

CHAPTER – THREE

3.0 Soil

Development of different types of soil is the result of climate, the nature of parent material, the topographic feature of parent material, the topographic feature and the time. The depth of the soil in North Bengal is rather low and the soil is principally derived from tertiary rocks. The texture of the soil is mainly from sandy loam to loam and the colour of the soil is yellowish. These soils are mainly porous and have faced acute erosion. These are not very fertile but responsive to fertilizers is noticeable.

The soils of North Bengal (Fig. 3.1) are generally poor in organic matter and as well as in nitrogen content. Organic matter is decomposed quickly in the soils. With the loss of organic matters other physio-chemical properties of the soil deteriorates. Therefore, the percentage of nitrogen and phosphorus content is very low. Soils of the hilly areas are immature than the soils of the plain areas, moreover hill soils are constantly disturbed by the process like soil creep.

The analysis of the soils of these region shows that the soils have low to medium nitrogen, potash and phosphate contents. Nitrogen content is markedly low in the districts of Darjeeling, Jalpaiguri and Cooch Behar. Potash and Phosphate contents are almost same in the six districts of North Bengal. The average pH value is between 4.5 to 6.4 and there is no problem with salt content (T.S.S. or total soluble salt) in the soils of North Bengal. In some areas of North Bengal the soils contain high organic matter and as a result soils are slightly dark in colour.

The following table 3.01 will give an idea about the types of soil availability of Nitrogen Potassium, Phosphate and pH as well as total soluble salts as found in the soils of different districts of North Bengal.

