CHAPTER - V
In Chapter III, we have analysed the growth of public expenditure on health programmes and development of medical infrastructure in the State of Assam. In this chapter our main objective is to analyse how, on account of the governmental efforts, medical infrastructure developed in the post-independence period. The medical infrastructure comprises of the medical institutions like hospitals, dispensaries, beds etc. and medical personnel, like doctors, nurses, midwives, auxiliary nurse-midwives, health visitors, dhais etc. The efficiency of the medical infrastructure is judged on the basis of the number of population served by them together with the area they cover. It is obvious that in cases when the number of population served by them is too large or/and the area covered by them is too large, their efficiency declines. In a populous State like Assam a sizeable load of population on the medical infrastructure is expected, but if this load declines through time, it may be concluded that their efficiency increases.

1. Government Hospitals

In 1950-51 there were 40 hospitals (government) in Assam. To this, three hospitals were added during the 1st
plan period. By 1960-61, 51 hospitals were there in the State. During the third 5 year plan this number increased to 64 and by 1967-68 this number increased to 73. With the separation of Meghalaya and Mizoram from Assam, the present state of Assam was left with only 54 hospitals in 1972 and till 1978-79 *nothing* one hospital could be added to this figure. However, during 1979-81 one hospital was set up to make the total number of hospitals in the State at 55.

In 1950-51, the area served by a government hospital was 2,490 Sq. kilometers. By the end of the 1st 5 year plan, this figure declined to 2,317 Km². By the end of the 2nd 5-year plan it further decreased to 1953 Km². In 1966, this figure was at 1556 Km². The area served by a hospital in the State further dropped down to 1454 Km² in 1972. After 1972, till 1979, the area remained more or less constant. However, it dropped down to 1267 Km² in 1981.

To analyse the trend in the decline of area served by a hospital in the State we have fitted three curves. They are:

\[ \hat{AH} = 2472.407 - 39.835 \, t; \quad R^2 = 0.793, \, n = 31. \]
\[ (37.19) \quad (10.99) \]

\[ \hat{AH} = 2609.002 - 64.685 \, t + 0.777 \, t^2; \quad R^2 = 0.807, \, n = 31. \]
\[ (26.01) \quad (4.48) \quad (1.77) \]

\[ \hat{AH} = 2674.09 - 87.288 \, t + 2.515 \, t^2 - 0.036 \, t^3 \]
\[ (18.63) \quad (2.28) \quad (0.91) \quad (0.64) \]

\[ R^2 = 0.803, \, n = 31. \]
(Figures in brackets are Student's t values; This convention will be maintained hereafter).

Where $A_H$ is the Area (in Km$^2$) served by a government hospital, $t$ is time (1 for 1951 .... 31 for 1981).

It is indicated by the value of $R^2$ and student's t values associated with the coefficients that the linear curve is quite well fitted, suggesting that the area served by a hospital decreased steadily at the rate of 39.84 Km$^2$ per year.

In 1950-51, population served by a hospital was 205.6 thousand which, however increased to 271.9 thousand in 1976 and 282.0 thousand in 1981, and thus every year about a load of 2.5 thousand people per hospital increased. These figures show that during 1951-81 growth of population was more rapid than the growth of the hospitals in the State leading to an increased load of population on the medical infrastructure, or alternatively, enough number of hospitals were not set up to keep up the pace with the growth of population in the State.

2. **Government Dispensaries**

   In 1950, the number of government dispensaries in Assam was 176. In the terminal year of our analysis (1981) the number increased to 435. The table given below gives us
the number of dispensaries, area served per dispensary and population served per dispensary in the 1st Five Year Plan onwards.

Table 5.1: Number of government dispensaries, area and population served by a dispensary in Assam.

