Chapter--IV

CLIMATE AND ITS IMPACT ON LAND POTENTIALITY
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Introduction :

4.1 Land potentiality evaluation concerns the understanding of the opportunities and limitations of the land and its various aspects. Land varies greatly in topography, climate, geology, soil and vegetation covers. An assessment of land may lead to the accumulation of plentiful information. An attempt has to be made to translate these findings into a usable form. Among various ingredients of land potentiality climate play an important role in land evaluation. The influence of climate on land related attributes like soil, drainage, soil erosion is multifold. It is an important parameter which determines the growth of all plant species, as the extreme climatic conditions are detrimental for plant growth. Climate and its various components influence the land use planning either directly or indirectly.

4.2 Latitudinaly, Purba Medinipur District extends between 22° 30'05"N to 21°36'35"N. As the study area is situated near the Tropic of Cancer as well as Bay of Bengal -the climate of the district is characterized by subtropical monsoon type of climate. The seasonal variations are quite pronounced. There is not much regional variation in climatic conditions but some portions like south and south- west regions are frequented by some climatic aberrations. The climate of the southern portion of the district is slightly different from that of the northern portion. Due to coastal location the climate of the southern portion is generally influenced by the marine environment.
Seasons:

4.3 On the basis of local rainfall and temperature conditions of different stations (Fig. 4.1) it is found that the entire study area is characterized with four distinct seasons (Table 4.1). The seasons identified are:

(a) Warm and Dry summer
(b) South-West monsoon
(c) North-East monsoon and
(d) Winter period

Table : 4.1
 Seasons of the Study Area

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Time</th>
<th>Seasonal Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warm and Dry Summer</td>
<td>March to May</td>
<td>Hot and Warm, sudden occurrences of Kalbaishakhi</td>
</tr>
<tr>
<td>South-West Monsoon</td>
<td>June to September</td>
<td>Rainy season</td>
</tr>
<tr>
<td>North-East Monsoon</td>
<td>October to December</td>
<td>Retreating monsoon</td>
</tr>
<tr>
<td>Winter Period</td>
<td>January to February</td>
<td>Winter dew, fog and occasional occurrences of cyclonic storms</td>
</tr>
</tbody>
</table>
Table: 4.2  Seasonal Temperature Variation in the Study Area

<table>
<thead>
<tr>
<th>Months</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contai</td>
<td>Maximum</td>
<td>31</td>
<td>34</td>
<td>37</td>
<td>40</td>
<td>40</td>
<td>37.5</td>
<td>36</td>
<td>36.5</td>
<td>36</td>
<td>34</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Minimum</td>
<td>5.5</td>
<td>8.5</td>
<td>13</td>
<td>16</td>
<td>19</td>
<td>18</td>
<td>21</td>
<td>22</td>
<td>21</td>
<td>17</td>
<td>10</td>
</tr>
<tr>
<td>Nandigram</td>
<td>Maximum</td>
<td>30.7</td>
<td>35.3</td>
<td>38.6</td>
<td>40.1</td>
<td>44.4</td>
<td>41.6</td>
<td>35.8</td>
<td>35.8</td>
<td>34.8</td>
<td>35.3</td>
<td>33.9</td>
</tr>
<tr>
<td></td>
<td>Minimum</td>
<td>8.4</td>
<td>9.6</td>
<td>15.3</td>
<td>16.8</td>
<td>19.6</td>
<td>22.2</td>
<td>22.2</td>
<td>22.3</td>
<td>23.3</td>
<td>18.8</td>
<td>12.7</td>
</tr>
<tr>
<td>Egra</td>
<td>Maximum</td>
<td>33.5</td>
<td>23.5</td>
<td>36.5</td>
<td>37.5</td>
<td>37.5</td>
<td>36.5</td>
<td>35</td>
<td>34</td>
<td>34</td>
<td>33</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Minimum</td>
<td>9.5</td>
<td>13</td>
<td>20</td>
<td>20.5</td>
<td>21</td>
<td>23</td>
<td>24</td>
<td>25</td>
<td>22.5</td>
<td>19</td>
<td>15</td>
</tr>
</tbody>
</table>

Source: Meteorological Stations at Seed Farms, District Statistical Hand Book of Bureau of Applied Economics and Statistics, Principal Agricultural Officer, Tamluk.
Seasonal Characteristics:

(a) Warm and Dry summer:

4.4 Due to tropical location, with vernal equinox the district suffers hot summer season. This is pre-monsoon period when a sharp rise in temperature is experienced in the entire district. Scorching heat and dry warm winds prevail during this period. Exceptionally high temperatures are a regular feature of the hot weather months of the district. This pre-monsoon season is comparatively dry, though December to January is the driest months of the district.

4.5 From the month of March the temperature starts rising and in the month of April it reaches approximately 37° at Egra, 39° at Nandigram, 38° at Contai (Table 4.2) and oscillates around it in the month of May. The maximum temperature during summer is recorded at Contai. April and May are the warmest months of the district. The mean annual maximum and mean minimum temperature of different stations are 32.9° and 17.3 at Contai, 34.2° and 18.2° at Nandigram and 31.4° and 21.2° at Egra.

4.6 Occasional thunderstorms known as *Kalbaisakhi* during this season are a frequent feature of the district. These thunderstorms are accompanied by lightening and heavy showers. These thunder showers lower the temperature considerably. From March to the middle of May it remains partially dry and enervating this makes this season quite uncomfortable, intolerable and unpleasant.

