"A Geographical Study on District Level Soil Status of West Bengal"

Dr. Razekul Islam
Associate professor, Education College
Basantapur, Domkal, Murshidabad

Abstract

Soil is a mixture of organic matter, minerals, gases, liquids and organisms that together support life. The soils of West Bengal does not present any great variety in plain area, except in the Western fringes of the state, nor in the Himalayan part except for the reddish yellow soil cap in Darjeeling and Duars which favours the cultivation of Tea. Soil is the thin surface layer on the earth, comprising mineral particles formed by peak down of rocks, decayed organic materials, living organism climate and relief. Soil is a medium to store water and to support plant life. No systematic analysis of the soils of the state has been made either by the government or other bodies. It is the enterprise of an officer in 1909, D.N. Mukherjee , that the soils of the West Bengal at district level was briefly summarised, owes whatever value it possesses. In 1948 J.K. Basu's report on soil conservation in West Bengal was a first step. S.P. Chatterjee's Bengal in maps' appear to be mainly restatement of D.N. Mukherjee's account. The study findout the spatial pattern, distribution, and characteristics of soil of west Bengal the six main types of soils found in different districts of west Bengal. The types are laterite soils, red soils, alluvial soils, coastal soils, terai soils.

Key Words: Soil, Lateritic soil, Red soil, Alluvium soil, Saline soil, Clay, Loam soil, Soil texture, Underground water, PH factor, Tidal soil, Mountain soil, Coastal soil, Loam, Sandy soil.

Introduction:

Soils are complex mixtures of minerals, water, air, organic and countless organism that are the decaying remains of once living things. Soil is capable of supporting plant life and is vital to life on earth. There are different types of soils each with its own characteristics. Most Soil have three major layers or horizons (A,B,C) and some have an organic horizon (O). The lateritic soils (5888 km^2) are found in the undulating well-drained track along the Chotanagpur plateau covering the western part of the region. acidic in character

(PH 5.5-6.5) and deficient in organic matter These are poorly aggregated possess low water holding capacity. The transported literates deposited on the eastern flanks of the lateritic stage stretch are called red soil are found in the eastern margins of the rarh plain and barind tract of malda and the west dinajpur covering about 4963.6km^2 acidic in character (pH 6-6.6)and poor in organic matter and plant nutrient. Unassorted materials deposited at the food of the Darjeeling Himalaya are responsible for typical taria soils in jalpaiguri and siliguri with and area covering about 6,600 km^2 acidic in character (pH 5.8-6.7).The major differences in the parent materials distinguish the alluvial soil which though at places inter degraded have distinct spatial location. The narrow alluvial strip along the lateritic and red soil in parts of the districts of Murshidabad, bankura, burdwan, Hooghly and west and east midnapur are different from the ganga alluvium which covers parts of the north Bengal plain and the whole of the remaining west Bengal delta excluding the coastal strips in 24 parganas and midnapur. The soils are acidic in character (pH 6.5-7.2) and relatively poor in plant nutrients and organic matters. The characteristics the flat land soils of the tract these are mildly acidic in reaction (pH 5.8-6.8)relatively matter profile and higher leaching have affected the uplands of the track leading there by to acidity (pH 5.8-6.9).The ganga alluvium is the rich in plant nutrients and organic matter and each alkaline in reaction (pH 7.0-8.2) the greyish color owes to the existence of fine sands. the inter fluvial zones are covered by soils ,clavy to sandy in texture depending on the location. The coastal soils are the outcome of the interaction of rivers and tides and have developed in the district of 24 parganas and both midnapur. The soils are saline and alkaline and contain deposits rich in ca, mg and decomposed organic matter. Soil plays a vital role in the very existence of mankind.

Objective of the study:

The main objective of the study are to measure-

To study the spatial pattern and distribution of soils in different districts of West Bengal.

Study area:

West Bengal is a state of the eastern zone of the Indian republic. West Bengal is located between the latitude of 21^{0}38’ north to 27^0 15’ north and longitude 86^0 0’ East to 90^0 04’ east covering an area of 88752 km^2.

Sharing about 3% area of the country and supporting 8,02,21,171 persons according to the census of 2001. The north south extended of the state is 620 kms and east-west extension is 320 kms . The Narrowest corridor is found in North Dinajpur district which is only 10-12 kms wide.

Source of Data:

Various qualitative and quantitative information about soils have been collected from the office of agriculture statistics Kolkata. Censuses of India, Kolkata, National Bureau of Soil Survey, National library, Kolkata , survey of India , Kolkata agricultural Department Govt. Of West Bengal . Writers building Kolkata . Indian agricultural research institute soil survey manual New Delhi. All India soil and land use survey and soil survey organisation Govt. of West Bengal. The study is well supported by the intensive field work and adequate appraisal of the prevailing situation supported by maps and photographs. Collected information have been evaluated to exhibit the spatial pattern of the soils their characteristics distribution with the help of maps, tables and text.

