Chapter VI
Section B

APPRAISAL OF INDUSTRIAL PATTERN

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6B.1 Introduction

A critical study of Geographical aspect of industrialisation is essential for mitigating the social evils, which are its consequences, in order that the economy of the country can be established on a stable footing (Choudhari, 1966). A study of industrial development of a region has a significant importance in its overall appraisal (Wodeyar, 1980). The modern industry will help to switch the economy on a new technological basis, which involves raising the standard of living through steady increase in efficiency of the production of economic status of a region.

Industrialisation is essentially a process of technological innovations and divisions of labour, which have inherent impulses to faster continuous and cumulative growth (Hermensen, 1974). It is not growing merely in the size of population or spatial expansion but also in respect of its economy of the region.

An endeavour is being made in the present study to understand the industrial pattern and their spatial relation with the growth of economic structure of the study area. For this purpose the following aspects have been dealt into greater detail – locational factors, potentials of industries, sources of raw materials, growth and distribution of industries, size of industries, sick industries, etc. After discussing all these, recommendations for future have been done on the basis of locations, demands, availability of resources keeping in view of spatial development.

6B.2 Locational Factors

There are peculiarities in each region, which are related to its geographic characteristics. The study area is unique in the economic, social, and demographic sphere. In assessing the potentials of industrial development, the geographers tend to make a close examinations of raw materials, fuel supplies, transport facilities,
market and to pass more lightly over the factors of capital and labour (Mount, 1971). The region recently has attracted the private entrepreneurs in the establishment of industries. The answers given by the existing owners of the industries and the answers to the questionnaires reveal that the following locational factors influenced the various industries in the study area. As such the region's vitality depends not only on its own internal resources, but also on its capacity to tap the gap for its growth from a vast surrounding area.

Easy availability of raw materials is one of the chief factors in the location and development of some kind of industries in the study unit. The high quality of raw materials is available within the district for agro-base industries. As a result of it, some of the agro-base units have been established in the region. However, it is clear that the success of industrialisation depends upon the expansion and improvement of agricultural activities in the study region.

The rice mills, oil mills, jute ginning, textile, general engineering, and other industries need a large number of workers. In this regard the study region has sufficient skilled and unskilled human resource, and the region gets labour force also from the surrounding area.

Suitable climate is another important for the location of industries. The district has 60 to 70 per cent of relative humidity, which is favourable for textile industries.

Power supply is another important locational factors for establishment of industries. Power station, the Tangail Electric Supply (Thermal) provides electric power to the industries in this area.

In addition to the above mentioned locational factors, the district is also favoured with high density of population, market centres (demand), water supply.
Apart from these, transport and communication systems are well connected within the district. The national high way has also passes through the region with good maintenance. This type of infrastructure is the main reason for the location of the various small to medium industries in the region. The Government has also encouraged the development of industries by various means of facilities such as improvement in management, financial aid, etc. This has helped the private entrepreneurs recently to start different types of industrial units in the district. In spite of all these favourable factors, the area is still remains backward in respect of industrial aspects. Of course, the reasons are obvious and discussed in the preceding analysis. The field investigations showed that the non-traditional factors are influencing more than the traditional factors like entrepreneur’s perception, techno-how.

6B.3 Regional Characteristics and Potentials of Industries

Industrial potentiality, the resource endowment, consisting of both natural and human resources determine the limits of industrial development of an area (Singh, 1991). There are three main potentials of raw materials available in the region; viz., agriculture, forest, livestock and aquatic base. The district has very fertile land and throughout the district; agriculture is the main pursuit, which is prosperous due to good climatic conditions, soil, and irrigation facilities. Besides, surrounding areas are also rich in this respect. The regional characteristic of the growth of industries depends on these raw materials in the Tangail district. Thus agro-base industries are mainly consists of textiles, jute ginning, food manufacturing, oil mills, rice mills, sugar cane industries and these are major industries of the district.
The forest plays an important role in the development of forest-based industries in the district. Due to more elevation with soil coverage, forest in the entire Sakhipur Thana and the eastern part of Madhupur and Ghatail thana is rich. This area provides raw materials to the sawmills and other industries. Sal (locally known as garan), Chambal, Joginichokra, Ajuli, Sonalu, Bajua, Jarul and other varieties of wood for the industry. All the materials are available within the radius of 150 kms from the district headquarters.

The district is also rich in respect of livestock resources and accounts for 970682\(^1\) (Cattle, buffaloes, sheep’s and goats) in the district. As a result more than 5 leather industries are functioning in the district. There is still a plenty of scope for the establishment of livestock base industries in the district.

6B.3.1 Sources of Raw Materials

With a view of understanding the locational factors a sample survey had been made in different categories of individual industries in the district. The study revealed that some industrial units depend for raw materials locally, within the division, and outside the division. Table –6B.1 gives the clear picture in this aspect. Out of total surveyed units of various types of industries, 56 per cent of the industries get raw materials locally, and about 38 per cent of industries get raw materials within the division and the remaining are from outside the division; i.e., about 62 per cent (Fig. 6B.1). Easy availability of raw materials available locally is one of the important factors for the existing industries.

