

# Chapter 2

## STUDY AREA

In this Chapter a brief discussion about the location, boundary, area, climate and weather, population, literacy, forest, fauna and river systems of the study area are given. Sampling stations in and around the tea gardens of the study area are also specified along with sampling seasons.

### 2.1 North Eastern India

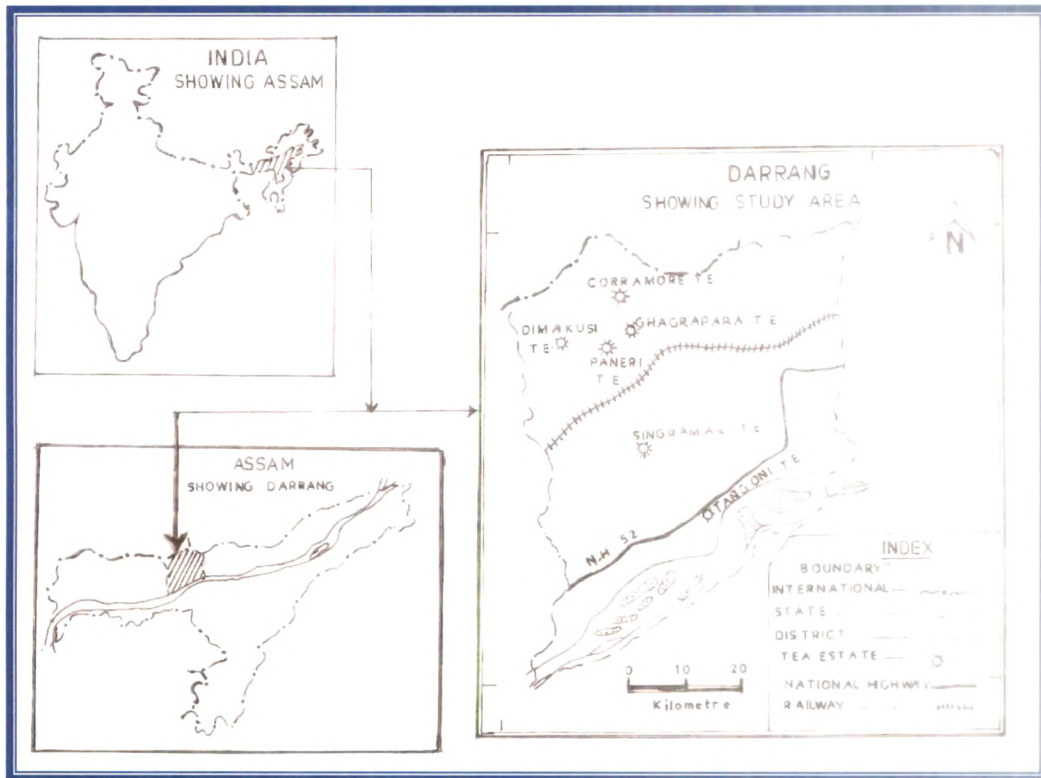
The northeastern region of India is a distinctive geophysical unit set in the Eastern Himalayan region with a unique physiographic framework and a vigorous monsoon dominated climatic regime. Situated between latitudes 22° N – 29°5' N and longitudes 89°3' E – 97°30' E (Figure 2.1), the region has an area of 2,55,083 km<sup>2</sup> comprising seven states viz. Arunachal Pradesh, Assam, Meghalaya, Tripura, Nagaland, Mizoram and Manipur. It represents 7.76% of India's total geographical area and 3.7% of the country's total population.

## 2.3 Location

The study area Darrang district is situated in the eastern parts of India on the northeast corner of Assam. Located on the bank of mighty river Brahmaputra, the district is largely plain except a few hillocks in Udalguri Subdivision. On the north, the foot-hills of Himalaya rise like a wall from the valley and mighty Brahmaputra flows along the southern boundary of the district. The district lies between  $26^{\circ}25'$  and  $26^{\circ}55'$  northern latitude and  $91^{\circ}45'$  and  $91^{\circ}20'$  east longitude (approximately).