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</thead>
<tbody>
<tr>
<td>No. of dispensaries</td>
<td>176</td>
<td>299</td>
<td>651</td>
<td>701</td>
<td>392</td>
<td>411</td>
<td>435</td>
</tr>
<tr>
<td>Area served by a dispensary in Sq. Km.</td>
<td>566</td>
<td>333</td>
<td>153</td>
<td>142</td>
<td>200</td>
<td>191</td>
<td>181</td>
</tr>
<tr>
<td>Population served by a dispensary (in 1000)</td>
<td>46.74</td>
<td>27.51</td>
<td>17.05</td>
<td>15.84</td>
<td>38.16</td>
<td>36.38</td>
<td>35.00</td>
</tr>
</tbody>
</table>

A perusal of the table 5.1 reveals that during the period 1950-71 number of dispensaries increased rapidly and the load of population and area to be served by a dispensary declined with a great speed. However, after the division of Assam, a good number of dispensaries, much more than commensurate with the population and area, went in Mizoram and Meghalaya. As a result, we see that in 1972 the area served by a dispensary and population served by a dispensary increased substantially. Since 1972 the pressure of population and area to be served by a dispensary could not be lessened to any significant extent.
To analyse the trend in the decline of area served by a dispensary in the State during 1950-81 period we have fitted three curves as follows.

\[
\hat{AD} = 377.392 - 8.328 t ; \quad R^2 = 0.38, \quad n = 31. \\
(11.32) \quad (4.58)
\]

\[
\hat{AD} = 541.640 - 38.192 t + 0.933 t^2 ; \quad R^2 = 0.73, \quad n = 31. \\
(15.74) \quad (7.71) \quad (6.21)
\]

\[
\hat{AD} = 696.052 - 91.881 t + 5.062 t^2 - 0.086 t^3 \\
(26.34) \quad (13.05) \quad (9.99) \quad (8.25)
\]

\[
R^2 = 0.92, \quad n = 31.
\]

Where AD is Area (Km\(^2\)) served by a dispensary. Among these trends the last one (Cubic curve) fits best to the data as judged on account of the value of \(R^2\) and the t values associated with the coefficients.

3. Doctors

Doctors deserve the most important position among the health personnel. In Assam, the number of doctors with the beginning of the plan period (1950-51) was 2423 which increased to 8000 in 1981. The following table provides us with the figures how doctors, area served by a doctor, and population served by a doctor have undergone changes in the period 1950-1981.
Table 5.2: Number of Doctors, area and population served per doctor in Assam

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>No. of doctors</td>
<td>2423</td>
<td>2998</td>
<td>3608</td>
<td>4245</td>
<td>5676</td>
<td>6884</td>
<td>8000</td>
</tr>
<tr>
<td>Area served (Km$^2$)</td>
<td>41.11</td>
<td>33.23</td>
<td>27.61</td>
<td>23.47</td>
<td>13.83</td>
<td>11.41</td>
<td>9.81</td>
</tr>
<tr>
<td>Population per doctor (1000)</td>
<td>3.40</td>
<td>2.74</td>
<td>3.08</td>
<td>2.62</td>
<td>2.64</td>
<td>2.17</td>
<td>2.20</td>
</tr>
</tbody>
</table>

We have fitted three curves to analyse the growth of doctors in the State of Assam during 1950-81 period. These curves are given below.

$$\hat{DR} = 1948.120 + 166.384 \ t; \ R^2 = 0.956, n = 31.$$  
(18.04)  (23.79)

$$\hat{DR} = 2552.086 + 36.963t + 4.793t^2; \ R^2 = 0.994, n = 31.$$  
(41.84)  (3.55)  (12.81)

$$\hat{DR} = 2283.943 + 145.985t - 5.113t^2 + 0.245t^3; \ R^2 = 0.998.$$  
(56.591)  (11.49)  (4.72)  (9.27)  n = 31

where \( \hat{DR} \) is the number of doctors in Assam.

Similarly, we have fitted three curves to analyse how area served per doctor has declined over time in Assam. The curves are given below.
ADR = $40.5^{49} - 1.127t$; $R^2 = 0.986$, $n = 31$  
\( (99.11) \) \( (42.54) \)

ADR = $40.5^{23} - 1.121t - 0.0002t^2$; $R^2 = 0.985$, $n = 31$  
\( (61.50) \) \( (9.97) \) \( (0.05) \)

ADR = $42.58 - 1.958t + 0.076t^2 - 0.002t^3$;  
\( (56.99) \) \( (8.33) \) \( (3.78) \) \( (3.84) \)  
$R^2 = 0.991$, $n = 31$

where ADR is Area (Km²) served per doctor.

