Chapter III

DESCRIPTION OF THE STUDY SITES
DESCRIPTION OF STUDY SITES

The landmass of North East India comprises of states namely Assam, Meghalaya, Arunachal Pradesh, Nagaland, Mizoram, Manipur and Tripura. Sikkim is also now considered as a part of NE region. The region covers an area of about 225,083 sq kilometer (excluding Sikkim) accounting for 7.7% of total land mass of India and contains about 3.74% of total populations of the country. The region borders with China, Bangladesh, Myanmar and Bhutan that shares approximately 5200 km of total international border.

North East India is characterized by hills, plateaus, mountains; inter-montane plains, piedmont plains and river valleys. NE India is physiologically not a homogenous unit and the present configuration of this region is geologically recent. The landmass was formed around 2000 million years back (Bhattacharyya, 2005). Sixty per cent of this landlocked area is covered by tertiary hills and mountains. This area comes under tropical monsoon with discrete local variations.

With natural biodiversity and forest resources, Northeast India is unique and incomparable. Distribution of vegetation and forest types is determined mainly by climate (Bhattacharyya, 2005). Soil factor is of secondary importance next to rainfall or precipitation in this region. Because of altitudinal, climatic and edaphic variations, several types of forests ranging from tropical wet evergreen to alpine types are commonly occurring in different states of NE India. Other biotic resources also show characteristic variations and uniqueness in relation to topography and local climates of the region.

Assam, one of the greatest states of region, is the gateway to the entire North East India, except Sikkim. Assam is situated on foothills of the Himalayan mountain ranges. The mighty River Brahmaputra is flowing diagonally through the state. River Brahmaputra is
the lifeline of the people of the area. It divides the state into two parts. Assam is hence, known as the land of the red river which is surrounded by the blue hills with high peaks. It is the home to hundreds of indigenous tribes and communities. In ancient times Assam was an independent kingdom where kings of different dynasties ruled successively. Assam has a glorious history with having the longest reigning dynasty of entire Asia. They were the Ahoms, who ruled the state at least for 600 consecutive years (Bhuyan, 1989).

Regarding the origin of the name “ASSAM”, some controversies still exist. According to one view, British colonials called “Asom” as “Assam” as they could not pronounce the name ‘Ahom’. The other view is that the word Assam is derived from the Sanskrit word “asoma” meaning peerless or unequal, and the name Asom was given to this landmass, for its undulating terraces with hills, hillocks, mountains, valleys etc (Ratan, 2004).

The oldest extant treatise of the human civilization – ‘the Vedas’ – mentioned the region as “Pragjyotishpura” which literally means the ‘city of eastern lights’. King Narakasura was the founder of Pragjyotishpura. King Narakasura and Bhagadatta were famous rulers around 1000 BC. The Vedas also reveal the geographical extent of Pragjyotishpura from the northern Himalayan foothills up to the southern Bay of Bengal (Devi, 1991). Long after in the year 1826 only, Assam goes under the British crown as a result of the famous historical “Yandabo Treaty”. Only in 15 August of 1947AD, Assam got independence and became the part of Independent Indian subcontinent.

Assam is situated at the eastward part of India in between $24^010'$ to $27^058'$ North latitudes and $89^049'$ degree to $97^026'$ East longitudes. It has a total land area of 78,438 sq. km and a total forest cover of 26,781.91 sq. km. The forest covers almost one third of the
1. Sobhagya Kunda
2. Kacho Pukhuri
3. Dighali Pukhuri
4. Jor Pukhuri
5. Raja Pukhuri
6. Rani Pukhuri
7. Gopeswar Pukhuri
8. Rini Minrln Pukhuri

LEGEND
- International Boundary
- State Boundary
- District Boundary
- State Headquarter
- District Headquarter
- Town
PHOTO PLATE III

GOPESWAR MANDIR PUKHURI

HAJO MADHAB MANDIR PUKHURI
total geographical area of the state. The state is located at an average of 79.5 meter above mean sea level. Dispur, which is a part of great historical city Guwahati, is the capital city of Assam. Guwahati is again the district head quarter of Kamrup, oldest and historically famed district of Assam. There are two districts in the name of Kamrup- Kamrup Metro and Kamrup Rural. The district Kamrup Metro was created by separating the old and united Kamrup district in the year 2003 only. Mention of Kamrup in a good number of the ancient Indian mythological literature like, 'Kalika Purana' and 'Jogini-Tantra' told us the historical glory of the place.

