and Barddhaman. Two other lines of perfect correspondence occur over northern boundaries of West Dinajpur district which is characterised by positive residual. Another zero line is seen to occur over the extreme north, running north-south through the centre of Jalpaiguri district. Positive residuals occur to the east of this line and negative residuals to the west. High positive residuals are again seen over Barddhaman.
WEST BENGAL

CORRESPONDENCE BETWEEN PERCENTAGE VARIATION OF URBAN POPULATION AND PERCENTAGE VARIATION OF WORKERS IN TRADE AND COMMERCE

1961-71

1971-81

RESIDUALS

Figure 3.11
district. A zone of high negative residuals is centred over Calcutta. The western part of Puruliya district is also characterised by residuals of over -20.

Urban centre level analysis for this decade also shows statistically significant and extremely high positive correlation between the variables, the value of the coefficient being 0.90. Residuals have therefore been computed on the basis of the regression equation $y_c = 20.05 + 0.62x_4$.

A study of the residual map of urban centres (Figure 3.12) shows that North Bengal is generally characterised by low residuals, only exception being Balurghat in West Dinajpur. Darjiling district is once again characterised by negative residuals in all urban centres except Siliguri. The constituents of the Calcutta Urban Agglomeration normally show low residuals. There are however, some exceptions like Kalyani, Garfa and Nibra which show high positive residuals. It is interesting to note that a number of urban centres in western Barddhaman show negative residuals. Surprisingly enough these include Durgapur which showed extremely high positive residual with respect to $x_2$.

Figure 3.11 shows that during 1971-81, the trend of the zero line over the central part of the state changed considerably. It encloses, besides Barddhaman, considerable portions of Murshidabad and Nadia districts. The last two districts show negative residuals during the earlier decade. A notable difference is seen in West Dinajpur where the amount of residual has changed from over +10 in 1961-71 to below -10 in 1971-81. This is probably due to the fact that percentage increase in commercial employment is much greater during 1971-81 compared to 1961-71 while the reverse is true with regard to percentage urban population growth.

3.3.8. Growth of urban population as a function of migration, industrialisation and commercialisation: a comparison

A comparison of the results of correlation and regression analysis with respect to the different independent variables considered reveals the following facts during the two decades under review.
WEST BENGAL
CORRESPONDENCE BETWEEN PERCENTAGE GROWTH OF URBAN POPULATION AND PERCENTAGE GROWTH OF WORKERS IN TRADE AND COMMERCE 1961-71

RESIDUALS

KEY TO INSET A

1 Keenkur
2 Illampur
3 Meherpur
4 Anand
5 Junghat
6 Barrakpur
7 Ganakhal
8 Haripura
9 Sarangpur
10 Baraltog
11 Barrakpur
12 Fort Dacca
13 Luktara
14 Bunkers
15 Nagpur and Solapur
Government Colony

16 Nabaghar
17 North Barrackpur
18 Barrackpur Cantonment
19 Punchli
20 North Dum Dum
21 Ranchi
22 Barrackpur
23 Madhyamgram
24 New Barrackpur
25 Dum Dum
26 Auroon
27 Panchur
28 Garden Reach

1961-71
Mai
Domhoni
WEST BENGAL

Figure 3.12
1961-71

i) This decade shows positive residuals over Barddhaman indicating greater than expected growth of urban population with respect to all the independent variables but the amount of residual is least with respect to $x_2$ (percentage growth of industrial workers) indicating that during this decade urbanisation in this district is primarily a result of industrialisation. This is not surprising since the establishment of heavy industries such as the Hindusthan Cable Factory, Chittaranjan Locomotive Works, steel plants including the public sector one at Durgapur and many others are primarily responsible for the growth of urban centres in this region. A comparison of the residuals obtained for $x_2$ and $x_4$ for Durgapur city shows that there is greater correspondence between percentage growth of urban population and percentage growth of workers in trade and commerce ($x_4$) than with the other independent variable ($x_2$). Census figures show that inspite of the fact, that emergence of this urban centre is related to the establishment of the steel plant and associated industries, % growth of residual workers during 1961-71 is 103.74% while that of workers in trade and commerce is 652.57%.

