CHAPTER III

ENVIRONMENTAL SETTINGS OF THE STUDY AREA

The name Guwahati is derived from two Assamese words: 'Guwa' (areca nut) and 'Haat' (market place). The name used to be spelled as Gowhatty (pre-colonial and colonial), standardized to Gauhati (colonial-British), which was then changed to the present form in the late 1980s to conform to the local pronunciation.

It is the largest city in the north-east region of India and is also considered as one of the largest cities of eastern India. Dispur, the capital of Assam, is located within the city. Guwahati is one of the most rapidly growing cities in India; during the past few decades it has experienced expansion and also a steep rise in population. According to a survey done by a UK media outlet, Guwahati is among the 100 fastest growing cities of the world, and is the 5th fastest growing among Indian cities.

Guwahati is a major commercial and educational center of North-East India. The city is also a major center for sports, cultural, administrative and political activities of Assam. It is a major hub of commercial, industrial, transportation and educational activities of the whole North-East India.

3.1 Location (Plate 1)

Guwahati (26°10'45"N / 91°44'0"E and an altitude of 55m above sea level), by the mighty river Brahmaputra is an important city for its geographical position and is also known as the “Gateway of Northeast India”. The city is situated between the south bank of the Brahmaputra river and extends up to the foothills of Shillong plateau, with LGB International Airport to the west, and the town of Narengi to the east. The city is gradually being expanded to North Guwahati on the north bank of the
Environmental Settings of the Study Area

Brahmaputra. Guwahati is locally governed by Guwahati Municipal Corporation (GMC) and it covers an area of 243.5 sq. km, while Guwahati Metropolitan Development Authority (GMDA), which is the planning and development authority, covers an area of 340 sq. km.

3.2 Physiography of Greater Guwahati

The city is located in a crescent basin surrounded by lofty hills. The festoon of hills is Nilachal (Kamakhya) and Fatasil to the West, Kalapahar and Nrakashur to the South and Navagraga and Japorigog to the East. The Brahmaputra River divides the city into North and South banks. The famous Rocky River Island ‘Umananda’ is located centrally between the two banks, adjacent to ‘Kachari’. Two other islands located in the rivers are ‘Karmananda’ and ‘Urvashi’. The central part of the city is plain and is thickly populated both by man and material. Physiographically the area can be divided into three units – (a) the hilly region in the south and east, (b) the alluvial plains in central part and (c) the western parts along with the swamps and water bodies.

3.3 Climate

Assam experiences a wild and moderate type of climate, never given to extreme cold or heat. The climate of Guwahati is characterized by hot, humid, rainy, summer and cold, foggy winter. The autumn season is comfortably cool. The seasonal details of Guwahati and the meteorological accounts of the study period are discussed below:

(i) Seasons – Climatically the whole year is divided into four seasons in accordance with India Meteorological Department –

a) Winter season (January and February).

b) Pre-monsoon season/ summer (March to May).

c) Monsoon/Rain season (June to September).

d) Post-monsoon/Autumn season (October to December).
(a) Winter season (January and February)

It generally starts in the last part of December and continues to the end of February. The mornings are foggy, nights clear and noon sunny. January is the coldest month with temperature fluctuating in between 10°C to 12°C. Temperature may fall as low as 5°C but generally stays above 9°C. Occasional rains may occur.

(b) Pre-monsoon season (March to May)

Pre-monsoon extends between the months of March to May. The season experiences a transitional period between a cold winter and a wet monsoon. The temperature increases gradually from March to May, occasionally going above 30°C. During the period starting from the latter part of February to mid March, Guwahati experiences dust storms of local origin. During late March to May, high velocity winds associated with hails and thunder storms prevails. This is locally known as ‘Bordoichilla’. In the month of June heavy showers give much relief in reduction of ambient air temperature and heat.

(c) Rainy season (June to September)

It is the season for the monsoons, characterized by heavy rainfall and sweating heat. The average annual rainfall ranges between 300 mm to 400 mm. August is the hottest month, with the average maximum temperature being 30°C – 37°C.

(d) Post monsoon season (October to December)

Monsoon retreats from the region during the month of September. The temperature gradually starts falling, with the winter season just round the corner.
(ii) **The range of meteorological variations during study period**

Four prime meteorological parameters viz. temperature (maximum and minimum), rainfall, relative humidity and wind speed were taken into consideration in this study. The range of variations of these parameters during the study period is given below.

(a) **Temperature**

The mean maximum temperature during 2008 varied from 24.2\(^\circ\)C to 33.4\(^\circ\)C, while the mean minimum temperature during that period varied from 11.1\(^\circ\)C to 26.3\(^\circ\)C. February was the coldest month with a mean minimum temperature of 11.1\(^\circ\)C and May and August were the hottest month with a mean maximum temperature of 33.4\(^\circ\)C.