(b) South-west monsoon:

4.7 The south-west monsoon or summer monsoon starts with the progressive advancement of the vortices of air motion from the Bay of Bengal towards the coast of the district. The weather condition of the district during this season is similar to other parts of south-West Bengal.
<table>
<thead>
<tr>
<th>Stations</th>
<th>Kharif</th>
<th>Rabi</th>
<th>Total Rainfall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>May</td>
<td>June</td>
<td>July</td>
</tr>
<tr>
<td>Panskura</td>
<td>101.38</td>
<td>177.3</td>
<td>274.4</td>
</tr>
<tr>
<td>Egra</td>
<td>135.96</td>
<td>280.2</td>
<td>292.06</td>
</tr>
<tr>
<td>Contai</td>
<td>145.5</td>
<td>225.25</td>
<td>284.29</td>
</tr>
<tr>
<td>Dlgha</td>
<td>215.02</td>
<td>269.25</td>
<td>230.51</td>
</tr>
<tr>
<td>Nandigram</td>
<td>112.71</td>
<td>286.42</td>
<td>330.13</td>
</tr>
</tbody>
</table>

With the onset of south west monsoon with a sudden outburst of clouds in second or third week of June the mean maximum temperature is reduced by 3 to 4’ Celsius. Rainfall helps in providing relief from the hot winds. The rainfall is controlled chiefly by the formation of cyclonic storms in the Bay of Bengal and impact over the whole of the south West Bengal. After formation it moves slowly towards interior of the West Bengal. The amount of rainfall generally increases gradually until it becomes maximum in the month of July and early August. About 80% of the total annual rainfall is received during the months of south-west monsoon. The monsoon rainfall is occasionally intensified by cyclones formed over the head of the Bay of Bengal. During their passage they cause heavier rainfall along their tract. The agriculture is large rain fed, therefore, most of the net sown area is confined to the kharif season. Soil moisture for crop production is available during rainy season. Due to lack of irrigational facilities, the area under rabi crops in the coastal region is limited. Therefore rainfall from south-west monsoon determines agricultural land use pattern in the study area.

4.8 The highest amount of rainfall is recorded between July to September months with an around 1000cm rainfall in the entire district. The (1994-2006) amount of total average annual rainfall in different meteorological stations are 1806.78 mm. at Digha, 1761mm at Contai, 1760 mm at Nandigram, 1381mm at Panskura and 1823 mm. at Egra approximately (Table 4.3)(Fig. 4.2). Average annual rainfall in the district decreases from the coastal regions towards interior (Fig.4.3). The south west portion (Egra, Digha and Contai) of the district receives highest amount of rainfall during Kharif as well as Rabi seasons. During south west monsoon periods cyclonic storms are less intense, less
MONTHLY AVERAGE DISTRIBUTION
OF RAIN FALL IN SELECTED BLOCKS
Purba Medinipur
(Ref. Table 4.3)
destructive and smaller in extent. Due to the presence of the Bay of
Bengal cyclones are often associated with heavy rainfall, as a result of
which floods are regular features of the district during rainy months.

North-East monsoon:
4.9 It is a transitional period between summer and winter season. From
the month of September- October a reversal of wind direction takes
place. During this season south – west monsoon winds are replaced by
north east winds. This short calm winds last till about the middle of
November. This is also the period of autumnal equinox. The serenity of
weather is occasionally disturbed by the appearance of sporadic
cyclones. These occasional cyclones are often associated with heavy
downpour incurring huge losses of agricultural activities during this
period.

Winter period:
4.10 With the apparent southward movement of the sun winter season
over South Bengal sets in. Nights start lengthening and loss of heat
through dissipation takes place. The months of December and January
represent cold weather season of the district. The diurnal temperature
starts falling from the month of December and it continues till January.
December and January are the coolest months of the district. Mean
winter temperatures at different stations of the district are18’c at Contai,
19.5’c at Nandigram and 21’c at Egra approximately. In the cold weather
months of December and January only a fraction of total rainfall occurs.
The rainfall during this period generally occurs by cyclonic storms which
form in the south- west portion of the district (Bay of Bengal) and
influence the agricultural activities (Rabi crops) of the district From about
SEASONAL RAINFALL CONDITIONS
Purba Medinipur
(Ref. Table 4.3)
the end of December when the Northerly Trade winds become establish, cold season storms are caused by shallow depressions, which originate in the North – East of Bay of Bengal and move east wards.

4.11 Usually sky remains calm and clear during this period. December to February is the driest months of the district. At the end of January or the beginning of February local sea breeze commences and extends their influence further inland. From about the middle of March a strong breeze begins to blow from the south and continues through the hot weather. Sometimes the weather is disturbed through the western disturbances.

**Conclusion:**

4.12 The entire district experiences a sub humid type of climate. There are little variations regarding temperature and rainfall distribution. The southern tracts receive higher amount of rainfall as compared to the northern tracts. The entire district is subjected to an array of climatic aberrations. Due to their coastal location the southern tracts are more prone to climatic disturbances like strong southerly winds, cyclonic storms associated with tidal surges etc. All these climatic parameters influence land potentiality of the district. As the study area has some depressed basins (Dubda basin and Barochowka basin of Egra Sub-division), the huge amount of rainfall the study area receives during rainy seasons often resulting into drainage congestion, waterlogging and devastating floods annually. As a result of which exploitable land potentiality is reduced. As a whole all these climatic parameters play an important role in land use pattern in the study area.