Methodology of the study:

Various methods and techniques have been applied to evaluate the soils distribution and their characteristics of west Bengal at spatial and temporal level. Suitable maps diagrams have been prepared after making necessary from the data. Collected data from the various sources to show the positive and negative variation in the soils distribution of west Bengal sampling techniques have been applied to select data and analysed interpret according to necessary data regarding soils.

Discussion of the study:

On the basis of the observation and analysis by the department of agriculture, Govt. of West Bengal the soils of the state has been classified in six categories and has been depicted in Fig-01.

1. Mountain Soil
2. Literitic Soil
3. Red Soil
4. Old Alluvium Soil

5. New Alluvium Soil
6. Saline or Coastal Soil

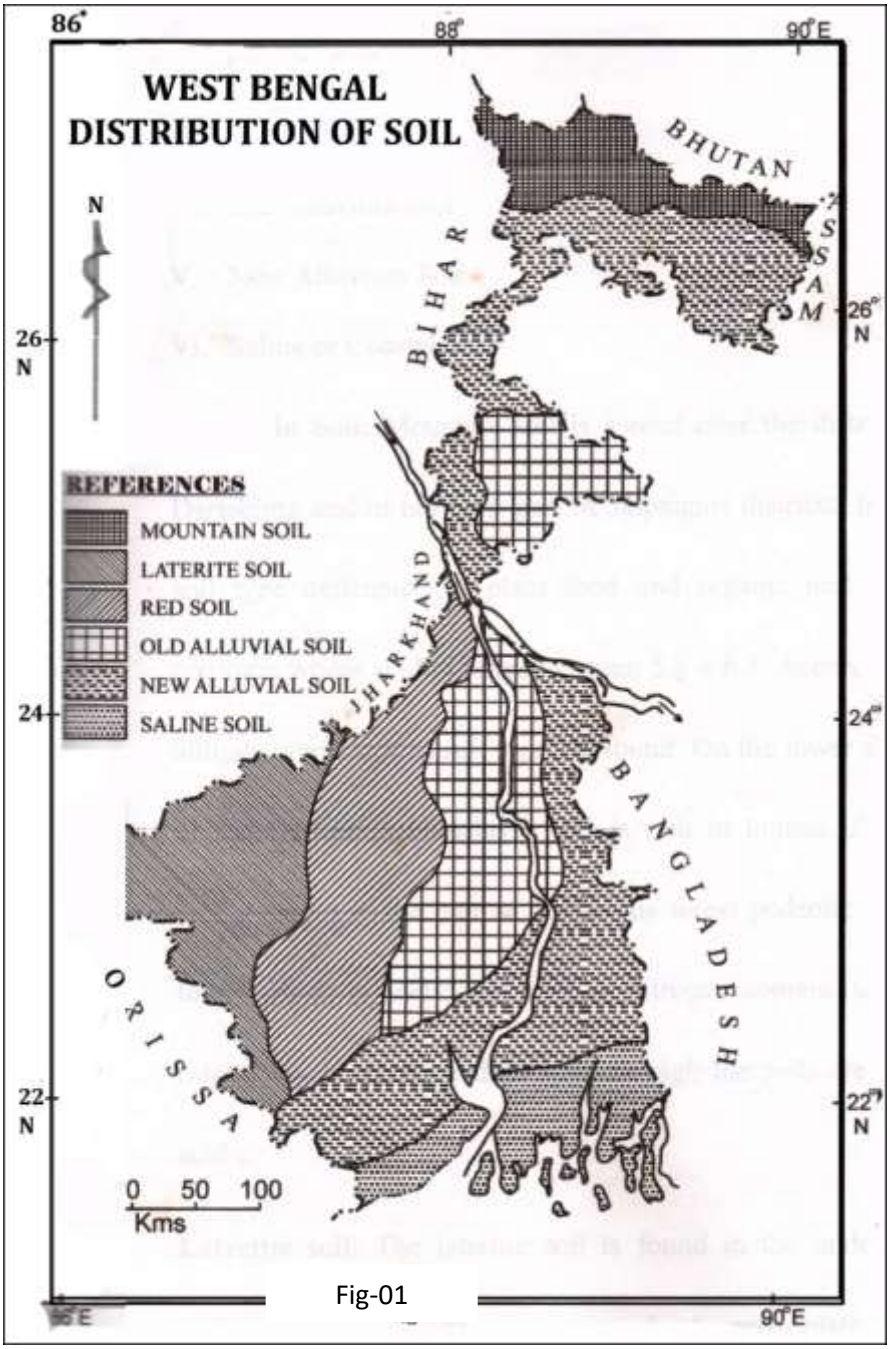

Fig-01

1.Mountain Soil:

Mountain soil is spread over the district of Darjeeling and in northern part of Jalpaiguri districts. In this soil type deficiency of plant food and organic matter are common where acidity range between 5.8 - 6.7. According to altitude, variations in soil type are found. On the lower slopes of the Darjeeling Himalayas soil is rich in humus. At still higher slopes in the part of coniferous forest podzolic soil is found which is acidic

and poor in nitrogen content. On the ridges which are more than 3000 m high the soils are more acidic.