The Kamrup District (undivided) is situated in between 25°46' to 26°49' North Latitudes and 90°48' to 91°50' East Longitudes. The Kamrup district is bounded by Udalguri and Baska District towards North, Meghalaya from South, Darrang District by East and Goalpara District and Nalbari District towards West. Kamrup district have total geographical area of 2740.74 Sq. km. with 26.8% of area under forest cover. Climate is sub tropical with semi -dry summer & cold winter. Annual rainfall ranges between 1500 mm to 2600 mm. Average humidity records around 75%. Maximum temperature is 38°5 ± 3.5 C and that of Minimum temperature is 7° ± 2 C.

Study reveals that heavy rainfall, floods, soil erosion and undulating terrain have affected the soil formation process, which gave diverse textural classification of soils in the district (Bhattacharyya, 2005). As per textural classifications, the extent of area coverage with red soil is 2.42% of the total land area, the district that of alluvial soil 26.14%, sandy soil 18.08%, sandy loam soil 39.28% and clay loam soil 14.08%. As a whole the district is having light to medium textured soils that is suitable for growing a wide range of crops. The soil reaction (pH) of the district is mostly acidic that ranges 5.0-6.0. Both the phosphorus and potash content of the soil is in the medium category with 10.25 to 15.00
and 110 to 280 kg/ha, respectively. Two categories of organic carbon viz., 0.5-0.75 (medium) and >0.75 (high) have been recorded. (Source: Krishi Vigyan Kendra, Kamrup, Assam Agricultural University, 2010).

The historical city Guwahati is often considered as a gateway to the North East India and is the largest city of this region. The present day Guwahati got mentioned in the mythological epic Mahabharata as the capital city Pragjyotishpura of demon king Narakasura and king Bhagadatta. Epigraphic evidences also conclusively confirm the location of some capitals of many other ancient but lesser known kingdoms in and around Guwahati. Archaeological survey of India traces the origin of Guwahati to the 6th century AD. The city was formerly known as ‘Pragjyotishpura, or ‘Durjoya’ during different periods of mythology and history.

Historic city Guwahati is also known as the city of temples for the existence of a numbers of ancient temples and historical monuments scattered in and around the city. Every temples or historical monuments have atleast one pond each which on the other hand, is considered as sacred as the temple or historical place itself. Majority of them could be traced back to nearly 400 years old. The Ahom dynasty (1228-1826) performed pivotal role in digging ponds (locally known as Pukhuries) in different parts of the district as per need of the beneficiary people.

Almost all of these historical ponds do not have any experience of drying up during their long existing history. These pukhuries or ancient ponds provide priceless economical and ecological services to the society. Many of them have aesthetic value, and hence have been attracting tourists too. A huge variety of aquatic flora and fauna are flourishing in these ponds, though large sized vegetation is rare in some temple ponds. For a good number
of indigenous fishes, turtles, and birds, these ancient ponds are the last heaven for their survival.

Kamrup district of Assam has altogether 352 wetlands occupying an area of 11407.0 hectare (Boruah, 2006). Altogether 18 historical tanks or ponds with having a total area of 80.00 hectare are reported from the entire Kamrup district. These historical ponds are of varying sizes. Some ponds are situated at the top of hills like, Sobhagya Kunda, Kacho Pukhuri, Rinmochan Kunda and Hajo Madhab Mandir Pukhuri. Each ponds has some rituals link with atleast one of the ancient temples and ancient places or monuments. Every big and small ponds have their own history, myth and believes.

In the present endeavour, eight historically famed old ponds of Kamrup (undivided) District of Assam were selected to study the algal ecology therein. Of these four ponds were selected from urbanized locality and other four ponds were considered from rural areas. Of the four ponds from Guwahati city, two ponds were situated at the hill top: Sobhagya Kunda and Kacho Pukhuri. The other two were located at the heart of the Guwahati city: Dighali Pukhuri and Jor Pukhuri. Among the four other historical ponds located at rural areas, 2 were located on the north bank of river Brahmaputra: Gopeswar temple Pukhuri and Hajo Madhab Mandir Pukhuri and the rest two were selected from South bank of river Brahmaputra: Raja Pukhuri and Rani Pukhuri.

