CHAPTER - I

THE AREA

Hooghly district, one of the six constituent units of Burdwan division of West Bengal, consists of four subdivisions namely, Hooghly (Sadar), Chandannagar, Arambagh and Serampore. Chandannagar subdivision was created on the 2nd October, 1954 by a government notification\(^1\) and another notification\(^2\) defined the local limits of those four subdivisions and transferred the police stations of Bhadreswar, Singur, Haripal and Tarakeswar from the erstwhile Serampore subdivision to the newly created Chandannagar subdivision (Banerji, 1972). At present Serampore subdivision has an area of 414.40 sq. km. (Census, 1971).

Location

Serampore subdivision is located in the southern part of Hooghly district between 87°59' E and 88°22' E, and 22°39' N and 22°48' N. It is bounded on the east by the meandering Bhagirathi river which is known as the Hooghly in this part and on the west by the Damodar river, on the north by Tarakeswar, Haripal, Singur and Bhadreswar police stations of Chandannagar subdivision of Hooghly district and on the south it is bounded by the district boundary line between Howrah and Hooghly (Fig. 1.1).

The subdivision consists of four police stations namely Serampore, Uttarpara, Chanditala and Jangipara. Serampore town is the headquarters of

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1. Notification No. 3536 G.A. dated 2. 10. 54.
2. Notification No. 3537 G.A. dated 2. 10. 54.
the subdivision. Serampore was originally occupied by the Danes. It was, for sometimes, under British control in the early nineteenth century and subsequently restored to them. In 1845, it was ceded to the Britishers (Banerji, 1972). Early in 1845, the Government became fully alive to the necessity of establishing the subdivision for the better supervision of the police and convenience of the people and before the close of that year, the subdivision was established with Dwarhatta as headquarters (Toynbee, 1888). In 1847, the subdivisional headquarters was transferred from Dwarhatta to Serampore* (Banerji, 1972).

Serampore subdivision consists of four blocks namely, (1) Serampore-Uttarpara block with headquarters at Serampore, (2) Chanditala block I with headquarters at Washat, (3) Chanditala block II with headquarters at Chanditala and (4) Jangipara with headquarters at Jangipara. Serampore-Uttarpara block comprises of Serampore and Uttarpara police stations except the municipal areas. Chanditala police station has been divided into two blocks namely, Chanditala I and Chanditala II, the area of Jangipara police station coincides with Jangipara block.

**Physical Environment**

Life is a synthesis of organism and environment. In geographical literature, environment is divided into physical and social aspects. In the beginning, the physical environment is described in the present study. Social aspect is dealt with in the following chapter. The physical environment can

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* At present it is spelt as Srirampur.
be subdivided into inorganic and organic elements. The inorganic elements are geology, physiography, drainage, climate, and soil. Natural vegetation of the area is an organic part of the environment which also has an impact on the economy of the people.

Geology: Geologically, the area is located in the stable shelf area of the western flank of the Bengal Basin and is entirely covered by alluvial formation. Sand is common in the river beds. Morphologically, a coalescing of a large number of alluvial fans forms subsurface geological structure. The principal deposits of the area vary in age from the Cretaceous period to the Pleistocene epoch. The sedimentation in most part of the area was deltaic in nature in the last geological period and is fluviatile at present as the deltaic stage has migrated southwards (Banerji, 1972). Bagchi (1944) describing the area observed: "A lowlying region characterised by swamps and unhealthy conditions is formed extending upto the Hooghly, which partakes of the nature of a deltaic region in some points. But it can be considered more as 'piedmont plain'. Moreover, this western tract is not included within the distributaries of any river. So that, judging by the structure, hydrography, origin and landforms, this region cannot be included within the present deltaic region of Bengal". However, Spate (1954) and Banerjee (1964) are of the view that Hooghly district is made up of two geomorphological units - a high old deltaic plain to the west (Arambagh subdivision) and the rest a dead delta. Serampore subdivision is categorised under the later unit.