The trend curves fitted to analyse the rate of decline in population served by a doctor are given below:

PDR = $3068.87 - 30.161t$; $R^2 = 0.446$, $n = 31$  
\( (31.53) \) \( (4.79) \)

PDR = $3180.6^{44} - 54.113t - 0.887t^2$; $R^2 = 0.443$, $n = 31$  
\( (20.68) \) \( (2.06) \) \( (0.94) \)

PDR = $3479.5^{15} - 175.630t + 11.929t^2 - 0.273t^3$; $R^2 = 0.508$  
\( (16.79) \) \( (2.69) \) \( (2.15) \) \( (2.01) \)  
$n = 31$

where PDR is population served per doctor.

If we compare the curves of ADR and PDR we find that in both cases the cubic equation is a better fit. However, in case of ADR, the explanatory power of the cubic curve is very high ($R^2 = 0.991$) while in case of PDR the explanatory power of the curve is rather low ($R^2 = 0.508$).
4: Nurses

Of all the auxiliary medical personnel, nurses occupy the top position. Their contribution to general health is magnificent. Life of a sick person/patient in the hospital largely depends on the efficiency of nurses. They may take a responsible role in preventing diseases. The activities of a nurse are not confined within a hospital or a dispensary, but also have a broad field outside these medical institutions, and thus their contribution to keep up the health of the people in general is great.

The total number of nurses in Assam during 1950-51 was 263. In 1955-56 it increased to 428 and by 1960-61 it recorded at 900. The growth rate kept pace with the growing population in the State and in 1965-66 the number of nurses increased to 1464. The division of Assam did not affect the growth in the number of nurses. In 1972-73 it became 1888 and by 1981 the number well over 2,6 thousand. The area and population served per nurse declined over time.

The following table presents how the number of nurses increased with time and the hospital beds and the population served by them reduced in 1950-81 period.
Table 5.3: Number of nurses, hospital beds and population served by a nurse in Assam

| Year | 1950 | 1955 | 1960 | 1964 | 1971 | 1975 | 1980-
<table>
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</tr>
</thead>
<tbody>
<tr>
<td>No. of nurses</td>
<td>263</td>
<td>428</td>
<td>900</td>
<td>1464</td>
<td>1835</td>
<td>2044</td>
<td>2650</td>
</tr>
<tr>
<td>Population served (1000)</td>
<td>31.27</td>
<td>19.22</td>
<td>12.34</td>
<td>7.58</td>
<td>8.15</td>
<td>7.32</td>
<td>5.80</td>
</tr>
<tr>
<td>Beds attended by a nurse</td>
<td>9.45</td>
<td>6.54</td>
<td>3.88</td>
<td>3.84</td>
<td>2.92</td>
<td>3.10</td>
<td>2.60</td>
</tr>
<tr>
<td>No. of beds (1000)</td>
<td>2.49</td>
<td>2.80</td>
<td>3.50</td>
<td>5.63</td>
<td>5.37</td>
<td>6.35</td>
<td>6.87</td>
</tr>
</tbody>
</table>

It is noted that since 1971-72 the number of beds increased appreciably, but the number of nurses did not increased so rapidly, which led to increase in the beds attended by a nurse. However, in 1977-81 period the position improved considerably.

To analyse the growth trends in the number of nurses in Assam we have fitted three curves. They are:

\[
\hat{N} = -14.505 + 85.512t \quad R^2 = .979, \quad n = 31. \\
(0.36) \quad (36.91)
\]

\[
\hat{N} = 92.185 + 64.862t + 0.688t^2 \quad R^2 = 0.982, \quad n = 31. \\
(1.60) \quad (7.34) \quad (2.41)
\]

\[
\hat{N} = 134.163 + 49.369t + 1.958t^2 - 0.028t^3; \\
(1.63) \quad (2.11) \quad (1.09) \quad (0.72)
\]

\[
R^2 = 0.982, \quad n = 31.
\]

where \( N = \) number of nurses.
A specification analysis of the curves fitted above would suggest that the cubic curve is not a correct specification of the growth trend in the number of nurses in the State. The quadratic curve is better specified one among the three curves fitted.