## 2.4 Boundary

The district is bounded by Arunachal Pradesh (State) and Bhutan (Country) in the North. The river Brahmaputra flows in the South. The district Sonitpur and Kamrup districts are in the East and West respectively. The District covers an area of 3,465.30 sq. km. (Figure 2.2)



**Figure 2.2:** Location of Darrang district

## 2.5 Climate and Weather

-The climate of the district is humid and congenial. The district has a sub-tropical climate with semi-dry hot summer and cold winter. Dust storms are common in the southern part of the district during February to April of the year because of the proximity of the area to sand loads of the Brahmaputra. Generally, December and January are the coldest months of the year. In the winter, the northern part of the district is colder than the rest of the district since it is covered by hills and forests. The average temperature ranges from 10° to 30° C. Average annual rainfall is about 2120 mm.

The relative humidity is about 37% in the month of February, March and about 82% in other months. The moonson of the district commences from the end of May and intensity gradually increases up to August and then declines to the minimum during Novermber and December. Recurrence of flood during monsoon due to heavy rainfalls in the district and neighbouring Arunachal Pradesh and Bhutan causes loss of crops and other properties almost every year.

## **2.6 The River System**

There are four major rivers in the district of Darrang and they are Barnadi, Nowanai, Mangaldai , Dhansiri and Panchnai. Three major river system of the district has been working as main drainage of the district- i) The Barnadi- Nowanai group in the west, ii) Mangaldai-Nowanai group in the middle iii) The Dhansiri group in the East. Some of the streams of these groups originates from the mountains and are perennial, but some others originate from the Tarai and they dry up in winter.

## **2.7 Population**

The inhabitants in Darrang district are not a homogeneous lot. Rather, they are a mosaic of ethnic groups, an admixture of diverse types of people. Majority of the people have Assamese language as their mother tongue; and the others also use it, as a *lingua franca*. Other languages spoken are Bodo, Nepali, Bengali and Hindi. The Provisional population total as per Census of India, paper 1 of 2001 is as follows,

**Table 2.1: Population of Darrang district**

Population 2001			Decadal growth rate		Sex Ratio		Density	
Persons	Males	Females	1981-1991	1991-2001	1991	2001	1991	2001
1,504,320	773861	730459	NA	15	931	944	345	432