SOBHAGYA KUNDA

Kamakhya Temple is regarded as one of the 51 Hindu Shakti Peethas located all over the world. It is situated atop of Neelachala hill (previously called as Kamagiri) located at Guwahati city of Assam. It is located at about 800 feet above mean sea level. Goddess Shakti, worshiping here is known as Kamakhya (meaning- the granter of desires). The
temple is very much ancient in its origin and believed to be built by king Narakasur of Pragjyotishpur prior to Mahabharata war. It was demolished by the Muslim invaders and partially lost its proud. Owing to disputes, the ravages of time and natural calamities, at present only the base of the original temple survives. However, various rulers and kings in later periods have added to the remnants of the original temple, and the present structure is an assortment of architectural contributions from different periods and dynasties. Later on it was restructured in 1665, and the effort of this reconstruction was made by King NaraNarayan of Cooch Bihar.

Of the ponds located at Neelachal hilltops, the most sacred among them is “Sobhagya Kunda”. This is a medium size pond with all its sides are concreted and well maintained. The global location of this famous pond is 26°9'/59.98"N Latitude and 91°42'/21.16"E Longitude. This pond is regarded as one of the holiest pond related to any Shakti Peeths of the world. One must wash his hands and feet in the pond before entering the great Maa Kamakhya temple. The water is used for all the important religious purposes of the temple. Even before sacrifices, animals are also blessed with the pond water. Holy bath is also a daily event in the pond. A good number of fishes are flourishing in this pond, and the temple wastes are regularly discharged into the pond.

Durga Puja is celebrated annually during Navaratri in the month of September-October. It is a three day festival attracting several visitors. A unique festival observed here is the Ambuvaci (Ameti), the festival of fertility. The temple is closed for three days during this period and opened with great festivity on the fourth day. Another annual celebration is the Manasha Puja. The worship of the Goddess Kamakhya in her various forms embrace a host of festivals and ceremonies which has contributed to the rich cultural heritage of the
region. During these festivals lakh of people gathers from all over the world and participate in rituals.

**KACHOPUKHURI**

At Neelachal hilltops of Guwahati city, another renowned pond is there named as “Kacho Pukhuri”. This pond is located at 26°9'55.48"N Latitude and 91°42'19.54" E Longitude. This pond receives its name from endangered Asian soft-shell giant turtles, locally known as ‘Kacho’ in Assamese. The pond is associated with the Bhairabi temple of Kamakhya dham. This is a natural pond. 30 - 35 numbers of full grown endangered Asian soft-shell giant turtles still inhabit in the ponds along with some fish varieties. However, it makes puzzle the zoologist and the common man that how these amphibians inhabit at such a high altitude (703 feet). Moreover, this pond has no record of drying up. A fair level of water is always maintained naturally throughout the year (pers. Comm. Joykanta Sarma, panda, Kamakhya dham). This pond is regularly using for washing of cloths and other household activities by the neighbouring priest families, besides using in rituals of the Bhairabi temple.

**DIGHALI PUKHURI**

It is a rectangular pond supposed to have been dug straight from River Brahmaputra. This pond got its name because of its half a mile of length (Dighal mean long). It is one of the most ancient ponds that still maintain the majesty of present day Guwahati. The pond is located at the heart of the city at 26°11'18.35"N Latitude and 91°45'4.28" E longitude. The period of its origin dates back to several hundred years. Dighali pukhuri has its mention in the epic Mahabharata itself. And it is mentioned there that this pond was actually created by king Bhagadutta of Pragjyotishpur by digging a canal
from river Brahmaputra. Initially it was connected to the Brahmaputra and was used as an ancient boat yard. But now it is an exceptional beauty spot of present day Guwahati. During the British regime the southern bulk of the pond was filled up and the Gauhati High Court and the houses of Judges were constructed. The present pond is just the remnant of its glorious past. Formerly this pond was used for swimming but now it is banned in the pond due to high occurrence of *Microcystis*, a well known noxious alga. A few number of drains carrying domestic waste water of neighbourhoods, find their way towards the pond. Now a day’s Dighali pukhuri is used for amusement of people and a park is constructed around it.