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\(^1\) District Statistical Office, Tangail, 1998.
**Table -6B.1: Sources of Raw Materials**

<table>
<thead>
<tr>
<th>Industries</th>
<th>Local (₹)</th>
<th>Division (₹)</th>
<th>Nation (₹)</th>
<th>Total (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light Engineering</td>
<td>6</td>
<td>12</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Handloom</td>
<td>25</td>
<td>13</td>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>Leather</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Glass</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Pottery</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Paper and Allied</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Printing</td>
<td>1</td>
<td>6</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Food and Beverage</td>
<td>10</td>
<td>3</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Wood</td>
<td>11</td>
<td>3</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>47</td>
<td>8</td>
<td>125</td>
</tr>
<tr>
<td>%</td>
<td>56%</td>
<td>37.6%</td>
<td>6.4%</td>
<td>100%</td>
</tr>
</tbody>
</table>

*Source: Field work, 2000.*

Based on the field work, the following causes are found for the slow development of industries in the district:

(a) lack of required infrastructural facilities;

(b) lack of initiation of industrial entrepreneurs;

(c) the finished products are not competitive due to lack of communication between the consumers and producers as well improper use of technoknow how;

(d) marketing problems of the products;

(e) lack of awareness among the people about the facilities given by the Government due to inadequate publicity and absence of creative efforts;

(f) in recent years sickness among the industries is progressively increasing, which is either because of lack of technical know-how or inefficient management;
(g) power shortage;
(h) haphazard growth of development; and
(i) during rainy season flood occurrence affects for small and medium scale industries.

Fig. 6B.1: Sources of Raw Materials

6B.3.2 Location Quotient

The location quotient measures the degree to which a specific region has more or less than its share of any particular industry or it can be used for any other economic endeavours (Karennavar, 1968). It means in brief, a quotient is ratio of ratios. For illustration – the ratio of employment in industries to the population of each Thana of the study area is taken separately. The location quotient of industries of employment of a Thana is determined by dividing its percentage by the district percentage which can be written as follows:
\[
L_q = \frac{(P_i/t_i) \times 100}{(d_P/d_P) \times 100}
\]

Where,  
\[L_q\] = Location quotient;  
\[P_i\] = Industrial population of thana;  
\[t_i\] = Total population of thana;  
\[d_P\] = Industrial population of district; and  
\[d_P\] = Total population of district.

A quotient 1.0 means that a region has neither more nor less of that division industry than its overall value of manufacturing would suggest. A quotient over 1.0 indicates a high particular concentration of that locating in relation to local industrial units. A quotient less than 1.0 suggests that an industry is less developed in the region.

The computed figures for individual thana of the study unit shows that only two thanas (Tangail Sadar, and Delduar) have more than 1.0 index of location quotient and the remaining thanas have less than 1.0 index of location quotient (Table - 6B.2). A quotient over 1.0 index indicates a high concentration of industries in relation to other thanas of the district. The high concentration of working force is mainly due to high concentration of industries in the region. While considering the location quotient of the district in the Division, it is less than 1.0; i.e., 0.49. This is justified, as the district is backward in respect to industrial activities in the Dhaka division. The maximum number of workers are found in Madhupur Thana followed by Tangail Sadar, Kalihati, Ghatail and Mirzapur thanas. This may be due to concentration of industrial units in these areas. The lowest is in Basail thana (Fig.- 6B.2).
Fig. 6B.2: Thana-wise Location Quotient of Industries

Legend

- Below 0.07 (LQ value)
- 0.12 to 0.31
- 0.31 to 0.82
- Above 0.82

Kilometer
6B.3.3 Intensity Rating

The location quotient gives a clear picture about the backwardness/forwardness of the district in respect of industry in the division/region. To know the exact position of the district in the industrial map of Dhaka Division in addition to the location quotient, the multiple rating criteria (Thompson, 1955) has also been computed. Separate ratings have been calculated for three criteria of intensity for each Thana to know the industrial potential regions in respect of labour force and capital investments. To find out the intensity rating value, the following aspects have been taken into account:

(a) the number of all employees in manufacturing to the total working force;
(b) the number of all employees in manufacturing to the total population; and
(c) value invested in manufacture to the total population.

The resulting quotients are multiplied by 100, summed up and average to obtain a multiple criteria ratio of intensity. The same is worked out in respect of each Thana and the district as a whole. The multiple intensity rating criteria may be expressed as follows:

\[ I_m = \frac{(I_1+I_2+I_3)}{3} \]

Where,

- \( I_m \) = Multiple intensity rating;
- \( I_1 \) = Intensity rating of first criteria;
- \( I_2 \) = Intensity rating of second criteria;
- \( I_3 \) = Intensity rating of third criteria;

\[ I_1 = \left( \frac{\text{All employees in manufacture}}{\text{Total employed in all activities}} \right) \times 100; \]
\[ I_2 = \left( \frac{\text{All employees in manufacture}}{\text{Total population}} \right) \times 100; \text{ and} \]
\[ I_3 = \left( \frac{\text{Value added by manufactures}}{\text{Total population}} \right) \times 100 \]
The results are given in Table - 6B.2. The results of intensity rating allege that Tangail Sadar and Delduar thanas have higher intensity rating than other thanas of the district. The higher intensity in the above said thanas are mainly because of the more concentration of industrial units. This technique exhibits not only labour concentration in the units but also the amount invested and total population in each thana (Fig. - 6B.3).