## 2.8 Literacy

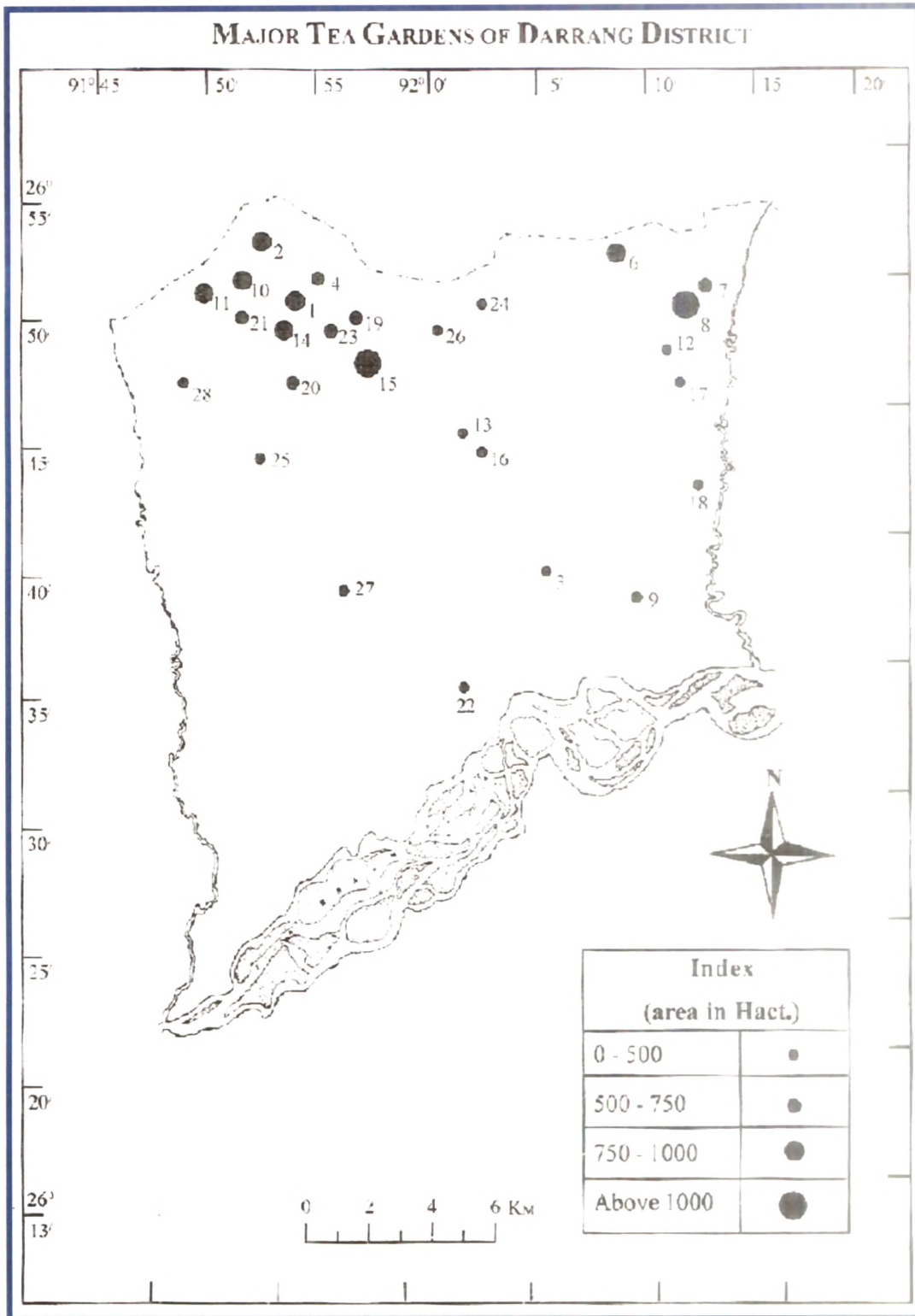
The Provisional literacy as per Census of India, paper 1 of 2001 is as follows,

**Table 2.2: Literacy of Darrang district**

Literacy			Literacy 1991 (%)			Literacy 2001(%)		
Persons	Males	Females	Persons	Males	Females	Persons	Males	Females
833508	494575	338933	28	21	35	55.15	63.91	46.4

## 2.9 Tea Gardens

Tea cultivation occupies a little less than a tenth of the cultivated area of Assam and 75 percent of the tea gardens are located in the districts of Darrang, Sibsagar and Lakhimpur. Cachar district accounts for 20 percent of the balance and the remaining 5 percent being accounted by the lower Brahmaputra valley. There are 28 big Tea gardens apart from several small tea gardens in the district of Darrang, Assam. The major tea producers of the district are (1) Corramore T. E. (2) Nanaipara T.E (3) Chikanmati T.E



**Figure 2.3:** Distribution of tea estates in Darrang district

(4) Majuli T.E. (5) Kopati T.E (6) Dhanseri T.E (7) Betty Bari T.E (8) Bahipukhuri T.E. (9) Bargara T.E. (10) Oragajuli T.E (11) Badlapara T.E (12) Beteli T.E (13) Chandana T.E (14) Bhutiachung (15) Lamabari T.E (16) Hatigarh T.E. (17) Mazbat T.E (18) Orang T.E (19) Attaree Khat T.E. (20) Paneri T.E (21) Dimakusi T.E. (22) Tangoni T.E (23) Borengajuli T.E (24) Krishna Susaibini T.E. (25) Bhergaon T.E. (26) Suola T.E. (27) Singrimari T.E. (28) Ambica T.E. Most of the tea gardens are situated in the Northern part of the district (Figure 2.3).