Physiography: Being a part of the flat plains adjoining the lower Gangetic delta, the topographical homogeneity of the area is remarkable. On
the vast aggradational surface the only marked topographical variations are those associated with the numerous shifts and diversions of the rivers and, unequal aggradation rendering some areas above flood level and others below. The slopes of broad interfluves are barely, if at all perceptible, the only noticeable relief being the flood plain bluffs and embankments. 

The tract of land lying between the Hooghly and the Damodar is a flat alluvial plain intersected by a number of sluggish rivers and streams. This tract is a land of dead and dying rivers. While some of these are the dying channels of the Hooghly which carried a lot of water of the Ganga in the past, one such river is the Saraswati which is now a days a small meandering stream, some others are the old channels of the Damodar. They have significant prefixes such as 'kana' which means blind. The important abandoned courses of the Damodar are the Kausiki, the Kana Nadi, the Dakater Khal, the Madaria Khal, etc. (Bose, 1968). The general relief of this tract will be evident from the following mean elevations above sea level.

<table>
<thead>
<tr>
<th>Police station</th>
<th>Mean elevation above sea level (in metres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jangipara</td>
<td>6.9</td>
</tr>
<tr>
<td>Chanditala</td>
<td>5.0</td>
</tr>
<tr>
<td>Serampore</td>
<td>3.8</td>
</tr>
<tr>
<td>Uttarpara</td>
<td>3.2</td>
</tr>
</tbody>
</table>

From the shifting characteristics of the Damodar towards west and the Saraswati being the bordering dying channel of the Hooghly river, it
appears that there existed an ill-defined water divide between the Saraswati and the previous streams of the Damodar basin.

Between the Saraswati and the Hooghly lies the vast depression consisting of bil area (marshy land) known as the marshy tract of Dankuni. East of that marshy tract lies the levee of the Ganga on which a continuous belt of urban area has been formed. From the flow direction of the rivers the general slope of the area seems to be from north to south. A very prominent levee was formed downstream along the left bank of the Damodar which constitute an important feature of topography. The left embankment, being continuous, had been provided with many sluices to allow inflow of irrigation water and outflow of inland drainage. The higher lands are more or less occupied by village sites or by jute fields or autumn rice and vegetable cultivation. The depression between the two rivers or streams have been turned into extensive rice fields or if still lower in elevation, form vast marshes (Dankuni, Makhalpara, etc.).

In the western parts of Serampore subdivision, the narrow silted up abandoned channels of the Damodar fails to carry the volume of water with sufficient rapidity that pours into them during heavy rain and they consequently overflow. After the retreat of monsoon, those blind courses of rivers appear to be a succession of stagnant pools by accumulation of water in the deeper parts of their beds while the surrounding land, because of poor drainage, becomes waterlogged. The topography of the area has also been changed to a great extent, due to human interference, by erecting embankments across the natural gradients for building railways, roads and also as a
measure of flood control. The Howrah–Sheakhala and the Howrah–Amta light railways for instance, were protected by high earthen bulwark, from the overflow of the Kausiki and the Kana Damodar. A number of important roads e.g. the National Highway No. 2 and other State Highways run along elevated surfaces. Erratically constructed embankments, the immediate neighbourhoods of which are desolate (perhaps due to the flood menace) are to be found between Furfura and Jangipara, below Nababpur to the west of the Howrah–Sheakhala light railway (Banerjee, 1972). From this, it is evident that the physiography of this area is very much a product of drainage and climate. The former is described first followed by the later.

Drainage: The rivers of this area provide a key to its geography, socio-cultural life and economy. The entire subdivision is the gift of its rivers which still supply water in the agricultural field and change the physiography. So, a clear idea about the river system of this area is very much essential for understanding the development of agro-economy (Fig. 1.2).

