



Studies on Soil Types and its Characteristic Features in Yalandur Taluk of Chamarajanagar District, Karnataka State

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ABSTRACT

Field investigation was carried out to determine the quantitative mineralogical compositions of various grain size fractions of soil samples in Yalandur taluk, Chamarajanagar district. Soil samples collected in the field analyzed (soil analysis) to know the soil type and its composition. Gravelly muddy sand, Slightly gravelly muddy sand, Sandy mud, Muddy gravel, Gravelly mud are the different types of soil texture present and are classified according to Folk's classification system. The rock types are Granite and dolerite, other than these Amphibolite dykes, Granodiorite and pelitic schist were also recorded.

Keywords :

Introduction

Soil is a natural body developed by natural forces. Soil is loose weathered rock material that covers the land surface of the earth and supports the growth of plants. Soil is an unconsolidated or loose combination of inorganic materials.

The formation of soil begins with the breakdown of rock into regolith (Layer of rock and mineral fragments that rests on bed rock and formed by the weathering of rocks and leaching of parent rocks). The continuation of weathering and the development of soil profile refers to the layers of soil known as Horizon 'O' present at the top and is primarily composed of organic matter. Next being Horizon 'A', which marks the beginning of the true mineral soil. Beneath 'A' horizon, it is little affected by soil forming processes and contains large shelves of unweathered rock.

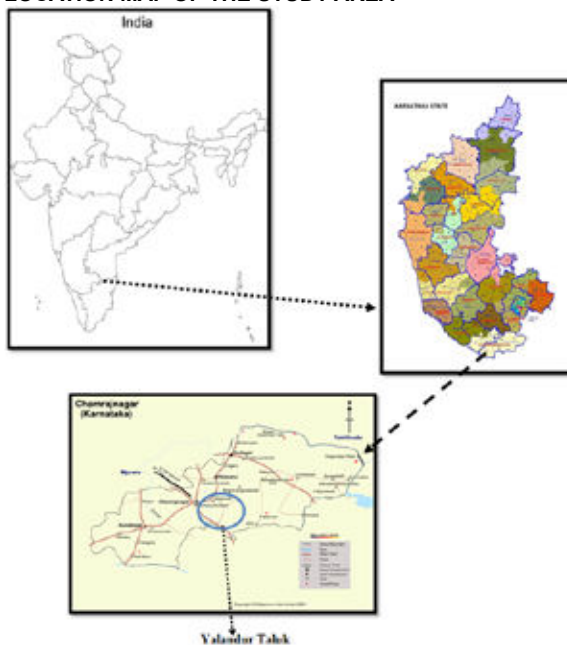
The size distribution of a mineral is characterized by the weathering process acting on the mineral. The study area exhibits predominantly Dolerite dykes, granites, gneisses and charnockites.

Formation of paleosols in the study area are very scare and unsatisfactory. Soils formed above are dolerite dykes, granite gneiss around Yalandur taluk was studied to document the grain size distribution and to know about the type of soil present in the study area.

Geology of the study area

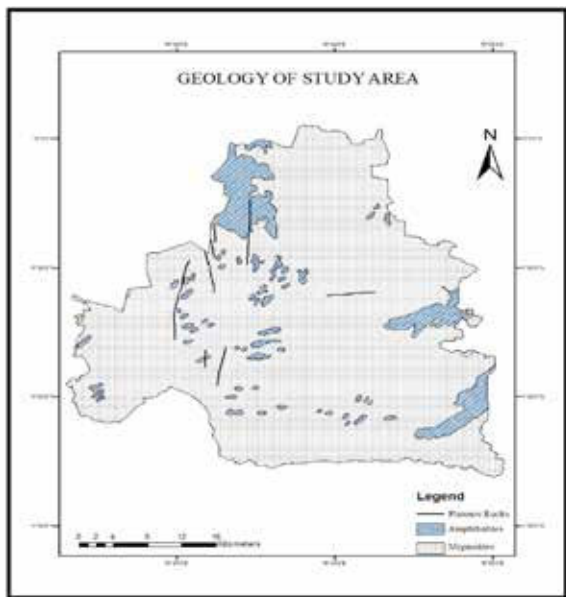
Yalandur taluk is located between 11°42' to 12°05' North latitude and 75°57' to 77°09' East longitude with an area of 264.7 sq.km falling in Survey of India toposheet numbers 58 A/9, 58 A/10, 58A/13 and 58 A/14 on 1: 50, 000 scale. The topography is generally undulating with few steep slopes. Southern and Northern parts have comparatively gently slopes. The normal annual rainfall is between 620 to 1140 cm.

