CHAPTER II: ECOLOGICAL DIMENSIONS OF STUDY AREA

2.1 Introduction
Study area here refers to a unit space on earth’s surface with homogenous physical attributes like geology, topography, drainage, climate, vegetation and soil. Here, it is a part of the larger Rarh area which is regional entity in itself. Therefore, in dealing with the dimensions of the ecological milieu of the study area, it becomes imperative to refer to the regional entity of Rarh area of which it is a part.

2.2 Study Area
Study area is Labpur C. D. Block of Birbhum District, West Bengal, India (Map 2.1). Located in the plateau-plain transition zone of West Bengal, the study area has an undulating topography. The undulations fade out in the east and the valley gradually merges in the alluvial plain of Gangetic delta. The climate is Tropical, characterized by oppressive hot summer, a cold weather (mid-November to February) followed by summer (March to May) and the south-west Monsoon season from June to September. Monsoon rainfall constitutes 77.37 % of total annual rainfall. Temperature rises rapidly from March, May (36.61° C) being hottest.

2.3 Justification for Selection of Study Area
Labpur C. D. Block, the study area is an administrative unit situated in south-eastern portion of Birbhum District, West Bengal. An administrative unit has been deliberately chosen because the study essentially deals with social space for which facts and figures related to land are maintained administrative unit wise by Govt. agencies. This facilitates information collection as well as data compatibility obtained from different Govt. departments.

2.4 Ecological Dimensions
2.4.1 Geology
The Tertiary and Pleistocene deposits of Rarh area are mostly covered by a variable thickness of Laterite which even envelops some portions of the peneplained and highly weathered gneissic terrain to the west. Along the north of the Ajay river, to the south of Labpur and Bolpur, the country is absolutely flat. The hollows between the ridges form natural drainage channels, which in the wider valleys are streams of considerable volume and in a few cases expand into broad rivers. The geological succession found in the study area is as given in table 2.1.

Archaean rocks are the oldest rock formations in this area, its Granitoid and Schistose rocks having crystallized at least 900 million year ago. These are a continuation to the east of
the Peninsular Archaean of the Chotanagpur plateau. These regions were subjected to
great diastrophic movements and erosion through a considerable period. On the deeply
denuded edges of the contorted Archaean, the sedimentary formations of Purana age
were deposited. The zone of unconformity between the Archaean and lower
Gondowanas is the evidence of large scale crustal movements and deformations that
brought about revolutionary changes in the physiography at the end of Purana period.

2.4.2 Topography
Spurs projecting from plateau section of West Bengal gives an undulating character to
the landscape. To the south east, ramification of ridges coming from west fade out, the
valley becomes shallow and gradually merges in Alluvial Plain of Gangetic delta. Ridges
on south bank of Mayurakshi river pass into flat country east of Suri, but swell into well-
raised uplands near Sainthia. Further east, undulations extend beyond the railway line a
few Km. east of Labpur, and even south of Bolpur, where the railway line runs through
a deep cutting of Laterite rock. Map 2.2 & 2.3 show the relief and slope of the study
area respectively.

2.4.3 Drainage
Study area is drained by Bakreshwar river system (Map 2.4). The source of river
Bakreshwar is 12-14 kms to the south of Rajnagar, near a place called Kathgare, south
east to Idagacha Many of its tributaries on right and left banks are seasonal and non
perennial. During rainy season; it overflows its banks and inundates the surrounding
areas. The region has Lateritic soil mixed with recent Alluvium and is characterized by
uneven surface configuration. Many of its tributaries (locally Kandors) on right and left
banks are seasonal and non-perennial. They carry a large volume of water during rainy
season and have formed miniature of Badland topography. The main river carries a
slender flow throughout the year and at places (Srikrishnapur) it has very high and
steep banks. Another perennial right bank tributary, Kopai nadi (river) joins Bakreswar
river at Paharghata with a new name Koiya nadi (river). An inconspicuous tributary
named Kandar / Khal (rivulet) join at the right bank of Koiya. The latter joins Mayurakhi
river in between Tarapur and Nabagram. The drainage pattern of Bakreswar river is
trellis. In between Ahmedpur-Katwa railway line southwest of Labpur extensive gully
erosion by tributaries of Bakreswar river, are noticed.