Similarly, we have fitted three curves to analyse how the load of population per nurse has declined over time. These curves are:

\[ \hat{PN} = 23719.625 - 755.561t; \quad R^2 = 0.733, \quad n = 31 \]
\[ \text{(16.53) (9.04)} \]

\[ \hat{PN} = 31925.772 - 2343.850t + 529.429t^2; \quad R^2 = 0.953, \]
\[ \text{(33.70) (16.10) (11.24)} \quad n = 31. \]

\[ \hat{PN} = 35853.681 - 3793.586t + 171.730t^2 - 2.640t^3 \]
\[ \text{(23.70) (6.71) (3.73) (2.67)} \]
\[ R^2 = 0.983, \quad n = 31. \]

where PN is the population served by a nurse.

The beds attended by a nurse has shown that they follow a quadratic trend or a cubic trend. This is shown by the curves fitted in the data on beds attended per nurse.

\[ \hat{BN} = 7.872 - 0.217t; \quad R^2 = 0.809, \quad n = 31. \]
\[ \text{(23.64) (11.17)} \]

\[ \hat{BN} = 9.480 - 0.528t + 0.010t^2; \quad R^2 = 0.919, \quad n = 31 \]
\[ \text{(27.90) (10.11) (6.14)} \]
\[ \hat{BN} = 10.306 - 0.832t + 0.035t^2 - 0.006t^3 \]
\[ (23.70) \quad (6.74) \quad (3.73) \quad (2.67) \]
\[ R^2 = 0.934, \quad n = 31. \]

where \( BN \) is the number of beds attended by a nurse.

5. Midwives

Among the auxiliary medical personnel, the position of midwives is next to nurses. While nurses are a general purpose personnel, midwives have a more specialised role in taking care of the mothers and infants. Efficient midwives may greatly reduce the number of still births and infant mortality and also the loss of life of the mother.

The total number of midwives in 1950-51 was 335 which increased to 509 in 1955-56. In 1960-61, the number grew to 848. In 1965-66, the number of midwives increased to 1196. Division of Assam did not affect the number of midwives substantially and it recorded at 1378 in 1971-72. In 1975-76 the number increased to 1527, followed by 1700 in 1980-81. Number of beds attended by a midwife declined over time during the first two five year plans. However, during 1961-66 it showed a stagnation. After ward, once again a declining trend was observed but it could not continue longer. On the whole, it may be noted that the number of beds attended by a midwife remained constant at 4 after the end of the 2nd Five Year Plan, though temporal fluctuations have occurred here and there.
In the following table 5.1 the number of midwives and beds attended by them have been shown.

Table 5.1: Number of midwives and beds attended per midwife in Assam

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</thead>
<tbody>
<tr>
<td>No. of Midwives</td>
<td>335</td>
<td>509</td>
<td>848</td>
<td>1196</td>
<td>1378</td>
<td>1527</td>
<td>1700</td>
</tr>
<tr>
<td>Beds attended per midwife</td>
<td>7.41</td>
<td>5.50</td>
<td>4.12</td>
<td>4.70</td>
<td>3.90</td>
<td>4.15</td>
<td>4.00</td>
</tr>
</tbody>
</table>

We have fitted three curves to analyse how the number of midwives and the number of beds attended by a midwife have changed over time.

\[ \hat{M}W = 268.892 + 49.888t; R^2 = 0.983, n = 31. \]
\[ (12.96) \quad (41.29) \]

\[ \hat{M}W = 197.876 + 63.633t - 0.458t^2; R^2 = 0.988, n = 31. \]
\[ (7.11) \quad (14.89) \quad (3.32) \]

\[ \hat{M}W = 269.360 + 37.249t + 1.704t^2 - 0.048t^3 \]
\[ (7.71) \quad (3.75) \quad (2.24) \quad (2.88) \]

\[ R^2 = 0.990, n = 31. \]

Where MW is the number of midwives. The trend curves for the beds attended by a midwife are:
\[ \hat{BMW} = 6.133 - 0.091t; \quad R^2 = 0.641, \quad n = 31; \]
\[ (28.85) \quad (7.33) \]

\[ \hat{BMW} = 6.922 - 0.244t + 0.005t^2; \quad R^2 = 0.758, \quad n = 31. \]
\[ (25.28) \quad (5.79) \quad (3.74) \]

\[ \hat{BMW} = 7.580 - 0.486 + 0.025t^2 - 0.0004t^3; \]
\[ (21.56) \quad (4.87) \quad (3.26) \quad (2.63) \]
\[ R^2 = 0.803, \quad n = 31. \]

Where \( BMW \) is the number of bed attended by a midwife.