**JOR PUHKURI**

The meaning of “JOR” is paired and this name is justified due to presence of two ponds separated by a road in between. It is an ancient pond believed to have been dug during the Ahom era. Its actual name was Ugratara Pukhuri as it is associated with the temple of Goddess Ugratara at Uzan Bazar almost at the heart of Guwahati City. The Ugratara temple is a prominent epicenter of shakti cult and was built in 1725 by Ahom king Siva Singha (1714-1744). These temple ponds are located in-between 26°11'21.27''/N Latitude and 91°45'19.31''/E Longitude. As that of Dighali pukhuri, this pond too was connected with Brahmaputra. Construction of roads and expansion of township make the pond narrow, and was divided into two almost equal helves by construction of a road in between. This pond is rich in aquatic lives and has been the home of whooper swans (*Cygus cygus*) commonly known as the Rajhaanh in Assamese. The pond is regarded as a sacred and the water is used for washing, cooking and other religious purposes of the temple too. Some opening of household drains carrying waste water dictates towards the pond.
RAJA PUKHURI

This historically famous pond is located at about 35 km away from Guwahati city at Bijynagar towards North West side. It covers a huge area of about 0.114 km² hectare, for which it is called as Raja Pukhuri, meaning king of all ponds. This pond is situated at 26°11'21.27" N Latitude and 91°28'58.76" E Longitude. It was dug by the king Arimatta of the Kamrup (1365- 1385 AD). The village surrounding this pond is known as the Raja Pukhuri Satra. This pond is associated with a famous Manasha temple and hundreds of devotees visit this temple each year. Being located in pollution free environment, the pond harbours good varieties of aquatic flora and fauna. Community fishing is being regularly practiced every year. During the winter season, this pond is the beautiful paradise for a large variety of migratory birds coming across the globe. Fishing is a regular pursuit of the beneficiary people and the pond water is consumed by people residing nearby besides using in many religious rituals.

RANI PUKHURI

The Rani Pukhuri is located at the Patgaon area of Rani, one km away from Azara Railway Station and located between latitude of 26°5'8.10"N and Longitude of 91°36'58.15" E. History says that it is as old as king Arimatta (1365- 1385 AD) of Kamrup as he ruled the Rani area and established many historical monuments. This pond is associated with an ancient Durga temple where very considerable festival is held every year during Durga puja. This pond is a habitat for many kinds of fishes. Water of this pond is also used in the day to day pursuits of the temple and cooking of temple foods and other ritual purposes too. Pond water is also used by the neighboring peoples for their routine household purposes.
GOPESWAR POND

The historical Gopeswar temple is an ancient seat of Lord Siva as worship by Hindus. History of the temple cannot be found in any earlier literatures. But according to the local myths, the temple was built by an Ahom King of Assam in 15th Century. The temple is located at about 26 km away from Guwahati city at Kamrup District of Assam on the north bank of Brahmaputra river and is situated at 26°18'4.42" N Latitude and 91°43'0.63" E Longitude. There is a pond in front of the temple which is known to be as old as the temple itself. This beautiful pond of the temple is called “Manjul”. Initially the total area covered by the temple and its pond was 2 bighas, 2 kothas and 7 lessa. The water of this pond has been regularly used for the day-to-day pursuits of the temple. The pond has been regularly using for washing and drinking by the temple visitors. As on tradition, discharging of temple wastes has been done in the pond resulting accumulation of a heavy load of organic deposition therein. The pond is one of the oldest ponds associated with Shaiva cult of Eastern India. Despite high degree of anthropogenic activities in and around the pond, there is no record of drying up of pond water in last 200 years and as well, it harbours a good micro flora.