2.Lateritic Soil:

The lateritic soil is found in the undulating well-drained tract of western upland and plateau of Chotanagpur covering the districts of Purulia, and parts of Birbhum, Burdwan, Bankura and West Medinipur. The soil is acidic in character, pH ranges between 5.5 - 6.5 and deficient in organic matter. The water-holding capacity is low.

3.Red Soil:

The transported laterites deposited on the eastern flanks of the lateritic stretch are called red soil. Principally they spread over the districts of Birbhum, Bankura, Burdwan East Medinipur. The presence of iron and aluminium gives them red colour. Morum, Feldspar and Limes concretions have also been observed in the bed. The shallow and coarse textured soils are acidic, poor in organic matters and plant nutrients.

4.Old Alluvium Soil:

Depending on the nature of parent materials the soils of the alluvium tract are divided into two families- A. Old alluvium and B. New alluvium

A. Old Alluvium:

Old alluvium soil is formed from the alluvium brought down by the rivers originating in Chotanagpur plateau. The narrow alluvial strip along the lateritic and red soils in the districts of Murshidabad, Bankura, Burdwan, Hooghly, Birbhum and Medinipur are areas of old alluvium soil and are different from the Ganga alluvium which covers parts of North Bengal plain and the whole of the remaining West Bengal Delta excluding the coastal stripe of 24 - Parganas and East Medinipur districts. In this group of ^ old alluvium the riverine tracts of the Damodar and Kasai have alternating sand beds and immature and irregular

stratification and hence ill developed profiles. The soils are neutral, pH 6.5 - 7.2, and relatively poor in plant nutrients and organic matter.

B. New Alluvium Soil:

The new alluvium of the Ganga alluvium is rich in plant nutrients and organic matter and is alkaline (ph 7.0 - 8.2) in reactions. The major parts of West Bengal i.e. the districts of Jalpaiguri, Cooch Behar, North Dinajpur, Malda, Murshidabad, Nadia, Hooghly, North 24 Parganas, East Medinipur are included in this group. The riverine tracts are prone to frequent siltation which marks the proper development of profiles. The inter fluvial zones are covered by soils, clayey to sandy in textures, depending on the location. The new alluvium soil is best suitable for agricultural practices. Almost all kinds of crops are grown here but are most suitable for rice and Jute cultivation.

6.Saline Or Coastal Soil:

The saline or coastal soil is the outcome of the interaction of rivers and tides. This type of soil is lime and whitest to greyish in colour. This soil group is best developed in the districts of South 24 Parganas and in southern part of East and West Medinipur. The soils are saline and alkaline and contain deposits rich in calcium, magnesium and half decomposed organic matter. Its larger part is covered by mangroves.

DISTRICT WISE DISTRIBUTION OF PRINCIPAL SOILS OF WEST BENGAL

Sl. No.	District	Heavy clay	Clay	Clayey loam	Loam	Sandy loam	Sand
1.	Burdwan	-	Ental Or Metel	-	Doansh	-	Bele, Or Bele Mati
2.	Birbhum	Bagha Entel	Ental Or Metel	Bele Metel	Doansh	-	Bele, Or Bele Mati
3.	Bankura	-	Ental Or Metel	Metel Doansh	Doansh	Bele Doansh	Bele, Or Bele Mati
4.	Purulia	-	Ental Or Metel	-	Doansh Or Doansla	Bele Doansh	Bele, Or Bele Mati
5.	West Medinipur	Ghara Entel	Ental Or Metel	-	Doansh	Bele Doansh	Bele, Or Bele Mati
6.	East Medinipur	-	Ental Or Metel	Entel Doansh	Doansh	-	Bele, Or Bele Mati
7.	Hooghly	-	Ental Or Metel	-	Doansh	-	Bele, Or Bele Mati
8.	Howrah	-	Ental Or Metel	-	Doansh	-	Bele, Or Bele Mati
9.	North 24-Parganas	-	Ental Or Metel	-	Doansh	-	Bele, Or Bele Mati
10.	South 24-Parganas	-	Ental Or Metel	-	Doansh	-	Bele, Or Bele Mati
11.	Nadia	Entel	Metal	-	Doansh	Bele Doansh	Bele
12.	Murshidabad	-	Metal	-	Doansh	-	Bele
13.	Malda	Jhen-Jhar Rangamati(Barind)	Matial Or Metal	Metal Doansh	Doansh	-	Bele
14.	North Dinajpur	Barind	Khiyar	-	Pali	Bele Doansh	Chora Or Balia
15.	South Dinajpur	-	Ferruginous	-	-	Sandy Loam	Sandy & Rocky
16.	Jalpaiguri	Hard Black Clay	Clay	-	-	Sandy Loam	Sand & Gravel
17.	Darjeeling	-	Sukhakhet	-	Panikhet	Sandy Loam	Sand & Gravel
18.	Cooch Behar	-	-	-	-	-	-