The system consists of two large rivers, the Hooghly (the Bhagirathi branch of the Ganga) in the east and the Damodar in the west and the interfluve is drained by the Kana Damodar, the Saraswati, the Kausiki, etc.

From Sukhsagar (in Nadia district), the Hooghly river runs southwest to Tribeni and then nearly south upto Hooghly town and Chinsurah of Hooghly district after that it follows a southerly course winding alternately from west to east and forms the eastern border of Serampore subdivision from Baidyabati and flow in the same direction till Mahesh. Then the river takes a southerly course upto the outfall of the Bally khal, which forms a part of
the southern boundary of Serampore subdivision as well as of Hooghly district. In the summer, the river shrinks much in width yet it is navigable by large boats and river steamers throughout the year.

Earlier, the Saraswati river seems to have been the main channel of the Ganga and the settlements were located at the confluence of the former and the present Hooghly river as may be observed in the old European maps (Chatterjee, 1963). The ancient port of Saptagram was located on its bank. The Saraswati branches out of the Hooghly near Tribeni (Hooghly district), enters into Serampore subdivision near Okardaha village and flows southward across the subdivision through Chanditala police station before entering into Howrah district. It meets the Hooghly again near Sankrail. Now, the bed of the Saraswati has been silted up and only during the rains, it gets the appearance of a small stream.

The Damodar is the next large river of the subdivision, which is much more responsible in the formation of the physiography of the region than the Ganga by shifting its courses in different times. The river originated in the Palamu Hills, Bihar and moves southward to enter into the district of Hooghly. It enters into Serampore subdivision at a point near Morhal above Rajbolhat of Jangipara police station and flows about 12.9 kilometres towards south and forms a natural western boundary line of the subdivision and finally enters into Howrah district. The river assumes a deltaic character throwing distributaries. Most of the distributaries have been silted up, while the main channel of the Damodar is liable to sudden and terrible floods, whose destructive force makes great havoc in the area for which it was known as the
river of sorrow. By erecting a continuous embankment in the east bank of the river, the havoc is restrained to a certain extent. Its notoriety is not only restricted for causing devastating floods but also to its tendency of changing the course frequently. The river is unaffected by tides. Cultivation, of ten, extends up to the margin of the bank of the river during rabi season. The river bed is sandy. It is fordable at many places in the hot and the cold seasons, but during the rains, it becomes navigable by country boats. The destructive nature of the Damodar has, however, now been tamed with the progress of the work under D.V.C. project. But the narrow silted channels remain a potential source of floods during the rainy season. During the period of excessive rain, these channels cannot carry the flood discharge from the reservoirs up stream.

A study of subsoil geology reveals that there are no continuous layers of sand, silt or clay of recent geological age, present in the inland delta and that the detritus brought down by the Damodar and the Bhagirathi are intermixed at all places as is proved from the infiltration of clay-pan of varying thickness in the beds of sand or silt. This establishes that the Bhagirathi, the Damodar and their spill channels have been shifting their courses and in the process of such migration has formed the inland delta (Sen, 1957).

The Kana Damodar was the major channel of the Damodar in the past. The prefix 'Kana' (blind) indicates that it was active in the past, but now it is choked up. However, it has been connected with the Rajapur drainage channel later on.
The Kausiki is also another abandoned channel of the Damodar which runs through the eastern part of Jangipara police station and is chocked now.

There are certain khals (canals) like the Dakater khal, the Metia khal, the Madaria khal, etc. which act as the village channel to drain out the water. These are also the spill channels of the Damodar. Dankuni bil is situated between the Saraswati and the Hooghly and Makhalpara bil is lying on the western side of the Saraswati river. The natural drainage of those bils was impeded by the construction of railway and road embankments.