Table - 6B.2: Location Quotient and Intensity Rating

<table>
<thead>
<tr>
<th>Name of the thanas</th>
<th>Industrial workers</th>
<th>Total workers (in all activities)</th>
<th>Total population</th>
<th>Location quotient values</th>
<th>Intensity rating values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basail</td>
<td>1697</td>
<td>81142</td>
<td>148555</td>
<td>0.42</td>
<td>0.48</td>
</tr>
<tr>
<td>Bhuapur</td>
<td>996</td>
<td>91199</td>
<td>177095</td>
<td>0.20</td>
<td>0.27</td>
</tr>
<tr>
<td>Delduar</td>
<td>6154</td>
<td>93459</td>
<td>175684</td>
<td>1.28</td>
<td>1.26</td>
</tr>
<tr>
<td>Kalihati</td>
<td>993</td>
<td>186319</td>
<td>341376</td>
<td>0.11</td>
<td>0.18</td>
</tr>
<tr>
<td>Ghatali</td>
<td>765</td>
<td>136288</td>
<td>252747</td>
<td>0.11</td>
<td>0.15</td>
</tr>
<tr>
<td>Gopalgur</td>
<td>16978</td>
<td>192222</td>
<td>354959</td>
<td>0.74</td>
<td>0.82</td>
</tr>
<tr>
<td>Madhupur</td>
<td>1200</td>
<td>204782</td>
<td>375295</td>
<td>0.12</td>
<td>0.16</td>
</tr>
<tr>
<td>Mirzapur</td>
<td>2846</td>
<td>186270</td>
<td>337496</td>
<td>0.31</td>
<td>0.37</td>
</tr>
<tr>
<td>Nagarpur</td>
<td>1812</td>
<td>127187</td>
<td>238422</td>
<td>0.28</td>
<td>0.31</td>
</tr>
<tr>
<td>Sakhipur</td>
<td>422</td>
<td>125134</td>
<td>220281</td>
<td>0.07</td>
<td>0.12</td>
</tr>
<tr>
<td>Tangail Sadar</td>
<td>8596</td>
<td>202037</td>
<td>380518</td>
<td>0.82</td>
<td>1.01</td>
</tr>
<tr>
<td>District</td>
<td>82459</td>
<td>1626039</td>
<td>3002428</td>
<td>0.49</td>
<td>0.83</td>
</tr>
</tbody>
</table>

Source: BBS, 1996 and personal computation

6B.4 Growth and Spatial Distribution of Industries

An industrial situation in Tangail district reveals that it has highly uneven character. The study of spatial pattern helps to understand the regional imbalances of growth and distribution of industries in the district. The economy of the district is mainly agricultural one with hardly any emphasis on industrialization in the past. In the sixties some of the industries developed based on raw materials locally available.
Fig. - 6B.3: Industrial Intensity Rating in Tangail District

Legend
- Below 0.18 (Intensity value)
- 0.18 to 0.37
- 0.37 to 1.01
- Above 1.01
Agricultural raw materials of considerable value are raised every year. Jute which constitutes the main item for Jute industries, Cotton for textile industries, and oilseeds especially rape and mustard, groundnut for large number of oil mills, are grown in considerable quantities. Sugarcane is largely grown in Delduar, Mirzapur, Tangail Sadar, and Nagarpur thanas and this has been helpful for the starting of sugar factories in the district. Apart from these, Jaggery manufacturing is common in these areas of sugarcane.

In the district the first industry was established in the year 1960, i.e., handloom industry, which is pretty old in the district. Since ancient time the area is known for its weaving industry. The weavers of Bajitpur produce embroidered Saris of a very high quality. The name of Tangail Sari is proverbial. Tangail is proud of handloom Saries, which are exported to different places of the world. Mat making is a thriving industry in the district. The Mat fine Sitalpati mats made of a particular reed that grown in the marshes of Tangail. The manufacturers of these mats (Patis) are known as patitas. Papermaking was an industry of considerable repute until the introduction of the cheap machine-made paper. In 1870, paper was produced from jute in Atia (Sachse, 1917). Boats are made on the banks of rivers and khals of the district. Bamboo concerning industry is quite flourishing in the district. The workers of this industry used to make different articles of every day use on cottage base.

Table – 6B.3 shows the manufacturing establishment by industry group in the district. The number of manufacture of food, textiles, beverage and tobacco industries are more (72%) followed by manufacturing of wood, wood product including furniture (13.33%), manufacturing of non-metallic mineral (4.91%), and textile wearing apparel and leather industries (3.51%).