If we compare the pattern of growth in beds attended by a nurse with the beds attended by a midwife, we find that though initially the number of beds attended by a nurse was greater than those attended by a midwife, through time this position was reversed. This has been due to a great deal of increase in the number of auxiliary nurse midwives who are close substitutes of midwives in taking care of the mothers and infants.

6. **Auxiliary Nurse-midwives**

Auxiliary Nurse-midwives function somewhere between the nurses, the general purpose medical personnel, and midwives, the special purpose medical personnel taking care of the gynaecological cases. Thus they are the close substitutes of nurses and midwives. The number of auxiliary nurse-midwives (ANM) has shown a rapid increase in the period under study. In 1950-51, their number was only 32. During the
first five year plan the increase in their number is not very great as they were only 51 in 1955-56. However, in the second five year plan their number increased rapidly to record at 408. Their number was doubled by 1965-66, and further it increased to 1345 in 1971-72. Since then their number is slowly increasing and it recorded over 1750 in 1980-81.

In general the growth rate of the number of ANM has superceded those of nurses and midwives. The following table gives a comprehensive idea of the increase in their number and decline in the number of beds and population served by them.

**Table 5.5: Number of ANM, beds attended by ANM and population served by ANM in Assam.**

<table>
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</thead>
<tbody>
<tr>
<td>Number of ANM</td>
<td>32</td>
<td>51</td>
<td>408</td>
<td>783</td>
<td>1345</td>
<td>1542</td>
<td>1750</td>
</tr>
<tr>
<td>Beds attended per ANM</td>
<td>78</td>
<td>55</td>
<td>9</td>
<td>7</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Population served by one ANM (in 1000)</td>
<td>257</td>
<td>161</td>
<td>27</td>
<td>14</td>
<td>11</td>
<td>9.7</td>
<td>8.8</td>
</tr>
</tbody>
</table>
The trend analysis of the number of ANM is presented by the following curves:

\[
\hat{\text{ANM}} = -284.993 + 69.531t; \quad R^2 = 0.974, \quad n = 31.
\]

\[(7.81) \quad (32.73)\]

\[
\hat{\text{ANM}} = -149.718 + 43.348t + 0.873t^2; \quad R^2 = 0.982,
\]

\[(3.18) \quad (5.99) \quad (3.73) \quad n = 31.\]

\[
\hat{\text{ANM}} = 76.763 - 40.242t + 7.722t^2 - 0.152t^3;
\]

\[(3.14) \quad (5.79) \quad (14.18) \quad (13.01) \quad R^2 = 0.998, \quad n = 31.\]

As we see, the cubic curve is the best fit in explaining the growth of ANM in the study period.

Beds attended per ANM has shown rapid decrease over time and the trend may be described by the following curves:

\[
\hat{\text{BANM}} = 54.682 - 2.317t; \quad R^2 = 0.64, \quad n = 31
\]

\[(10.06) \quad (7.32)\]

\[
\hat{\text{BANM}} = 83.805 - 7.953t + 0.188t^2; \quad R^2 = 0.899, \quad n = 31.
\]

\[(18.52) \quad (11.44) \quad (8.36)\]

\[
\hat{\text{BANM}} = 93.844 - 11.659t + 0.491t^2 - 0.007t^3; \quad R^2 = 0.914, \quad n = 31.
\]

\[(15.84) \quad (6.94) \quad (3.81) \quad (2.38)\]

where BANM is bed attended per ANM.

Population served by an ANM is described to be declining by the following trend curves.
\[ \hat{PANM} = 176.299 - 7.460t; \quad R^2 = 0.587, \quad n = 31. \]
\[ (9.04) \quad (6.57) \]
\[ \hat{PANM} = 259.584 - 23.580t + 0.537t^2; \quad R^2 = 0.770, \]
\[ (11.37) \quad (6.72) \quad (4.73) \quad n = 31. \]
\[ \hat{PANM} = 294.314 - 36.399t + 1.588t^2 - 0.023t^3; \]
\[ (9.30) \quad (4.05) \quad (2.30) \quad (1.54) \quad R^2 = 0.781, \quad n = 31. \]

Where PANM is population (1000) served per ANM in the State.