Table-1

Sources: Agricultural Dept., Govt. of West Bengal

Soil Texture:

Texture of soil refers to the size and shape of particles which constitute the soil. Soil texture studies the relative size group of the individual soil grain and its classification is based on different combination of gravel, (2 mm and more in diameter), sand (2 to 0.02 mm) silt (0.02 to 0.02) and clay (less than 0.002). Thus, on the basis of these particle size a number of textural classes, such as sandy, clay and silt have been recognised. It signifies certain physical proportions of soil which affect the plant both mechanically and physiologically. An understanding of soil texture is an invaluable aid in reaching a decision as to which of

several parcel of land is likely to be most productive and can most profitably be utilized through proper management. The soils of West-Bengal contain more of clay 2 and sand than silt. Loamy sand covers 40.95 per cent of the state and most of these areas are under canal irrigation. Where as clay loam, loam & sand loam together occupy only 70 per cent of the state. Mountain soil is confined in the district of Darjeeling. Old and New alluvial soil stretches along the Ganga river and along the Bhagirathi-Hooghly river. Table-I.4 shows the textural group of soil found in the districts of West Bengal

Soil and Underground Water Level:

It has been accepted that textural groups of soil have considerable control over agriculture. As the capacity of soil to retain water is controlled by the pore-space to some extent. The pore-space depends very largely on the size and distribution of the soil particles, In the fine grained texture and where soil is fairly compact, water table is at higher level than areas where soil is either sandy loam or sandy. The water table is generally at a uniform depth below the surface, except in parts of the Western boundary of the state, the porosity of the upper layer resting on a bed of impervious clay, which retains the moisture. In West Bengal western plateau tracts are areas of low water level. There is possibility of well and tube well irrigation in most of the districts lying in this part. It can be suggested that soils of this region are productive in proportion to the moisture holding capacity, particularly in areas where irrigation is absent. In irrigated areas the rate of application of water for specific crops may be regulated by the knowledge of water-holding capacities of sub-surface soil. In the study area productivity is also associated with rainfall sufficiency.

Conclusion:

The present study attempts to evaluate different aspects related soils. On the basis of observation analysis made by the department of the agriculture West Bengal has six soil categories, Mountain soil, laterite soil, Red soil, Old Alluvium , New Alluvium , Coastal soil, on the basis of soil particle size the texture of soil are sandy, clayly and salty no variation in soil type is found because of and regional relief uniformity. The textural groups of soils have considerable control over agriculture. The productivity is associate with rainfall sufiency. Soil plays a vital role in the very existence of mankind. Productivity of agricultural leading to better efficiency and economic of nutrient use with off farm advantage of environmental security.

Since red and lateritic soils form and important soils group covering about 28% land area of India. Study was carried out in typical red and lateritic soil zones of Birbhum and Bankura district of West Bengal.

References:

Agarwala, V.S. (1951): Ancient Indian Geography, Bull, N.B. Soc Ind Varanasi.

Bosc. S.C. (1978): The Geography of West Bengal, National Book Trust India, New Delhi.

Bondhopahy, T.K. & Shil, A.K. (1990): Modem Geography of India (Bhoo-Porichay), University of Calcutta.

Chakraborty, S. (1970): Some consideration on the evolution of Physiography of Bengal (ed) Chatterjee A.B. & Alou, Firma, K.L. Mukhopadhyay Calcutta pp. 16-29.

Genny H. (1941): Factors of Soil Formation Mc Graw Hill com ,New York

Indian Agricultural Research Institute Soil Survey Manual, New Delhi. Indian Soil & Landuse Survey Organisation

Morgan Jand Mc Intiri (1959): W.G. Quartemary Geology of West Bengal Basin East Pakistan & India. Bull Geal, Society Am 70,pp.319 342

Singh, R.L. (1971) :(Ed) India A Regional Geography National Geographical Society of India, Varanasi.

Singh, R.L. (1971) : Lower Ganga Plain in India, A Regional Geography Silver Jubilee Publication National Geographical society of India , Varanasi ,p.254