In the year 2009, the mean maximum temperature varied between 24.9\(^\circ\)C to 34.3\(^\circ\)C. The mean minimum temperature ranges from 12.6\(^\circ\)C to 26.3\(^\circ\)C. In this period July was the hottest month with a mean maximum temperature of 34.3\(^\circ\)C and January the coldest month with a mean minimum temperature of 12.6\(^\circ\)C.

During 2010, the mean maximum temperature was recorded between 24.8\(^\circ\)C to 33.5\(^\circ\)C. and the mean minimum temperature ranged from 10.8\(^\circ\)C to 26.6\(^\circ\)C. August was the hottest month with a mean maximum temperature of 33.5\(^\circ\)C and January the coldest month with a mean minimum temperature of 10.8\(^\circ\)C.

(b) **Rainfall**

Guwahati receives rainfall mainly due to the south-west monsoon winds. Generally the city receives sufficient rainfall from the month of May to September. The months of November to March were comparatively dry.
(c) **Relative humidity**

Guwahati experiences high relative humidity during the whole year. The highest humidity was recorded in the month of July, 2008 (81%); August and December, 2009 (82%); August and September (86%) in 2010.

(d) **Wind Velocity**

Mild winds blow from northeast to southwest during the winter months. Then this wind is gradually replaced by the monsoon winds. The monsoon winds blows from the southwest in north-easterly direction. The highest wind speed was recorded in the month of April, 2008 (5.1Km/h); April, 2009 (3.9 Km/h) and May in 2010 (8.8 Km/h).

3.4 Flora and fauna

Assam is a part of the transition zone between the Indo-Malayan and Indo-Chinese biogeographical regions. Favorable climate as well as topographic and edaphic factors support luxuriant growth of diverse plant and animal communities in the region and create varied habitats. The wet Evergreen, semi Evergreen, moist Deciduous, wet Savannah and Riparian forests as well as extensive network of river systems and swamps, marshes and wetlands of the state provide ideal conditions and suitable habitats for subsistence of a wide variety of fauna be it mammals, primates, reptiles, amphibians, fish, molluscs, birds, butterflies, moths, that is, they support the existence of one of the most diverse faunal population. The flora and fauna of Greater Guwahati are discussed below:

3.4.1 Floral Diversity

Guwahati falls within the biogeographic Zone - Brahmaputra Valley of India. It is located in the district of Kamrup which has 1432 sq. km of forest area, comprising of

- 69 sq.km of very dense forest,
- 609 sq. km of moderately dense forest and
- 754 sq. km of open forest.
The forest in this region comprises of Tropical Moist Deciduous type of forests. This forest is further divided into Sal forest and mixed deciduous forest. In these forests, Sal grows in association with Ajar (*Lagerstoeemia species*), Ghogra (*Schima wallichii*), Paruli (*Stereospermum prsonatum*), Haldu (*Adina cordifolia*), Sam (*Artocarpus sp.*), Bor (*Ficus sp.*), Uraim (*Bischofia javanica*), Gomari (*Gmelina arborea*), Teeta champa (*Michelia champa*), Poma (*Toona ciliata*). Efforts were focused on intensive studies of the ecological habitat, vegetation composition and the presence of faunal groups specifically around the areas where impact may occur, both during the constructional as well as the operational phase.

### 3.4.2 Faunal Diversity

Assam state supports rich biodiversity. It supports rich faunal biodiversity ranging from Indo-Chinese species to peninsular Indian species. Diverse types of fauna ranging from mammals, avian species to reptiles were recorded in Guwahati.

### 3.5 Population

Guwahati is one of the most rapidly growing cities in India. The city's population grew from just two-hundred thousand in 1971 to more than five-hundred thousand in 1991. In the census of 2001, the city's population was found to be 808,021 and as per provisional reports of Census India, population of Guwahati in 2011 was 963,429; of which male and female were 502,255 and 461,174 respectively. The sex ratio of Guwahati city is 918 females per 1000 males. Irrespective of this recorded data a quite high percentage of floating population visits Guwahati daily on various personnel and professional grounds.
In 2001, males constituted 55 percent and females at 45 percent of Guwahati's residents where as in 2011 males constitute 52% and females 48%. Total children (0-6) in Guwahati city were 86,806 (9%) as per figure from Census India report on 2011. There were 43,217 boys, while 43,589 are girls. Child sex ratio of girls is 1009 per 1000 boys.

In education section, total literates in Guwahati city are 798,726 of which 426,401 are males while 372,325 are females. Average literacy rate of Guwahati city is 91.11 percent of which male and female literacy was 92.89 and 89.16 percent.

Guwahati city is governed by Municipal Corporation which comes under Guwahati Urban Agglomeration. Although Guwahati city has population of 963,429; its urban / metropolitan population is 968,549 of which 505,542 are males and 463,007 are females.

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