7. Dhais

Dhais are very important medical personnel who complement nurses and midwives. The number of Dhais was 501 in 1950-51 and it tripled during the 30 years since then. The following table may help us to see how their number, beds attended by them and population served by them changed over time.

Table 5.6: Number of Dhais and beds and population served by a Dhai in Assam.

<table>
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</thead>
<tbody>
<tr>
<td>Number of Dhais</td>
<td>501</td>
<td>713</td>
<td>1162</td>
<td>1300</td>
<td>1411</td>
<td>1483</td>
<td>1490</td>
</tr>
<tr>
<td>Beds attended per Dhai</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Population served per Dhai (1000)</td>
<td>16.4</td>
<td>11.5</td>
<td>9.6</td>
<td>8.5</td>
<td>10.6</td>
<td>10.1</td>
<td>10.0</td>
</tr>
</tbody>
</table>
The number of Dhais increased rather slowly. The trend curves fitted to their number are:

\[ DH = 588.687 + 37.182t; \quad R^2 = 0.887, \quad n = 31 \]
\[(13.95) \quad (15.14)\]

\[ DH = 349.450 + 83.486t - 1.543t^2; \quad R^2 = 0.978, \quad n = 3 \]
\[(12.08) \quad (18.79) \quad (10.74)\]

\[ DH = 331.292 + 90.188t - 2.093t^2 + 0.012t^3 \]
\[(7.96) \quad (7.68) \quad (2.31) \quad (0.61)\]
\[ R^2 = 0.978, \quad n = 31. \]

Where \( DH \) is the number of Dhais. It is obvious that the cubic curve is mis-specified and the quadratic curve is the best fit to describe how the number of Dhais has grown over time.

The trend curves of beds attended per Dhai are given below:

\[ BDH = 0.047 - 0.005t; \quad R^2 = 0.06, \quad n = 31 \]
\[(18.48) \quad (0.43)\]

\[ BDH = 4.667 - 0.125t + 0.004t^2; \quad R^2 = 0.117, \quad n = 31 \]
\[(14.94) \quad (2.61) \quad (2.58)\]

\[ BDH = 5.768 - 0.532t + 0.037t^2 - 0.0007t^3 \]
\[(17.45) \quad (5.67) \quad (5.18) \quad (4.69)\]
\[ R^2 = 0.511, \quad n = 31. \]

Where \( BDH \) is beds attended by a Dhai.
It is obvious that the cubic curve fits the data well while the linear trend and quadratic trend are not fitting the data.

Population served per Dhai may be described to grow by the following trend curves:

\[ \hat{PDH} = 32.651 - 1.150t; \quad R^2 = 0.05, \quad n = 31 \]
\[ (3.12) \quad (1.89) \]
\[ \hat{PDH} = 62.053 - 6.840t - 0.190t^2; \quad R^2 = 0.21, \quad n = 31. \]
\[ (4.15) \quad (2.98) \quad (2.55) \]
\[ \hat{PDH} = 100.273 - 20.947t + 1.346t^2 - 0.026t^3 \]
\[ (5.33) \quad (3.92) \quad (3.28) \quad (2.86) \]
\[ R^2 = 0.38, \quad n = 31 \]

Where PDH is the population (in 1000) served by a Dhai.

It may be noted that the growth in the number of Dhais, beds attended by them, and population served by them cannot be explained very well by trend analysis as the curves fitted have rather poor explanatory power.

8. **Health Visitors**

Health visitors have a commendable hold to restore and keep up the general health in the State. They are treated as essential health personnel mostly in the less developed, remote rural areas where health institutions like hospitals are not within an easy reach. The system of health visitors
was primarily started to visit door-to-door in order to know the condition of physical health of the people and provide treatment on ailment as first aid. In addition, they also teach the rural masses about personal hygiene and sanitation and the necessary steps to be taken at the time of epidemic and contagious diseases. Hence, an increase in the number of health visitors is likely to control diseases, especially in rural areas.