NORTH BENGAL SOIL

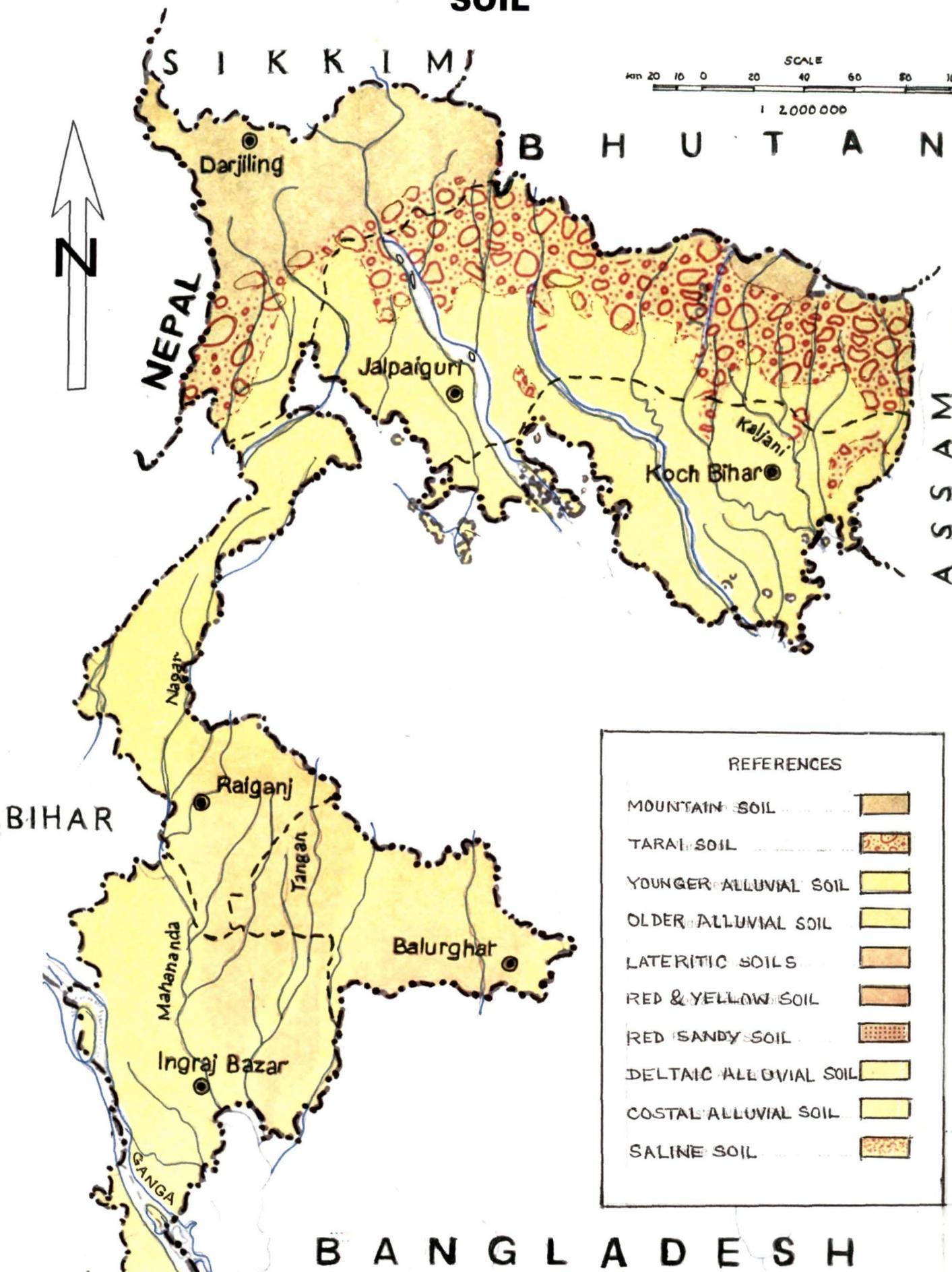


FIG. 3.1

Source- NATMO, Kolkata

Table 3.01

Textural Classification of Soils of North Bengal

Sl.No.	District	Darjeeling	Jalpaiguri	Cooch Behar	Uttar & Dakshin Dinajpur	Malda
	Soil Type	Sandy Loam	Sandy Loam	Loam and Clay Loam	Loam and Clay Loam	Loam and Silty Clay Loam
1	pH-Acid	94.5	94.0	100.0	47.6	14.4
2	Normal	5.5	4.0	-	52.4	85.6
3	Tending Alkaline	-	-	-	-	-
4	T.S.S. Normal	100.0	100.0	100.0	94.5	100.0
5	Germination Critical	-	-	-	-	-
6	Growth Critical	-	-	-	-	-
7	Nitrogen					
	<i>Low</i>	15.5	20.0	18.7	68.3	78.8
	<i>Medium</i>	68.9	74.7	80.2	30.3	21.2
	<i>High</i>	15.5	5.3	1.1	1.4	-
8	Phosphorus					
	<i>Low</i>	38.8	51.4	19.1	60.0	56.8
	<i>Medium</i>	31.1	35.3	39.9	24.2	13.6
	<i>High</i>	30.2	13.3	41.9	15.8	29.3
9	Potassium					
	<i>Low</i>	4.2	80.0	-	66.7	25.7
	<i>Medium</i>	52.0	20.0	-	33.3	41.0
	<i>High</i>	43.8	-	-	-	33.3

Sources : 1. Dept. of Agriculture, W.B. 2. Dept. of Agriculture, Soil Division, Siliguri, 2000.

Taking all the factors into consideration, following broad classification of soils of North Bengal may be made. Table 3.02.

- (a) Hill soils (podzol).
- (b) Terai soils
- (c) Alluvial soils and
- (d) Red soils

Table 3.02**Types of Soils in North Bengal**

Types of soil	Area
Brown Hill / Forest Soils (Palehumulls)	Hilly areas of Darjeeling district.
Terai soils or Tista Alluvium (Haplaquolls)	Jalpaiguri, Cooch Behar, Uttar Dinajpur and Dakshin Dinajpur
Alluvial Soil Gangetic Alluvium (Haplaquents)	Malda
Red soil	Eastern part of Malda and South Eastern Part of Dakshin Dinajpur

Source : Directorate of Agriculture, Govt. of West Bengal (Soil Conservation) 2001.

3.01 Hill Soil (Podzol)

The hill soils occupy the large forest belt of the district of Darjeeling. The nature of the soils changes with the altitude. For example, it is black and alluvial soil in the Siliguri Sub-Division but higher up it is rather reddish or white in colour and less fertile. In the northern part of Darjeeling soils mainly consists of boulders, pebbles and sands. Reddish soil is found in some tracts of Kalimpong and Gorubathan Police Stations of Darjeeling district. In Kalimpong Police Station clay soil with high acid content is available. Grey brown soils are found in the hills of North Bengal. This soil is rich in Nitrogen and calcium content. Podzolization is evident in this soil and genuine Podzol soils are found here.

3.02 Terai Soil

The terai soil is the soil of the region. The best quality of land is occupied by the tea gardens of terai region. The terai soil have been classified into three broad groups; (i) Grey sand loam, (ii) Yellow Sandy Soils and (iii) Red Earth.

- (i) **Grey Sandy Loams** : This type of soils occupies the reverine tracts of the terai and the duars. The soil is composed of grayish sands formed of gravels and sands. This is the most fertile agricultural tract of North

Bengal. This type of soil is highly acidic but the organic composition of the soil is lower.