2.4.4 Climate
Climate is characterized by oppressive hot summer. The cold weather (mid-
November to February) is followed by summer (March to May). South-west monsoon lasts from
June to September. Monsoon Rainfall constitutes 77.37 % of total annual rainfall.
Temperature rises rapidly from March, May (36.61°C) being the hottest. Minimum and
maximum temperatures (11.49° C; 36.61° C) are recorded in January and May
respectively. Average monthly temperature range (6°C to 8°C) coincides with highest rainfall period (June to September). The minimum range is 1.45°C in the month of May (Figure 2.1).

2.4.5 Vegetation
The common plants seen around the habitation in villages are clumps of *babla* (*Acacia nilotica*), *bel* (*Aegle marmelos*), *atta/ sitaphal* (*Annona squamosa*), *kanthal* (*Artocarpus heterophyllus*), *neem* (*Azadirachta indica*), *bansh* (*Bambusae arundinaceae*), *Papaya* (*Carica papaya*), *amaltas/sondal* (*Cassia fistula*), *Lebu* (*Citrus medica*), *Bot* (*Ficus benghalensis*), *pakur/aswattha* (*Ficus religiosa*), *aam/ mango* (*Mangifera indica*), *sajina / drumstick* (*Moringa oleifera*), *Aamra* (*Spondias pinnta*), *Jaam* (*Syzygium cuminii*), *tentul / tamarind* (*Tamarindus indica*), *Arjun* (*Terminalia arjuna*) and other arborescent species. Trees planted on both side of the road and open areas are *akashmoni /sonajhuri* (*Acacia auriculiformis*), *babla* (*Acacia nilotica*), *Sirish* (*Albizzia lebbeck*), *Gulmohar* (*Delonix regia*), *Bot* (*Ficus benghalensis*), *pakur/aswattha* (*Ficus religiosa*), *aam/ mango* (*Mangifera indica*), *Karenja* (*Pongamia pinnata*), *Segun* (*Tectona grandis*). The common plants seen around tanks, bunds of paddy field and marshes are *Kachuripana* (*Eichhornia crassipes*), *Kini* (*Eragrostis unioloides*), *Jhanji* (*Hydrilla verticillata*), *Ishalangulya* (*Hydrolea zeylanica*), *Kuliakhara* (*Hygrophila suriculata*), *Kalmi* (*Ipomoea aquatica*), *Kesardam* (*Ludwigia adscandens*), *Susni* (*Marsilea minuta*), *Mukha* (*Monochoria vaginalis*), *Panilajuk* (*Neptunia prostrata*), *Saluki* (*Nymphsa nouchali*), *Takapana* (*Pistia stratiotes*), *Panimarich* (*Polygonum spp.*), *Jhillmarich* (*Aphenoclea zeylanica*), *Paniphal* (*Trapa natens*), *Janjhi* (*Utricularia aurea*). The predominant rofty stands of *Tal* (*Borassus flabellifer*) and *Khejur* (*Phoenix sylvestris*) with the crown of their leaves are very common to the landscape. The compact formation of *Arjun* on the banks of numerous streams is characteristic the area.

The distribution of natural forest and land under social forestry is not uniform throughout the area. Higher proportion of forest cover is seen in the southern part, around the villages of Mahutar and Amnahar. Moderately dense forest cover is scattered all over the region. The northern, north-western, middle, and southern portion of the region has low forest cover. Around Labpur, meager forest cover is seen because of the rapid extension of settlement and encroachment over cultivated land, consequent to immense population pressure. Most of the densely vegetated areas are inhabited by tribal population and agriculturally and socially less developed areas. It is also inferred that the above mentioned ‘densely vegetated area’ does not conform to the national and international standard of area to be under forest cover (Map 2.5).
2.4.6 Soil
The region has lateritic soil, mixed with recent alluvium and is characterized by uneven surface configuration. The soil characteristic of the area is described below and shown in Map 2.6.

From table 2.2 it is seen that about 37.64% of villages have clay soil texture, whereas 20.22% of villages have clay loam, loam & sandy loam texture each. The sandy texture covers only 1.69% of villages.