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Table 6B.3: Number of Manufacturing Establishment by Industry Group, 1999-2000

<table>
<thead>
<tr>
<th>Name of the Industry</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacture of food, beverage and tobacco</td>
<td>205</td>
</tr>
<tr>
<td>Textile wearing apparel and leather industries</td>
<td>10</td>
</tr>
<tr>
<td>Manufacturing of wood, wood product including furniture</td>
<td>38</td>
</tr>
<tr>
<td>Manufacturing of chemicals, petroleum, coal, rubber and plastic product</td>
<td>08</td>
</tr>
<tr>
<td>Manufacturing of non-metallic mineral except petroleum and coal</td>
<td>14</td>
</tr>
<tr>
<td>Manufacturing of fabricated metal product, machinery and equipment</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>285</td>
</tr>
</tbody>
</table>

Source: BBS, 2001

The number of establishment of industry and employment size classification shows that the number of establishment of Handloom Textiles industry is the highest in the district and it accounts for 75% of the total establishment of the industry followed by Rice mills (9.4%), Bamboo and Cane products industry (3.3%), Soap and Detergents industry (3.3%), etc (Table – 6B.4). Employment size classification of Handloom Textile Industry shows that 10-19 employment size is highest (94.7%) followed by employment size 20-49 (3.3%), 50-99, 100-199, and below 10 (0.7%). Employment size establishment of industry in the district also shows that 10-19 employment size is the highest (81.8%) followed by employment size below 10 (8.8%), 20-49 (6.9%), 50-99 (1.2%), 100-199 (1%), 200-499 (0.2%), and above 1,000 (0.05%) because of the lack of accumulated capital; communication; and extensive trading facilities results in slow growth of sizeable manufacturing units.
Traditional handicrafts of national importance and heritage exist as cottage industries. Tangail, one of the industrially backward districts of the country with only 6324 \(^2\) cottage industrial units represents 11.8% of Bangladesh. The maximum 11.8% number of units under tailoring sub-sector with 1107 units represents 17.50% of the total industrial units in the district. The second position is of pottery with 594 units follows by bamboo and cane products having 480 units (BSCIC, 1994). The increasing pattern of cottage industry in the district (Table - 6B.4)

\(^2\)The industries are not registered but industrial survey from census manufacturing industries shows these figures.
reveals its importance in the rural economy. The industries provide employment to 20,733 persons with fixed investment of Tk.8,79,35,595 wherein cost of production is Tk.18,72,79,642, consuming raw material of Tk.1,04,51,853 generating total sales value of Tk. 21,06,54,657 (Table – 6B.6). The existing cottage/tiny industrial structure is mentioned in Appendix VIB.1.

Table – 6B.5: Year-wise Establishment of Existing Cottage Industries

<table>
<thead>
<tr>
<th>Year of Establishment</th>
<th>Year-wise total Establishment</th>
<th>Cumulative Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1963</td>
<td>2246</td>
<td>2246</td>
</tr>
<tr>
<td>1964</td>
<td>105</td>
<td>2351</td>
</tr>
<tr>
<td>1965</td>
<td>230</td>
<td>2581</td>
</tr>
<tr>
<td>1966</td>
<td>194</td>
<td>2775</td>
</tr>
<tr>
<td>1967</td>
<td>226</td>
<td>3001</td>
</tr>
<tr>
<td>1968</td>
<td>262</td>
<td>3263</td>
</tr>
<tr>
<td>1969</td>
<td>213</td>
<td>3476</td>
</tr>
<tr>
<td>1970</td>
<td>222</td>
<td>3498</td>
</tr>
<tr>
<td>1971</td>
<td>83</td>
<td>3781</td>
</tr>
<tr>
<td>1972</td>
<td>328</td>
<td>4109</td>
</tr>
<tr>
<td>1973</td>
<td>385</td>
<td>4494</td>
</tr>
<tr>
<td>1974</td>
<td>272</td>
<td>4766</td>
</tr>
<tr>
<td>1975</td>
<td>242</td>
<td>5008</td>
</tr>
<tr>
<td>1976</td>
<td>147</td>
<td>5155</td>
</tr>
<tr>
<td>1977</td>
<td>96</td>
<td>5251</td>
</tr>
<tr>
<td>1978</td>
<td>127</td>
<td>5378</td>
</tr>
<tr>
<td>1979</td>
<td>81</td>
<td>5459</td>
</tr>
<tr>
<td>1980</td>
<td>66</td>
<td>5525</td>
</tr>
<tr>
<td>1991</td>
<td>799</td>
<td>6324</td>
</tr>
</tbody>
</table>

Cottage industry has been described as an industry confined to family labour and or very few hired labour

Source: BSCI, 1993
There is decreasing trend in the industrial development rather than positive trend. In 1963 maximum number of industries grew. However little increase in the establishment of industries occurred in 1999. Though number is more compared to 1, actually the dead industries of older are renewed and registered.

(in `000 Tk.)