ii) Positive residuals with respect to all independent variables are also seen over West Dinajpur but here the lowest residual is seen with respect of $x_4$ (percentage variation of workers in trade and commerce) indicating that growth of commercial activities is the most significant factor behind urban growth in the district. Next lowest value is seen with respect to percentage growth of migrants showing that it is also responsible to some extent for urban growth. Highest values of residuals (over +30) are seen with respect to the remaining independent variable, thus showing that industrialisation is the least important among the parameters selected to explain urban growth in the district. This is only to be expected since most of the urban centres of this district are trade centres for surrounding rural areas and there is hardly any significant industrial unit.
i11) Calcutta, which shows the highest level of urbanisation in the state, shows negative residuals with respect to all the independent variables, indicating that population growth has been less than that expected in terms of these variables during this decade. Value of the negative residuals are particularly high (over -20) with respect to two of the three variables considered, namely, percentage growth of industrial workers and percentage growth of workers in trade and commerce. Lowest value of residual is seen with respect to variable $x_1$ indicating that this variable exerts the most significant influence on urban growth in the district. This may be related to the attractions of Calcutta as the leading metropolis of eastern India. It is an established fact that once a large city is created it exerts a pull in terms of the various facilities it offers and thus continues to grow. In spite of its many problems which has slowed down the population growth rate, the attractions that Calcutta still offers in terms of labour and capital, existing amenities and infrastructures still continue to attract people. In addition, political factors are also responsible for the large proportion of migrant population in the city, since large numbers of displaced people, received in the state after partition settled in and around Calcutta; as for example, according to the 1961 census more than 50% of Calcutta's population was born out of the place of enumeration.

iv) In contrast Twentyfour Parganas, a district with a comparatively high level of urbanisation shows positive residuals with respect to all three variables, the value being highest in the case of $x_1$. Low positive residuals may be seen with respect to the remaining variables showing that the industrial and commercial developments are important influences behind urban growth.

v) Haora and Hugli, two other districts where a number of important constituents of the Calcutta Urban Agglomeration are located, show low negative residuals with respect to variables $x_2$ and $x_4$ and low positive residuals with respect to $x_1$, showing that slightly less than expected growth occurred in terms of industrial and commercial growth but slightly more than expected growth with
respect to migration. Low values of residuals thus show that urban growth in the district may be explained quite satisfactorily in terms of these variables.

vi) Districts characterised by low levels of urbanisation like Bankura, Puruliya and Medinipur show similar trends with respect to variables $x_1$ and $x_2$, all three being characterised by negative residuals in the former case and positive residuals in the latter. With respect to the remaining variables Puruliya and Bankura show negative residuals while Medinipur shows positive residual. It may be noted here that while Bankura and Medinipur are characterised by low residuals indicating that the urban growth may be explained quite satisfactorily in terms of the independent variables selected for analysis, Puruliya shows large amounts of negative residuals especially with respect to $x_4$. Surprisingly enough, lowest residual is seen in the case of $x_2$ showing close correspondence between urban growth and industrial development in this economically backward district. However, the residual map for urban centres shows negative residuals with respect to this variable in most of the urban centres of the district, the value of the negative residual being quite high in Adra. Therefore, it is possible to conclude that the low positive residual, seen for the district as a whole, is a result of the inclusion of the population of two new urban centres in the district during 1971 census.

vii) Birbhum, another district with a low level of urbanisation shows low residuals with respect to all the independent variables.

viii) Two border districts of Murshidabad and Nadia with their long urban history but relatively low level of urbanisation at present show negative residuals with respect to all three independent variables. It may be noted here that in terms of lowest residuals, percentage growth of workers in trade and commerce and percentage growth in the number of migrants emerge as the most important urbanising influences in Murshidabad and Nadia districts respectively.
ix) Among the northern districts of the states, Darjiling shows negative residuals irrespective of the variable concerned and lowest values may be noted with respect to percentage increases in migration. Jalpaiguri district shows low residuals with respect to all three independent variables but the amount of residuals is quite high over Koch Bihar which show high negative residual with respect to \( x_2 \) and high positive residual with respect to \( x_4 \). It may also be noted that lowest residuals in all three districts are seen with respect to \( x_1 \) showing that migration has a significant influence on urban growth in this part of the state. Maldah district show lowest residual with respect to \( x_2 \) showing that growth of industrial activities has the closest correspondence with urban growth in this district.

1971-81

As already noted earlier, there appears to be considerable changes in the situation during 1971-81. The trends noticeable during this decade are:

1) Highest residuals generally occur over the northern districts. Jalpaiguri which records highest residuals is the most remarkable in this respect and the high residuals indicate that the independent variables selected here are not sufficient to explain urban growth in this district, where urban population growth in 1971-81 is much greater than expected.

11) Over West Dinajpur district extremely high values of residuals are no longer seen to occur and this may be said to be a result of much lower urban growth in the district during this decade. Interestingly enough, this decade shows lowest residuals with respect to \( x_2 \) and \( x_4 \) showing that during 1971-81 urban growth has comparatively close correspondence with industrial and commercial developments. However, the type of industrial activity associated with urban growth is mostly of the small scale nature as is proved by the comparatively high residual for \( x_3 \).