Climate: Proximity to the Bay of Bengal in the south and location of the Himalayas in the north are the chief determinants of the climate of the plains of West Bengal and as such, the climate of this area hardly differs from the overall humid mesothermal climatic pattern. The moisture is the limiting factor but not the temperature. The climate of the area is characterised by an oppressive summer, copious rains and high humidity followed by a cold and soothing weather. The year may be divided into four seasons - hot summer starts from mid March to mid June. Average highest temperature varies from about 26°C in March to 42°C in May. The hot season is characterised by strong westerly winds from the middle of March upto the middle of May. The weather is oppressively hot and associated with thunderstorms, that commonly occur in the afternoon followed by heavy rains with hails. Sometimes severe squalls come from the north-west known as the nor-westerly (the Kalbajshakhi) causing massive damage of summer fruits.
Average rainfall of this season is 130.96 mm. (approx.) which is 10.4 per cent of the total annual rainfall. The sultry and oppressive weather after middle of May is the forerunner to the burst of the southwest monsoon. The monsoon commences in about the middle of June comprising the second part of the summer season (the rainy season) which is controlled totally by the movement of the southwest monsoon. It lasts upto September. The season is associated with heavy rain and thunders. Highest temperature varies from 39°C in June to 34°C in September. Average rainfall of the season is 1367.02 mm. (approx.) which amounts to 78.4 per cent of total annual rainfall. Humidity is very high in July and August, but the weather becomes most trying in September, the period being vulgarly known as Pacha Bhadra (rotten September). October and the first half of November is the post monsoon period (table 1.2). It is fairly pleasant.

Table 1.2
Rainfall Record for 2 stations (in mm.)
(10 years average from 1951-60)

<table>
<thead>
<tr>
<th>Station</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chanditala</td>
<td>8.43</td>
<td>12.77</td>
<td>23.15</td>
<td>33.57</td>
<td>79.45</td>
<td>264.72</td>
<td>322.05</td>
</tr>
<tr>
<td>Serampore</td>
<td>17.19</td>
<td>13.93</td>
<td>24.74</td>
<td>47.53</td>
<td>153.49</td>
<td>317.13</td>
<td>395.46</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Station</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chanditala</td>
<td>275.98</td>
<td>340.04</td>
<td>153.89</td>
<td>11.66</td>
<td>3.30</td>
</tr>
<tr>
<td>Serampore</td>
<td>412.51</td>
<td>406.13</td>
<td>154.68</td>
<td>7.95</td>
<td>2.49</td>
</tr>
</tbody>
</table>

A few thunderstorms occur in October. The cold season starts after the middle of November and lasts till the end of February. Maximum fall of temperature is observed in December and January (Table 1.3). Occasional fog occurs during this season.

Table 1.3
Mean Maximum and Highest; Mean Minimum and Lowest Temperature
(Average of 1957-1960 in °C)

<table>
<thead>
<tr>
<th>Station - Barrackpur</th>
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<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Mean Maximum</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>January</td>
</tr>
<tr>
<td>February</td>
</tr>
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<td>October</td>
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<td>November</td>
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<td>December</td>
</tr>
</tbody>
</table>


* As Hooghly district has no observatory, temperature recorded at Barrackpore station is given.
The agriculture of the area is mostly controlled by its climate. This is reflected by the belief of the cultivators. They said that heavy rains are necessary in Asher and Sravana (mid June to mid August) to quicken the growth of seedlings and to reduce the ground to soft mud required for transplanting the young seedlings from the nursery. The most trying weather from the middle of August to the middle of September (Bhadra) permits the successful maturing of early paddy (aus) and jute. The fairly good rain in Aswin (mid September to mid October) helps the winter paddy just coming into ear. Cyclonic storms and the accompanying winds are injurious for paddy plants during this period. Finally, rainless Agrahayan (mid November to mid December), is ideal for ripening of rice and an excellent yield of the crop. A little rain is welcomed for the rabi crops in the month of Paus (mid December to mid January) and light showers in Magh (mid January to mid February) and Phalgun (mid February to mid March) are necessary for healthy and vigorous rabi crops as well as to facilitate ploughing to prepare the land for jute and aus paddy and seedbed for aman paddy.