HAJO TEMPLE POND

It is situated at Hajo, a small town thirty Kilometers away from Guwahati city. History says that this area was under a separate kingdom of Mech (Koch) tribe. The word Hajo came from the name of “Mech king Haj”. Hajo is famous for the Hayagriva-Madhab Temple situated atop the hill named Manikuta at an altitude of 602 m above the sea level. The temple enshrines an image of Lord Vishnu, which resembles the image of Lord Jagannath at Puri (Orissa). The temple is also considered as a major pilgrimage spot by
Buddhist too. It is one of the most sacred pilgrimage spot in Assam. A huge pond is present at that temple above the hill located at 26°14'39.09'' N latitude and 91°31'35.69'' E longitude. The pond, associated with this temple is called Bishnu Puskar Pukhuri. This pond was constructed during the Koch dynasty and now it is well maintained by the temple committee and now the surroundings are concreted. A large number of fishes and turtles are still flourishing in this pond.
Table: 3.1: MORPHOMETRIC FEATURES OF THE STUDIED PONDS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Sobhagya Kunda</th>
<th>Kacho Pukhuri</th>
<th>Dighali Pukhuri</th>
<th>Jor Pukhuri (I)</th>
<th>Jor Pukhuri (II)</th>
<th>Raja pukhuri</th>
<th>Rani pukhuri</th>
<th>Gopeswar Pukhuri</th>
<th>Hajo Madhab Pukhuri</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latitude</td>
<td>26°9'59.98&quot;N</td>
<td>26°9'55.48&quot;N</td>
<td>26°11'18.35&quot;N</td>
<td>26°11'21.27&quot;N</td>
<td>26°6'3.27&quot;N</td>
<td>26°5'8.10&quot;N</td>
<td>26°18'4.42&quot;N</td>
<td>26°14'39.09&quot;N</td>
<td></td>
</tr>
<tr>
<td>Longitude</td>
<td>91°42'21.16&quot;E</td>
<td>91°42'19.54&quot;E</td>
<td>91°45'4.28&quot;E</td>
<td>91°45'19.31&quot;E</td>
<td>91°28'58.76&quot;E</td>
<td>91°36'58.15&quot;E</td>
<td>91°43'0.63&quot;E</td>
<td>91°31'35.69&quot;E</td>
<td></td>
</tr>
<tr>
<td>Altitude (feet)</td>
<td>785</td>
<td>703</td>
<td>194</td>
<td>197</td>
<td>197</td>
<td>160</td>
<td>187</td>
<td>184</td>
<td>185</td>
</tr>
<tr>
<td>Length (m)</td>
<td>28.66</td>
<td>25.39</td>
<td>349.5</td>
<td>76.3</td>
<td>97.18</td>
<td>357.29</td>
<td>73.4</td>
<td>30.06</td>
<td>147.06</td>
</tr>
<tr>
<td>Breadth (m)</td>
<td>10.95</td>
<td>18.02</td>
<td>113.98</td>
<td>67.58</td>
<td>53.94</td>
<td>319.15</td>
<td>33.94</td>
<td>11.82</td>
<td>78.13</td>
</tr>
<tr>
<td>Area (m²)</td>
<td>313.827</td>
<td>457.528</td>
<td>39836.010</td>
<td>5156.354</td>
<td>5241.889</td>
<td>114029.104</td>
<td>2491.196</td>
<td>355.309</td>
<td>11489.798</td>
</tr>
<tr>
<td>Mean depth (m) (approx)</td>
<td>2.4</td>
<td>2.78</td>
<td>3.27</td>
<td>2.18</td>
<td>2.2</td>
<td>4.98</td>
<td>3.52</td>
<td>2.8</td>
<td>4.65</td>
</tr>
<tr>
<td>Water spread area (avg.) (m²)</td>
<td>296.5</td>
<td>378</td>
<td>38748.6</td>
<td>5104.0</td>
<td>5175.3</td>
<td>108497.83</td>
<td>2330.0</td>
<td>341.5</td>
<td>10453.7</td>
</tr>
<tr>
<td>Basin shape</td>
<td>Saucer shaped</td>
<td>Saucer shaped</td>
<td>Saucer shaped</td>
<td>Saucer shaped</td>
<td>Saucer shaped</td>
<td>Saucer shaped</td>
<td>Saucer shaped</td>
<td>Saucer shaped</td>
<td>Saucer shaped</td>
</tr>
<tr>
<td>Pond bottom</td>
<td>sandy</td>
<td>sandy</td>
<td>clay</td>
<td>clay</td>
<td>clay</td>
<td>clay</td>
<td>sandy</td>
<td>clay</td>
<td>clay</td>
</tr>
</tbody>
</table>

54