According to Tea Statistical report 31<sup>st</sup> March, 2007, the total registered area of the tea estates is 21,500 hectares against the 3,46,530 hectares of land in the district. The report also shows that a total 35,518 number of labourers are engaged in different tea gardens of the district, out of which 13,759 are males, 18,890 are females and 2,869 are in the age adolescence.

## **2.10 Sampling Information**

### **2.10.1 Soil Sample Collection**

Thirty soil samples were collected in and around the five selected tea gardens by adopting lottery method during January to June, 2008, where no appropriate chemical testing of soils are done on a regular basis as shown below:

**Table: 2.3** Soil sampling stations:

Sl. No.	Name of the Teagarden	Sample No's (Inside)	Sample No's (Outside)	Number of Samples
1	Tangoni	A1-A3	A11-A12	05
2	Paneri	B1-B3	B11-B12	05
3	Dimakusi	C1-C3	C11-C12	05
4	Corramore	D1-D3	D11-D12	05
5	Ghagrapara	E1-E3	E11-E12	05
6	Singrimari	F1-F3	F11-F12	05



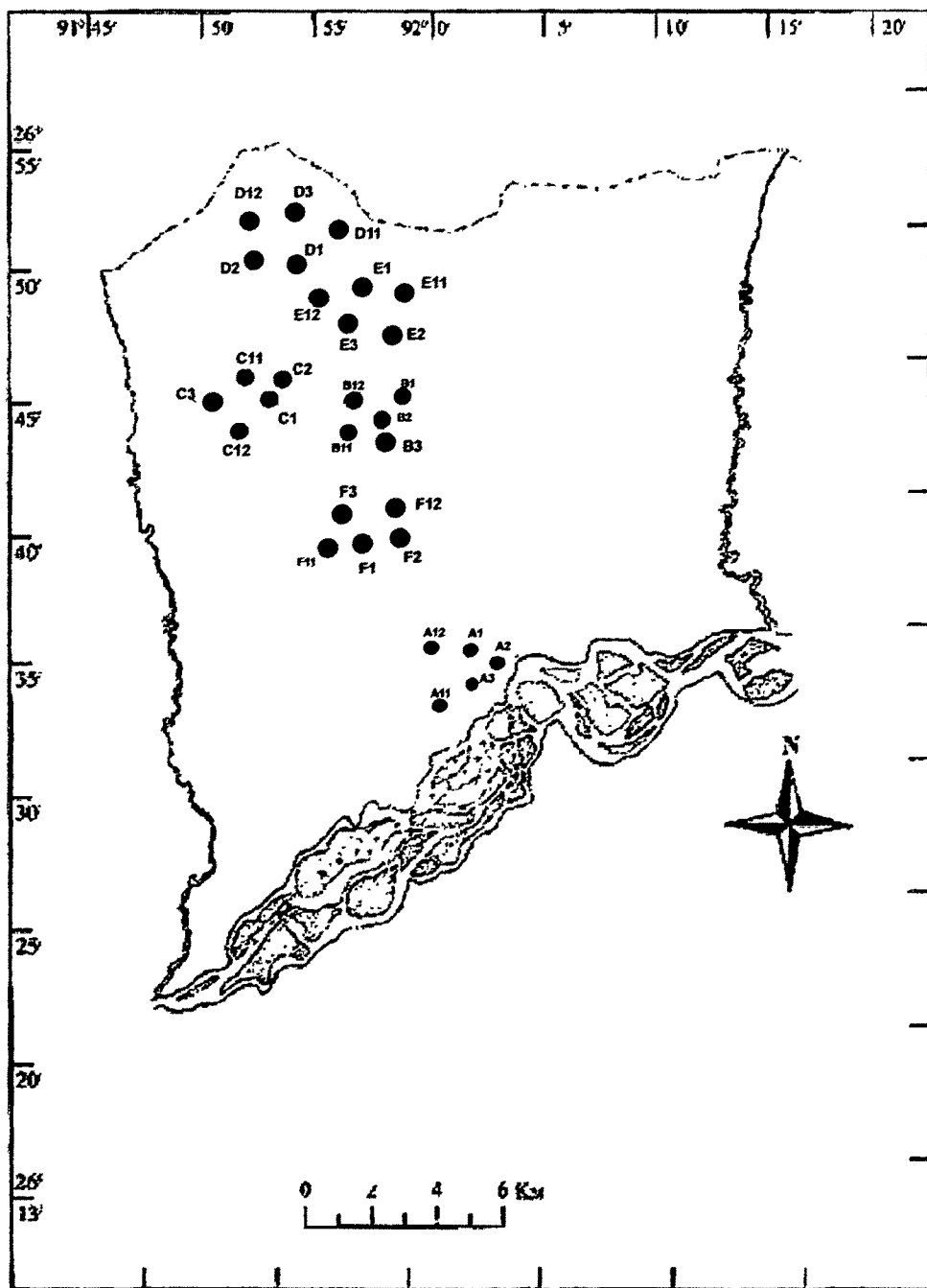


Figure 2.4: Sketch map of Darrang district showing 30 soil sampling stations

### 2.10.2 Water Sample Collection

For the present study, twenty eight water samples were collected in and around the six tea gardens of Darrang district during the following two seasons.

- (i) Post monsoon (June, 2008 to November, 2008)
- (ii) Pre monsoon (December, 2008 to May, 2009) and

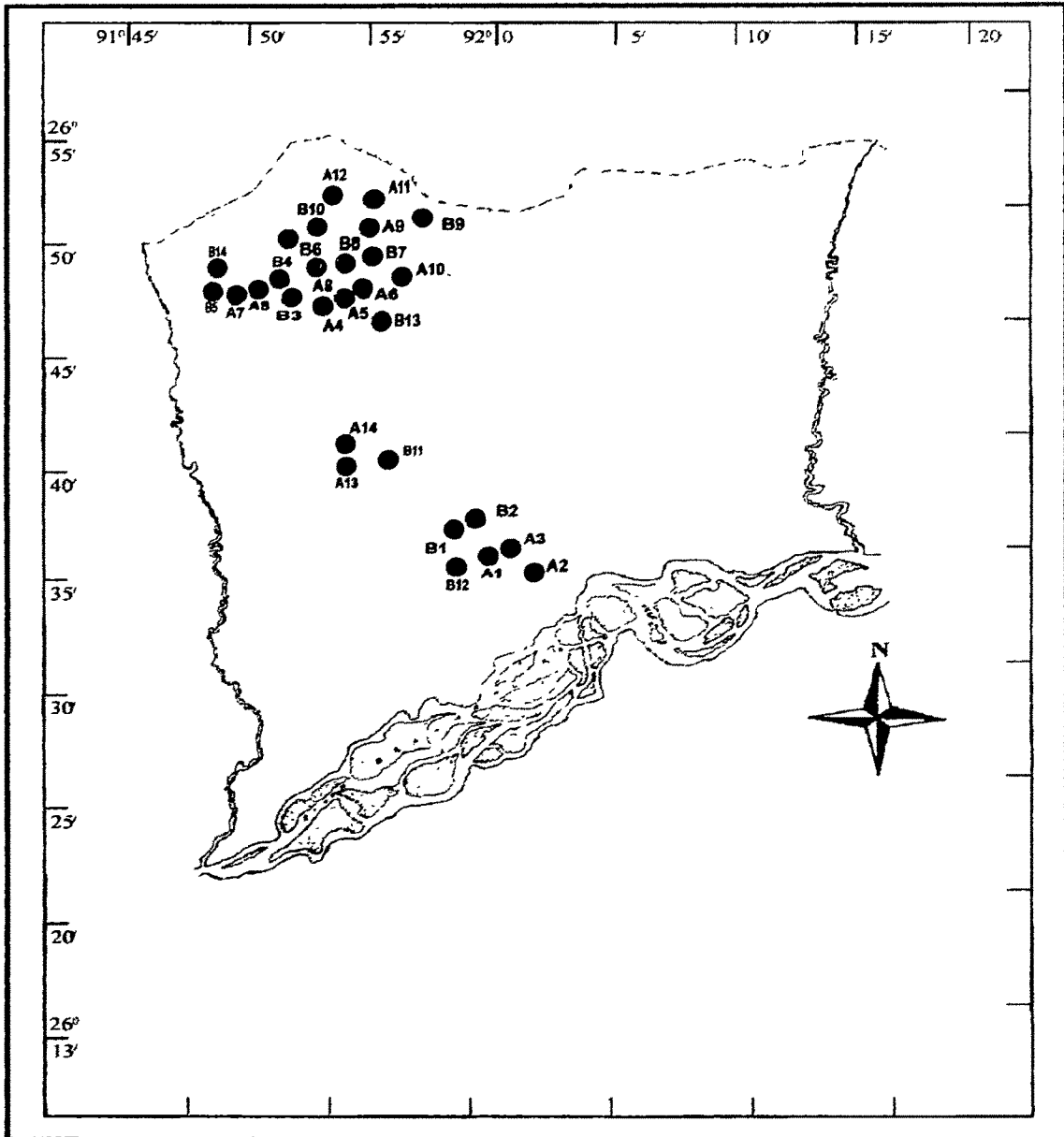
The sampling points are presented in Table 2.4 and 2.5.