Soil: Serampore subdivision lies in the alluvial tract between the Hooghly and the Damodar with their tributaries and distributaries, these are prime sources of alluvium. This alluvium was the parent material on which the soil forming factors acted to produce the soil. In the formation of soil of this region, the physiography of the area also played a significant role (Lahiri, 1964). From pedogenic aspect, the soil of this area have been divided into two families depending upon their primary sources (of alluvium). The two soil families of this subdivision are as follows:  

(1) Vindhyan alluvium: In some parts of the area the alluvial deposits were laid down by the rivers originating from the eastern part of the Vindhyan Range of hills in the Chhotanagpur plateau. Precisely for this reason, soils formed on such alluvium are given family name of Vindhyan alluvium. It occurs in Jangipara police station.

(2) Ganga alluvium: These soils have been formed from the Gangetic alluvium. They are found in Chanditala, Serampore, Uttarpara and eastern part of Jangipara police stations.

The soils of each family consist of a number of soil associations (Fig. 1.3). The Vindhyan family is represented here by (1.i) Damodar riverine and (1.ii) Damodar flat land soil associations. The Ganga alluvium family is represented here by (2.i) Ganga flat land and (2.ii) Ganga low land soil associations.

(1.i) Damodar riverine soil: This type of soil is mostly formed in central and northwestern portion of Jangipara. An immature profile has developed in this type of soil. Sand is common along the eastern part in the braided channels of the Damodar. In some places subsoil is formed of coarse sand. The texture of the top soils vary from sandy clay loam in northwest and loamy sand to silty loam in the centre. These tracts suffer from inundation during the rainy season.

(1.ii) Damodar flat land: This type of soil is found in the western half of Jangipara police station. Presence of calcium, potassium and clay indicates that a process of leaching has started, and as a result the surface
has become slightly acidic in nature. The textures of the top soil vary from sandy loam to sandy clay loam or loamy sand.

(2.1) Ganga flat lands: These soils occur in the eastern part of Jangipara and western part of Chanditala police stations. The soil in Jangipara is loamy sand and in Chanditala loamy sand to clay loam and in places silty loam. The soil types depend upon the different micro relief of the area and at places are calcareous in nature.

(2.2) Ganga low lands: These soils occur in the eastern and the south-eastern parts of Chanditala police station and in entire area of Serampore and Uttarpara police stations. The areas having this soil are physiographically low land. They are generally abandoned river beds and silted up bils. Much of these areas get inundated during the rains. These are the lands that experience drainage problem. In these areas, the top soil is clay and subsoil consists of silty clay and has a good percentage of sodium. Utmost care, therefore, is necessary to protect the area from the subsoil water otherwise the area will be occupied by reeds and marshes. The cultivated land with this type of soil have been reclaimed from marshes. The top soil of these lands are clay, clay loam, silty loam and sandy clay loam in Chanditala police station. Whereas clay, clay loam, silty loam, sandy loam and loam soils are found in Serampore and Uttarpara police stations.

On a very generalized basis it may be said that the areas near the Damodar river has sandy loam while the land bordering the Hooghly river has clayey loam to clay. The areas marked by marshes have clayey soils and the soil profiles near them indicate poor drainage down the profile. On the
whole, except the areas mentioned, the profiles display good drainage conditions. The nitrogen, phosphorous and potassium (N.P.K) status of the soils are rather low. The organic matter content is also low which is quite natural in a cultivated area (Bhattacharyya, et. al. 1972). The application of fertilisers and compost manures are necessary to raise the yield of different crops.

Natural vegetation: As a result of urbanisation and high population pressure in the rural areas, the natural vegetation of the subdivision has long been depleted by human intervention. The area, at present, is dominated by cultivation and associated weeds.

REFERENCES