It is also seen that almost 57.86% of the total area are covered by the fertile clay and clay loam soil. It is the reason that agriculture is the basis of economy of study area.

2.5 Chapter Summary
The study area is characterized by lateritic soil and highly dissected topography. Climatically it is classed as semiarid with the consequent scarcity of surface and ground water. Surface drainage is typically tropical characterized by intense seasonality of monsoon rains which leads to seasonal swelling of the otherwise non perennial and semi perennial surface drainage lines. Natural vegetation cover is abysmally below the national and international recommendation area being under vegetation cover. This compounds the ecological stress imposed by pedogenic, climatic and topographic limitations because it limits water ground water recharge, prevents soil moisture retention and lead to soil erosion. The overall impression of these dimensions of ecological milleu is stressful as far as their conduciveness to land based resource appropriation activities is concerned. However, some of the indigenous varieties of trees and plants are found around homestead.

2.6 Concluding Remarks
The ecological milleu of the study area has several limitations. Under ordinary circumstances

i. they influence the distribution of the principal resource base among various social groups and
ii. they impose constraints on resource appropriation processes

Whether this is true or not is the subject matter of enquiry in the subsequent chapters. However, to examine remark number (i) we need to describe the socio-economic dimensions of the study area (Ch.III).
### Table 2.1 Geological Succession

<table>
<thead>
<tr>
<th>Age</th>
<th>Deposits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent</td>
<td>Alluvium</td>
</tr>
<tr>
<td>Tertiary (Miocene)</td>
<td>Laterite and Lateritic gravels with fossil wood, clay bed. Ferrugenius</td>
</tr>
<tr>
<td></td>
<td>and Falspathic sandstone and clay beds</td>
</tr>
<tr>
<td>Middle to Upper Jurassic</td>
<td>Rajmahal traps</td>
</tr>
<tr>
<td>Upper Gondowanas (</td>
<td>Grit, ironstone, sandstone and shales with beds of fire clay and coal</td>
</tr>
<tr>
<td>Middle Trias-Jurassic)</td>
<td>seams</td>
</tr>
<tr>
<td>Unconformity</td>
<td></td>
</tr>
<tr>
<td>Archeans</td>
<td>Granite (Porphyritic &amp; Granitic) Gneisses &amp; Schists with Pegmatite and</td>
</tr>
<tr>
<td></td>
<td>Quarly veins</td>
</tr>
</tbody>
</table>

Source: Majumdar, 1975:20

### Table 2.2: Types of Soil Texture

<table>
<thead>
<tr>
<th>Types of soil texture</th>
<th>Number of villages under different types of Soil Texture</th>
<th>Percentage of villages to C.D. Block under different types of Soil Texture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clay</td>
<td>67</td>
<td>37.64</td>
</tr>
<tr>
<td>Clay Loam</td>
<td>36</td>
<td>20.22</td>
</tr>
<tr>
<td>Loam</td>
<td>36</td>
<td>20.22</td>
</tr>
<tr>
<td>Sandy</td>
<td>3</td>
<td>1.69</td>
</tr>
<tr>
<td>Sandy Loam</td>
<td>36</td>
<td>20.22</td>
</tr>
</tbody>
</table>

Source: NIC, Birbhum District, West Bengal, 2008
Figure 2.1

Average Monthly Temperature & Rainfall

Source: *Meteorological Observatory, Sriniketan, 1985-2007
& **Block Seed Farm, Lalpur C.D. Block, Birbhum District, 1985-2007
Map 2.1
Relief
Labpur C.D. Block
Birbhum District, West Bengal

Source: Census of India, 2001
SRTM Data, 2010

Map 2.2
Map 2.3
Drainage
Labpur C.D. Block
Birbhum District, West Bengal

Map 2.4
Landuse/Landcover
Labpur C.D. Block
Birbhum District, West Bengal

Source: Census of India, 2001
Landsat Image, 2011

Map 2.5
Map 2.6

Soil Texture
Labpur C.D. Block, Birbhum District

Index
Soil Texture
- Clay
- Clay Loam
- Loam
- Sandy
- Sandy Loam

N.A. - Data Not Available
Source: NIC, Birbhum District, West Bengal