**Table 2.4:** Water sampling locations inside the teagardens

Sl. No	Sampling Station	Source
A1	Inside Tangoni Tea Garden	Tubewell
A2	Inside Tangoni Tea Garden	Tubewell
A3	Inside Tangoni Tea Garden	Tubewell
A4	Inside Paneri Tea Garden	Tubewell
A5	Inside Paneri Tea Garden	Tubewell
A6	Inside Paneri Tea Garden	Tubewell
A7	Inside Dimakusi Tea Garden	Tubewell
A8	Inside Dimakusi Tea Garden	Ringwell
A9	Inside Ghagrpara Tea Garden	Ringwell
A10	Inside Ghagrpara Tea Garden	Ringwell
A11	Inside Corramore Tea Garden	Stream
A12	Inside Corramore Tea Garden	Stream
A13	Inside Singrimari Tea Garden	Tubewell
A14	Inside Singrimari Tea Garden	Tubewell

**Table 2.5:** Water sampling locations outside the teagardens

Sl. No	Sampling Station	Source
B1	Outside Tangoni Tea Garden	Tubewell
B2	Outside Tangoni Tea Garden	Tubewell
B3	Outside Paneri Tea Garden	Tubewell
B4	Outside Paneri Tea Garden	Ringwell
B5	Outside Dimakusi Tea Garden	Tubewell
B6	Outside Dimakusi Tea Garden	Tubewell
B7	Outside Ghagrapara Tea Garden	Ringwell
B8	Outside Ghagrapara Tea Garden	Ringwell
B9	Outside Corramore Tea Garden	Ringwell
B10	Outside Corramore Tea Garden	Ringwell
B11	Outside Singrimari Tea Garden	Ringwell
B12	Outside Tangoni Tea Garden	Ringwell
B13	Outside Paneri Tea Garden	Tubewell
B14	Outside Dimakusi Tea Garden	Ringwell



**Figure 2.5:** Sketch map of Darrang district showing 28 water sampling stations