<table>
<thead>
<tr>
<th>Types</th>
<th>1981</th>
<th>1991</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Small</td>
<td>Cottage</td>
</tr>
<tr>
<td>Units</td>
<td>348</td>
<td>5525</td>
</tr>
<tr>
<td>Fixed</td>
<td>14866</td>
<td>41325</td>
</tr>
<tr>
<td>Working Capital</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Machinery Equipments</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Emoluments</td>
<td>9580</td>
<td>-</td>
</tr>
<tr>
<td>Raw materials consumed*</td>
<td>19936</td>
<td>70431</td>
</tr>
<tr>
<td>Production cost**</td>
<td>-</td>
<td>88414</td>
</tr>
<tr>
<td>Goods produced</td>
<td>26310</td>
<td>125637</td>
</tr>
<tr>
<td>Sales value</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: !Except for “units” and “manpower” all figures are in Tk. `000’s;
*value of raw materials for production including servicing basis
**excluding cost of raw materials for production on serving basis
- indicates not available

Source: BSCIC, 1983 and 1994

Considering the thana-wise spatial distribution of major industrial units, there is a disparity and imbalance. Table – 6B.7 states thana-wise growth and distribution of small scale industries. Kalihati thana (1227) has maximum number of small-scale industries followed by Tangail Sadar (956), Mirzapur (923), Ghatal (798), Nagarpur, and so on. The lowest concentration is found in Delduar thana (412). The high concentration of major industries in certain thanas is mainly due to favourable locational factors; i.e. raw materials availability. Considering the scattered
distribution in various thanas, it is necessary to give much attention to establish more industrial units in the backward thanas, depending upon the resources, infrastructural facilities. Recently, Government has provided many incentives and attractive schemes to the industrial entrepreneurs even upon the cottage and small industrial units in the study area. Inspite of all the facilities, the expected development has not been achieved. This may be mainly due to improper utilisation of money and resource. Besides even in the existing industrial units, many units have been considered as sick industries.

**Table – 6B.7: Thana-wise Small Scale Industries 1981 and 1991**

<table>
<thead>
<tr>
<th>Names of Thanas</th>
<th>1981</th>
<th>1991</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>% of the Total</td>
</tr>
<tr>
<td>Basail</td>
<td>459</td>
<td>8.21</td>
</tr>
<tr>
<td>Bhuapur</td>
<td>282</td>
<td>5.04</td>
</tr>
<tr>
<td>Delduar</td>
<td>365</td>
<td>6.53</td>
</tr>
<tr>
<td>Ghatail</td>
<td>620</td>
<td>11.09</td>
</tr>
<tr>
<td>Gopalpur</td>
<td>324</td>
<td>5.79</td>
</tr>
<tr>
<td>Kalihati</td>
<td>1096</td>
<td>19.60</td>
</tr>
<tr>
<td>Madhupur</td>
<td>186</td>
<td>3.33</td>
</tr>
<tr>
<td>Mirzapur</td>
<td>706</td>
<td>12.62</td>
</tr>
<tr>
<td>Nagarpur</td>
<td>489</td>
<td>8.74</td>
</tr>
<tr>
<td>Sakhipur</td>
<td>336</td>
<td>6.01</td>
</tr>
<tr>
<td>Tangail Sadar</td>
<td>730</td>
<td>13.05</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>5593</td>
<td>100.00</td>
</tr>
</tbody>
</table>


Note: Number of unregistered industries are found in many thanas especially in Tangail and Delduar thana.

The earlier discussion exhibits the distribution and growth of industrial pattern of the study area. Thus it is also essential to study some of the major industries in detail; viz, agro-based, forest-based and livestock-based industries. All these different types of industries are found in almost all thanas. Yet location is not in a
proper pattern. Considering the scattered distribution in various thanas, it is necessary to give much attention to establish more industrial units in industrially backward areas, depending upon the resources, infrastructural facilities, demand and other locational factors. Since Tangail district is rich in agricultural resources, it is suggested that more attention to be given to agro-based units (demand based) first and secondly to develop different types of industries.

6B.4.1 Agro-based Industries

Agricultural development and industrialisation are closely interrelated. Agriculture provides raw materials to industries. Tangail district has been essentially an agricultural district with 70.89 per cent of its geographical area under cultivation. The district has rich in raw materials for agro-based industries; viz., food industries, sugar industries, oil mills, rice mills and textiles. And these industries are considered as most important agro-based industries in the study area. The detailed study has been done on individual industries as follows.

Food Industries

Under this category, food industry – Bakery, parched mills, sugar and gur processing industries, rice mills and oil manufacturing units have been included. There are totally 461 units manufacture food and beverages. Amongst these units (demand based), sugar and gur processing units are more in number.

Rice Mills:

Paddy dominates in cultivation in the study area and constitutes 75 per cent of total produce from all field crops. Ghatail thana ranks first (17.8% of the total rice production) in respect of rice production followed by Sakhipur (17.6%), Tangail
Sadar (12.9%), Mirzapur (11.1%) and so on. The rice mills are concentrated in the paddy growing areas of Mirzapur, Tangail Sadar, Ghatail thana as in the case of sugar and gur industries. The spatial characteristics of this industry are that, the rice mills are established in the big villages rather than towns in the study region. There are totally 170 rice mills functioning in the district. This industry provides employment to 4290 persons directly and provides work indirectly to about 11000 persons. Subtracting the total capacity of existing rice mills in the district, some more rice mills are required to mill the available surplus at present and also in the future. Because of natural factors these industries have to function only 6-8 months. The flood occurrence made difficult. The maximum numbers of rice mills are found in the moderate flood zone. To have less risk these are located in this belt rather than severe flood zone. Large scale base is not advisable since size of holding is also small. Within the existing infrastructure, industries have to be located and function.