111) During this decade Maldah and Murshidabad districts which
experienced some industrial expansion centred around Farakka Barrage Township situated on the borders of the two districts, showed negative residuals in terms of variable $x_2$ indicating that industrial growth has outpaced urban growth in these two districts. The amount of negative residual is particularly noticeable over Murshidabad district with respect to $x_3$, showing considerable development of large scale industries in this district. Low positive residuals may be noticed with respect to the remaining variables showing close correspondence between urban population growth and commercial growth and migration in both districts.

iv) Nadia district, which during earlier decade showed negative residuals in all cases, is characterised by low positive residuals during 1971-81 indicating that the urban growth in the district may be explained equally by the independent variables considered.

v) There is hardly any change in the situation regarding Calcutta which is still characterised by negative residuals, the highest values of which are seen with respect to $x_2$ and $x_3$ and lowest with respect to $x_1$ and $x_4$ once again showing that migration and commercial activities are the most significant influence on its continuing growth.

vi) There are some changes in the district of Twentyfour Parganas during this decade. In the earlier decade this district showed greater than predicted growth of urban population irrespective of the variable considered, but during this decade moderately high negative residuals are seen to occur with respect to $x_1$ and $x_4$ showing that urban growth is less than that predicted in terms of these variables. It may be noted here that considerable increase in the percentage decadal variation of all variables may be seen during this decade, especially in the two mentioned above and percentage figures increased from 8.45 and 30.21 in 1961-71 to 59.19 and 59.22 in 1971-81 respectively.

vii) The degree of correspondence between urban growth and the independent variables in Haora and Hugli districts remained similar,
in that both districts show low residuals in all cases. However, there are some changes; as for example, negative residuals may be seen with respect to $x_1$ in both districts, the same variable having shown positive residuals in the earlier decade.

viii) The western districts of Birbhum, Puruliya and Bankura show negative residuals with respect to all the variables and value of the negative residuals are especially high over Bankura, showing that urban population growth is much less than that predicted by the independent variable concerned. Medinipur district also shows less than expected growth of urban population in all cases except $x_1$ where moderately high positive residuals are seen to occur. Lowest values of residuals are seen with respect to $x_3$ and $x_4$ showing that during this decade industrial expansion and development of commercial activities are closely associated with urban growth in the district.

ix) Barddhaman district is still characterised by high positive residuals with respect to all independent variables except $x_1$. The latter variable, however, shows low negative variations indicating close correspondence between this variable and urban growth on the one hand and slightly faster rate of increase of migrant population than urban population growth on the other.

3.4. CONCLUSION

On the basis of the above analysis the following conclusions may be drawn:

1) Correlation analysis reveals quite clearly that during both decades growth of urban population in West Bengal has been influenced significantly by the processes of migration and commercialisation. During the earlier decade industrial growth, especially growth of medium and large scale industries, played a very minor role as an urbanising influence in the state. However, during the latter decade the importance of industrialisation as an urbanising process increased significantly.
ii) Analysis of the maps of residuals reveals the following trends:

a) In Barddhaman district the actual growth of urban population is always greater than the one predicted irrespective of the independent variable under consideration, only exception to this is provided by figure 3.7B where the district is characterised by a low negative residual, indicating that a more or less satisfactory prediction has been made in terms of migration for this decade.

b) West Dinajpur is another district which shows high positive residuals during 1961-71 denoting greater than expected growth of urban population. However during 1971-81 the district is mostly characterised by low to moderate residuals showing that during this decade urban growth has close correspondence with the variables under consideration.

c) The south eastern part of the state, especially Calcutta and its immediate neighbourhood, is mostly characterised by negative residuals and the amount of residual is sometimes quite high. This is only to be expected since growth of urban population in the entirely urban Calcutta district has slowed down considerably in comparison to the other districts of the state.

d) Districts, with high levels of urbanisation, like Haora and Hugli show low residuals indicating that there is close correspondence between population growth and variables considered during both decades. In contrast, Twentyfour Parganas, also a district with a high level of urbanisation, show moderately large negative residuals with respect to $x_1$ and $x_4$ in 1971-81 and large positive residual with respect to $x_1$ in 1961-71. Thus, low residuals for the remaining independent variables seem to indicate that industrial growth corresponds more closely to urban growth in the district.

e) Less than excepted growth of urban population or negative residuals are usually found to occur over the two western districts of the state, namely, Puruliya and Bankura.
f) During 1971-81 high positive residuals over Jalpaiguri district in the north indicate an accelerated pace of urbanisation that cannot be explained only in terms of the independent variables under consideration.

g) Elsewhere over the state, the picture changed depending upon the independent variable considered and also the decade under review.

REFERENCES