LOCATION MAP OF THE STUDY AREA



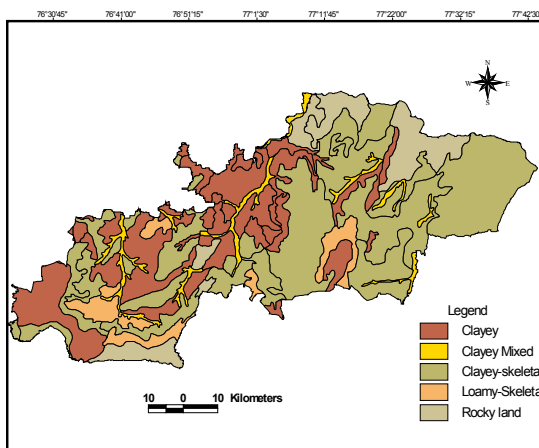
Yalandur Taluk

The study area comprises granite, gneisses, charnockites, pegmatite and dolerite intrusions overlaid by different soils. The area is divided into two equal halves in the NE-SW direction by the contact of charnockites lying in the eastern part of the area and the gneisses lying in the western part of the area. The thickness of weathered zone ranges from 3m to 20 m followed by a deep fracture zone.



The major rock types of the study area are Plutonic rocks(dolerite dykes, granite), Amphibolites(gneisses, charnockites), Migmatites. These rocks play a significant role in the geomorphologic units.

The types of soil present in the study area are Gravelly muddy sand, slightly gravelly muddy sand, Sandy mud, Muddy gravel and Gravelly mud.



Soil map of the study area

The soil types occur in the pediplains vary in their thickness. They are very deep to deep, well drained, dark reddish brown to dark red in colour occurs on gently sloping land with moderately eroded and it is gravelly clay soil. Clayey soils, in valley and alluvial plains are mainly derived from the hills and deposited along streams. They are very deep to deep, well drained occurs on nearly level surface of gneissic terrain due to their thickness. These soils are shallow, well drained, dark brown with mixed mineralogy. They occur on undulating to rolling land of contact between Charnockites and gneissic rock with moderately eroded to severely eroded. Clayey soil of valleys and slightly saline. Moderately shallow, well drained, gravelly clay soils on hills and ridges with moderate erosion; associated with shallow to excessively drained, reddish brown to yellowish brown gravelly sandy loam to gravelly clay loam. These soils are very shallow, somewhat excessively drained, dark brown consists of more than 35% gravel with severe erosion and occurs on undulating to rolling land.

Materials and methods

Field work was done to identify different types of soils developed on dolerite dykes, granites, gneisses and charnockites in Yalandur taluk, Chamarajanagar district. The district maps published by GSI, used for the purpose of mapping of geology of study area, Topographic maps used to know the geomorphologic features in the area. Comparison of soil thickness and topography to be done in order to locate suitable sites for the study of soil profile.

Soil samples were collected where dolerite dykes, granites and gneisses are located along with the rock samples. A detailed profile of soils, altered zones and bed rocks will be prepared. Folk's classification system is used to identify soil types in the area and compared with Indian standard profiles.