Oil Mills:

Since the study area has an advantage of wide irrigational facilities, there is no dearth of oil seeds - rape and mustard, til, linseed, groundnut. These crops are grown both in kharif and rabi season. The different variety of oil seeds grown is about 16,938 hectares in the district. Amongst all oil seeds rape and mustard stands first followed by til, groundnut, linseed, etc. Nagarpur thana ranks first (15.9%) in the production of oil followed by Bhuapur (15.5%), Gopalpur (15.4%), Mirzapur (13.3%), and so on. These thanas are very rich in respect of production of oil seeds. The product fulfills the local industries of the area and the excess product will be sent to neighbouring district especially to Dhaka. Since oil seeds are grown after
receding the flood as a short period crop, these industries are concentrated in the severe flood zone. Irrigation does not require to a full extent.

There are 22 oil mills running on small and medium scale base and manufacturing the oil of mustard, ground nut, til and cake. Still there is plenty of scope for the establishment of oil industries in the district at village level on cottage base. The oil seed crops are also recommended for extensive cultivation by flood protection project authorities to encourage this sector on the basis of agro-climatic condition.

**Sugar and Gur Industry:**

Sugar and Gur industry is one of the major traditional agro-based industries in the district and the progress it has made in recent years is very much significant. Sugarcane, which is a basic raw material for this industry, is grown abundantly in the study area. The total area under sugarcane cultivation in the district varies from year to year because of uncertainty of purchase of cane by the factories and government policies regarding the prices, loans, fertilisers and as well of the river flooding nature.

By products of sugar industries like bagasse and molasse are important raw materials for other industries. The beverage factories are taking advantage of these industries. At the same time the bagasse is used in preparing paper and pulp by the concerned industries. Still there is a lot of scope for the establishment of paper industries and recently efforts are being made to utilise that waste bagasse in textiles also. The maximum number of sugar and gur processing units are found in Tangail Sadar thana followed by Delduar and Mirzapur.

There are numerous gur-processing units, which have not been registered but run on commercial base. The field investigation shows that nearly 25 per cent of the
sugar grown in the areas goes to manufacture of gur at local level, which is the main setback for the sugar industries in the study unit. This should be stopped and gur preparation must be done on recorded base with at least on little advanced

**Textile Industries**

Most important commercial crops along with sugarcane in the district are jute and cotton. Almost complete use can be made of these two crops that is fibre and stick, and lint and seeds. Fibre and lint goes to textiles, and stick and waste seed goes to fire, and cattle-feed units and oil extractions respectively. The textile industries included jute, and cotton ginning and pressing, and decorating units, units for manufacturing of ready-made garments, sarees, hand-bags, hold-alls, and the like. Cotton textiles, jute textiles, silk and synthetic textiles and Handloom textiles are included in this category.

Totally there are 1,355 textile concerning units (1,350 Handloom textiles, 3 cotton textiles, 1 jute textiles, and 1 cotton textile) functioning in the district giving an opportunity to work about directly 25000 persons, and indirectly it provides part-time work for about 60000 workers. There is still scope for the establishment of textile industries on large scale, which help to utilise the jute and native cotton. In respect of distribution, it is not found exactly in the cultivated area but industries are located in the district head quarters as a demand base. The maximum number of industries are found in Kalihati, Tangail Sadar and Nagarpur thana.

**6B.4.2 Forest-based Industry**

Industry depends on plant for many of its raw materials. The area under forest is limited in Tangail district; i.e., 43,501 hectares. The forests are distributed unevenly
and concentrated mainly in the hilly tracts in the eastern part of the district. Mainly the forests are distributed in Sakhipur, Madhupur, and Ghatail thana. Whatever the forests are distributed those are covered under reserved forest category. The important flora resources are timber wood, jungle wood, and medicinal herb. The industries, which are functioning on this base are about 100 located at different localities. These industries are concerned with wooden furniture’s, saw mills, bamboo and cane products, gum manufacturing, agarbaties, strawboard, sport goods, agricultural implements, rope making, and oil extraction. Among eleven thanas, Tangail Sadar is having maximum number of forest-based industrial units; i.e., 21 followed by Ghatail, Mirzapur, Kalihati, Madhupur, Sakhipur and Nagarpur. In view of available flora resources some more industries can be established; viz., herbal medicinal industrial units, small handicraft industries, etc. These industries can be established as raw material base and demand base.

6B.4.3 Live-Stock Based Industries

In the area under study, the livestock is an important resource contributing to small scale and agricultural prosperity. It is an integral part of the domestic rural economy for providing milk products, manure, leather, skin hiding, bones, etc. Already five textile wearing apparel and leather industries are functioning. Along with this, there is tanning unit to utilise the hides available. The tanned cow and sheep skins are used for a variety of lining material in the manufacture of footwear and other leather articles.