(ii) **Yellow Sandy Soil** : This type of soil occupies extensive areas between the rivers Torsa, Tista and Dima. This soil has developed by the action of rivers of the terai and the Duars. These rivers are the Mahananda, the Mechi, the Balason, the Tista and the Torsa. Yellow sandy loam soil is rich in organic matter but the clay content of the soil is remarkably low, the ultimate result of which is leaching. All the organic matter are transported downward. In this way all the acid and iron components are accumulated in the lower layer. This soil is Chemically rich due to podzolization. (Banerjee 1954)¹

(iii) **Red Earth** : The red earth occupies the transitional zone between the Darjeeling hills and the plains. This soil occupies the areas from Rhohini and long view to the plains, in the Duars, the soil is found between Lehti and Diana rivers. This typical soil has high percentage of clay, alumina and iron oxides. This soil has the highest percentage of clay fractions followed by coarse sand, fine silt etc. But this soil is differentiated from water borne soils.²

3.03 Alluvial soil

This type of soil occurs in the southern part of the district of Jalpaiguri, Cooch Behar and western part of Uttar Dinajpur, Dakshin Dinajpur and Malda. In the district of Jalpaiguri, the alluvial deposits spread over a heap of sand resting on a irregular rock formation of uneven height. The alluvial layer consists of coarse gravel near the hills and sandy clay and sandy loam further south. A path of hard black clay has developed in the areas between the Jaldhaka and the Tista. The highland of the district is mostly sandy, whereas low lands consists of clay with small portion of sand. Alluvium soil

¹ Banerjee, B : The Soils of West Bengal. Geographical Review of India, Vol. 14, No. 3, p. 4

² Ibid, p. 5

occupies the greater part of Cooch Behar district. In some places loam and clay loam are noticed. Again some parts of the district contains light loaming soil with moisture holding capacity. The layer of fine loam is thin and fine sand is available in the sub-soil followed by coarse sand. Black loamy soil is found in the eastern part of the district. The high lands are generally sandy and medium lands contains ash coloured loamy soil. The soil of the north-western portion of Uttar Dinajpur and Dakshin Dinajpur of the river Tangon and Punarbhaba are sandy loam. A greater proportion of sand is found in this type of alluvial soils. The alluvial soils of the district of Uttar Dinajpur and Dakshin Dinajpur may be classified as old alluvium, alluvium and new alluvium. The texture of old alluvium varies from heavy clay to clay loam with slightly acidic in reaction. This type of soil occurs in Balurghat, Tapan, Kumarganj, Gangarampur, Bashihari, Itahar and parts of Hilli, Kushmandi, Kaliaganj and Hemtabad. Old alluvium soil is poor in organic matter and phosphate content.

The soils of Raiganj, Karandighi, parts of Hilli Kushmandi, Kaliaganj, hemtabad and Gelpukur-II belong to alluvial group. These types of soils are from clay loam to sandy in texture, mostly slightly acidic to acidic in reaction and internal drainage capability is medium. The remaining parts of the both Uttar and Dakshin Dinajpur occupies new alluvial soil. It is mostly found in the areas of Islampur sub-division. The soils are acidic and very acidic in reaction and sandy loam in texture with fair drainage capability.

The above mentioned three types of alluvial soils have low nitrogen with medium phosphate content.

The soils of the western part of Malda is loam and silty clay loam. On the bank of the Ganga mixture of mud and fine sand is found.

3.04 Red Soil

The eastern part of Malda and south eastern part of Dakshin Dinajpur consists of quasilateritic alluvial soil. It is the result of the wathering of metamorphic rocks. The

colour of the soil is red to reddish black. The texture of the soils coarse and poor in organic matter and plant nutrients. The soil is acidic in nature.

At present all available normal soils are utilized for agricultural purpose and hence defective soil regions may be utilized after necessary ameliorations. Acid soils in N.B. are found in the districts of Darjeeling, Jalpaiguri Malda. Acidity of the soils of this state varies between pH 5.0 & 6.5; though in some areas like Darjeeling it is even less than 5.0.

Table 3.03

Acidity of soils

Name of the districts	Soil pH
Darjeeling	5.0
Jalpaiguri	6.4
Malda	6.1
Cooch Behar	6.0
Uttar Dinajpur	6.1
Dakshin Dinajpur	6.1

The acidic character of the soils makes them less suitable for agriculture most of the plant nutrients become poorly available of the major nutrients, nitrogen and phosphorous tend to become available in lesser amounts below pH 6.0 without sufficient supply of these nutrients plant cannot thrive well. Hence to get good yield of crop soil pH requires rectification. The best means of checking soil pH is to use burnt lime or indigenous material like shell of snail oysters etc. which contain sufficient lime which is however released to the soil very slowly.



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11 JUN 2009