But unfortunately much could not be done to increase the number of health visitors in the State. One would wonder to see that their number is only 50 in 1980-81 while it was 11 in the year 1950-51. The State of Assam is dominated by rural people and they exceed a crore in number. For such a large population, the number of health visitors should have been in thousands, but it is discouraging to see that population served by a health visitor exceeds 3 lakh, which is impossible for any one to take care of.

We note therefore, that the efforts of the government in improving the health facilities have mainly gone on to benefit the urban people while rural people have been rather forgotten. It is undesirable and shows that the public expenditure on health facilities have been directed to create imbalance between rural and urban areas. We will
return to this aspect later on when we will evaluate the health programme and public expenditure on them.

The trend of increase in the number of Health visitor and the population served by them may be described by the following curves.

\[
\hat{HV} = 7.342 + 1.313t; \quad R^2 = 0.907, \quad n = 31
\]

\[
(5.49) \quad (16.86)
\]

\[
\hat{HV} = 11.873 + 0.436t + 0.029t^2; \quad R^2 = 0.931, \quad n = 31
\]

\[
(6.60) \quad (1.58) \quad (3.27)
\]

\[
\hat{HV} = 7.121 + 2.190t - 0.114t^2 + 0.003t^3
\]

\[
(3.18) \quad (3.44) \quad (2.34) \quad (2.98)
\]

\[
R^2 = 0.947, \quad n = 31
\]

Where HV is the number of health visitors.

In case of population served by a health visitor, the trend curves are:

\[
\hat{PHV} = 626.028 - 11.147t; \quad R^2 = 0.647, \quad n = 31.
\]

\[
(24.29) \quad (7.43)
\]

\[
\hat{PHV} = 699.835 - 25.432t + 0.476t^2; \quad R^2 = 0.710, \quad n = 31
\]

\[
(19.09) \quad (4.51) \quad (2.61)
\]

\[
\hat{PHV} = 833.753 - 74.859t + 4.526t^2 - 0.090t^3; \quad R^2 = .85
\]

\[
(22.22) \quad (7.03) \quad (5.53) \quad (5.02) \quad n = 31
\]

Where PHV is the population (in 1000) served by a health visitor.
Concluding Remarks

As we have seen in the preceding sections, on account of the public efforts there has been a great improvement in the medical infrastructure. Nevertheless we note that the area served by the medical institutions and medical personnel is quite large and one cannot hope that for such a large area the medical institutions and personnel are enough to cater to the need of the people. One cannot expect a hospital to cater to the needs of 2.82 lakh people and similarly, one cannot expect a government dispensary to be adequate for servicing the health needs of 35 thousand people. Even if we assume that only 1% of people are ailing (which is by any standard too small a figure in the existing conditions of Assam) the load on the medical infrastructure becomes tremendously high that must reflect on the efficiency of the medical institutions and personnel and many people must not be in a position to be taken care of. It shows that in spite of the efforts of the government in expanding the medical infrastructure, people are not in a position to receive adequate medical care from the existing infrastructure.

Further we note that the development of medical infrastructure has been biased in favour of the urban areas. Rural areas have largely been ignored. For serving the rural areas properly and judiciously it was needed that adequate number of
health visitors and primary health centres should have been provided. We have noted that the number of health visitors is very small from the very beginning and they remained in a small number till 1981. Similarly, primary health centres which are primarily located in rural areas have not been set up in adequate number and they can at best be considered to be a drop in the desert of the rural needs for health facilities.

In 1968-69, there were only 90 primary health centres and area served by a primary health centre was 1107 Sq. Km. The number slowly increased to 146 in 1976-77 and area served by a unit of primary health centre declined to 538 Sq. Kms. The growth in the number stopped at 146 and till 1981 no new primary health centre had been established and thus the area served by a unit of primary health centre stagnated at 538 Sq. Kms. Now, one primary health centre catering to the needs of people living in a vast area of 538 Sq. Km. is utterly inadequate as the load of population on one primary health centre is over 138 thousand. We conclude therefore that the public efforts have been unjust to cater the needs of the rural people in the State of Assam.