There is also scope for establishing a bone meal unit as a raw material, which is locally available sufficiently. The trimming and cuttings of raw hides, skins, and other fleshing which cannot be further processed to make leather are important raw materials can be used to make best quality glue.
**6B.5 Size of Employment in Different Categories of Industries**

The potentiality of providing employment opportunity varies from one industrial unit to other unit. *Table – 6B.8* indicates the number of small and cottage industries, and the size of employment of the district.

*Table – 6B.8:* The Number of Employment and Size of Industries

<table>
<thead>
<tr>
<th>Industrial Groups</th>
<th>Units</th>
<th>Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>Small Industries</td>
<td>730</td>
<td>10.35</td>
</tr>
<tr>
<td>Cottage Industries</td>
<td>6324</td>
<td>89.65</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>7054</td>
<td>100.00</td>
</tr>
</tbody>
</table>


Above table highlights that the share of cottage industries is above 89 per cent of the total industries and rank first in industrial types, employing 66.98 per cent of industrial workers. The small-scale industry combined with the share of 10.35 per cent of the total units with 33.02 per cent of the total industrial workers in the district is lower than cottage industries. So far importance by the government was given to cottage industries in this zone. The reasons are obvious. Recently, Government has given incentives and concessions to the big entrepreneurs to establish medium scale/large scale units, which are on agro-base. Yet it is not materialised in this district.

**6B.6 Sick Industries**

Sick industries are the most common phenomena in the developing regions. Those industries fall sickness either in finance or in infrastructural facilities or due to short supply of raw materials or lack of entrepreneurship or natural factors like floods, uncertainty of availability of agricultural products. However, it can be defined
commonly as a unit, which fails to generate internal surpluses on a continuing basis, and depends for its survival on frequent infusion of external factor. A sick industry is a unit, which has also undergone a loss of cash during the year and is likely to continue in losses in cash in the next financial year too.

6B.6.1 Parameters for Identifying the Sick Industry in the Study Unit

The sickness of an industry does not arise all of a sudden. It comes day by day that will be experienced by the unit. Following are some of the parameters used to identify the sickness of the industry of the study unit:

(a) poor utilisation or consumption of production of the unit because of the obvious reasons;
(b) decrease in sales and profit, and thereby increase in liabilities which remain unmet;
(c) frequent labour unrest, and unawareness of its income;
(d) frequent fluctuation in the price and availability of raw materials, and in the end products of the unit;
(e) high turnover of managerial personnel;
(f) supervision of the staff or lack of administration of the unit;
(g) lack of locational advantages – raw materials, transport facilities;
(h) lack of good entrepreneurship; and
(i) improper utilisation/implementation of government policies.

In all, the nature of sickness and reasons for the sickness vary from industry to industry. It is rather difficult to pinpoint the same. The sickness of the industry can be classified as under:

(a) born sick due to wrong location, wrong technological adoption, delay in implementing the project;
(b) sickness due to financial aspects, it is because of under-financing the unit or delay;
(c) due to lack of production planning, non-availability of skilled labourers, poor quality control, improper selection of machinery;
(d) uncertainty of market – unhealthy competition, dependence of a few buyers, variation in price and cost, and the production;
(e) management due to dispute between partners, labour problems, difference of opinion between the unit and financial institution;
(f) lack of industrial competitiveness and lack of total infrastructural facility;
(g) government policies (political situation) which is indirectly a major set back;
(h) poverty of the entrepreneur (in case of entrepreneur of cottage industry);
and
(i) sickness because of political disturbance.

These are some of the major common reasons for a unit to fall sick in Tangail district. The above mentioned causes are mainly affecting the cottage industries.

Being industrially the backward district, it has 20 to 35 per cent\(^3\) of sick industries. Sickness in industries is largely found in small-scale units especially food, beverages, and general engineering. For instance, in the agro-base industry, Tangail Cotton Mills has been considered as sick industry. There is no dearth of raw materials, labour, and infrastructural facilities. So the other minor causes have made it as sick industry. Like this many industries are suffering in the district and there can be a list of sick industries in all category. Anyhow, the reasons for the sickness characteristically differ but basically they are same. For excess growth of

\(^3\)The detailed data is not available. However the C.M.I. has opined this.
population, industrialisation is the only key, which substitutes to the local population. Top priority must be given for the development of this section by adopting different strategy because of its peculiar physical and regional characters.

6B.6.2 Remedies for Sick Industries

Industries being the backbone for the region in the modern days they are responsible for strengthening the region, against poverty and ill health. If they fall ill, the immediate question will be what is to be done for its sickness. The answer is that financial institutions and government agencies have to put whole-hearted efforts to bring back the sick unit to improve and normally by a suitable development programme. These programmes must come into practice and progress effectively. Following are the few remedies for a sick unit:

(a) ascertain the reason for sickness and initiative preventive measures; may be natural or political factors;

(b) educating the entrepreneur in the management of the unit;

(c) guiding committee should be kept in all the thanas to look after the units for the districts in a proper manner;

(d) instead of insisting upon the unit to bring further money for nursing, finance should be provided either by the Government or through any other agencies with the least interest at village level;

(e) Government should take bold steps to purchase the products to fulfill the incompetent unit at an earlier stage;

(f) there should be some rules and regulations for the trade unions;

(g) politics must be kept away from the industrial activities;

(h) the government policies should favour cottage industries much rather than big one; and
since the geographical factors influence the locations, along with economists, geographers opinion must be considered even at the beginning stage because of the peculiar physical characters of the country which are discussed in Chapter I.

According to the observation and base line survey, the researcher is of the opinion that a district level or the micro-level/thana level, a committee must be there to look after the reasons for sickness and avoid the sickness of the industries. For this, Government should not keep away the academicians, researchers and planners and village people from this field. Then only the industrial policy will be succeeded to develop the regional industrial structure of the region.

6B.7 Environmental Pollution

Public awareness of the problems of environmental pollution is perhaps the most important development in recent years. Practically all the industrial manufacturing process lead to generation of pollutants, which are conventionally discharged into the atmosphere and water bodies (Wodeyar, 1980, p. 130). The impact of pollution on the environment is profound and the pollutants emitted from the industries constitute a point source of pollution. However, the pollutants are biological, chemical and physical in the study area, which occur usually in three natural categories; viz., mainly on water, land and on air (most of the industries are on small scale, and agro and forest based).

The present haphazard growth of industrial units and disproportional growth of population has resulted in imbalance between the self-purifying power of nature and enormous degree of environmental pollution. Of course, the pollution of environment in respect of air, water and land have attained the global status and it is prime in the developing country like Bangladesh. The industrial development
though aimed at raising the standard of living, which involved greater intensity of mechanisation and concentration of wealth among few industries, has created an environmental pollution. The concentration of industries at particular places; viz., Tangail Sadar, Gopalpur, Basail, Bhuapur, Deldaur, Ghatail, Kalihati, Madhupur, Mirzapur, Nagarpur and Sakhipur towns have created mainly water pollution whose effects are seen in the surrounding area. Since almost all existing industries are located in and nearby the towns they have created problem of environmental pollution. In rural areas air pollution is increasing since they use husk, baggase, straw, as fuel in food industries. They can not use other than this. Therefore, the technology should be adapted which can help to reduce the smoke generated by those fuels. In future, the area will have many large, medium and small-scale industries. So all precautionary steps must be taken up to avoid industrial congestion and its worst impact on all sides.

6B.8 Proposed Industries

The discussion proves that Tangail district is endowed with natural and cultural resources. The existing industrial pattern does not impress much on these lines. Proper utilisation of available resources is yet another prime factor to be considered in the study area. Basically district is an agrarian nature and the situation is different in the agro-industrial sector. Due to alluvial flood plain agriculture has become prosperous one. Future projections of agricultural productions in the study area as mentioned in Chapter V, shows there are good chances of having food grains and cash crops, which needs processing, proper plan and management.

For the present and perhaps for the next few years, and decade, industrialisation in Tangail district should be based on agriculture and demand base. Four major crops; viz, paddy, oilseeds, jute and sugarcane will provide the raw materials even for the
future industries in the district. Out of the gross cropped area, about 61 per cent under paddy, 11 per cent under oil seeds, 9 per cent under jute, and 0.5 per cent under sugarcane. The district is more efficient and surplus in its production in above-mentioned crops. Thus it provides raw materials to the agro-based industries like rice mill, oil mill, bakery, food and beverage, ginning and processing medicinal cosmetics, etc. These agro-based industries can be established in various parts of the district, as mentioned in the Appendix VIB.2. These are suggested on the basis of infrastructure, labour, demand, and availability of raw materials.

In case of forest base industries, only few minor industries are existed. These industries are concerned with manufacture of furniture, bullock cart and agricultural implements, saw mills, bamboo and cane work, gum manufacturing, agarbathi, straw board, sports goods, rope making, etc.

In view of available flora resources, various industries may be established. There is lot of scope for establishment of mini and tiny scale industries on various items, which can have place in rural and remote areas, and greater demand in urban centres.

After the fieldwork and study of industrial aspects of the district, number of industries has been suggested/proposed on the basis of demand base, resource base, and skill base in the study area on thana level Fig. – 6B.4 (Appendix - VIB.2). The total number of proposed industries is 175. Maximum numbers of industries are suggested to establish in Tangail Sadar thana (29 units) followed by Madhupur (19), Bhuapur (17), Kalihati (17), Deldaur (17), Ghatal (16), Gopalpur (16), Mirzapur (14), Sakhipur (11), Nagarpur (10) and Basail (9). While establishing the industries mainly at and near by the growth centres, other suggested industries also must get importance by the government. The proposed industries should be
established in the rural areas. This is needed to develop the rural's economy, and the young unemployed will get job. At the same time it becomes secondary income to the family by engaging the women at the houses. The wastage agricultural products will be stopped. So that the rural people will also be benefited and that will be the just, when all these are materialised, definitely, the study area will get good place in the industrial map of the country and all raw materials will be promptly utilised by those industries. Justice will be given to the development of the regional economy. Thus integrated area includes not only agriculture but also decentralised industries to provide work for agricultural labourers, small and marginal farmers and others too.
Fig. - 6B.4: Proposed Industries at Growth Centres
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