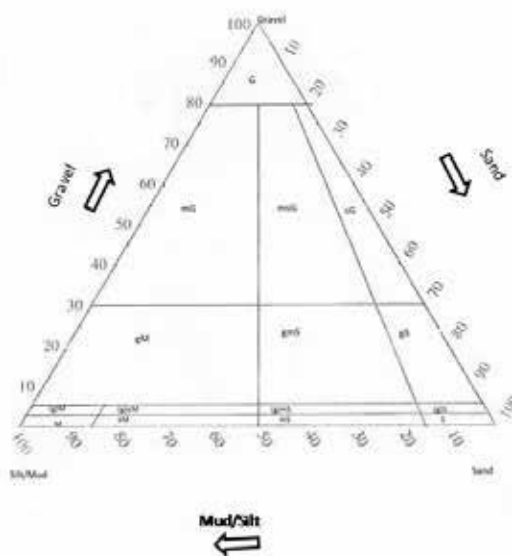
Results and Discussion

In order to achieve the above mentioned hypothesis, we need to determine the mineralogical compositions of the various soil size fractions. Therefore, the obtained soil samples were fractionated by sieving the averaged samples into the following 10 grain size fractions.

- 4.67 mm
- 2 mm
- 1 mm
- 0.6 mm
- 0.4 mm
- 0.3 mm
- 0.2 mm
- 0.1 mm
- 0.075 mm
- < 0.075 mm

Grain size greater than 2 mm is considered as Gravel, between 2 to 0.05 mm is Sand, and in between 0.05 to 0.002 mm is known as Silt. The grain size lesser than 0.002 mm is considered as clay (According to USDA classification system)

Folk's classification diagram



- G - Gravel
- g -Gravelly
- (g)-Slightly gravelly
- S-Sand
- s-Sandy
- M-Mud
- m-Muddy

Based on the textural triangle, USDA and Folk's classification system the size and type of soil samples were classified by the following data.

Nearly 15 samples were collected in the field but here the data is given only for 2 samples and is plotted in the triangular diagram.

1. Sample No : 1Y P – 1

Total weight = 291gms
1 – Location

Y – Yalandur

P – Profile/ Horizon

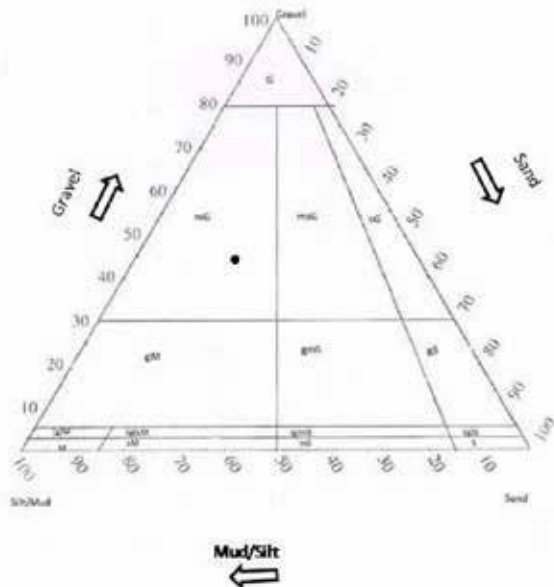
Sieve No	Weight of soil (in grams)
1. 4.75mm -	19g = 6.52% = 7%
2. 2.00 mm -	112g = 38.48% = 39%
3. 1.00 mm -	38g = 13.05% = 13%
4. 600 microns -	06g = 2.06% = 2%
5. 425 microns -	04g = 1.37% = 1%
6. 300 microns -	06g = 2.06% = 2%
7. 212 microns -	09g = 3.09% = 3%
8. 150 microns -	07g = 2.40% = 2%
9. 75 microns -	02g = 0.68% = 1%
10. (Receiver) clay -	88g = 30.24% = 30%

Total 291g 100%

Gravel = 46%

Sand = 23%

Silt = 31%



Soil type ----- **Muddy Gravel**

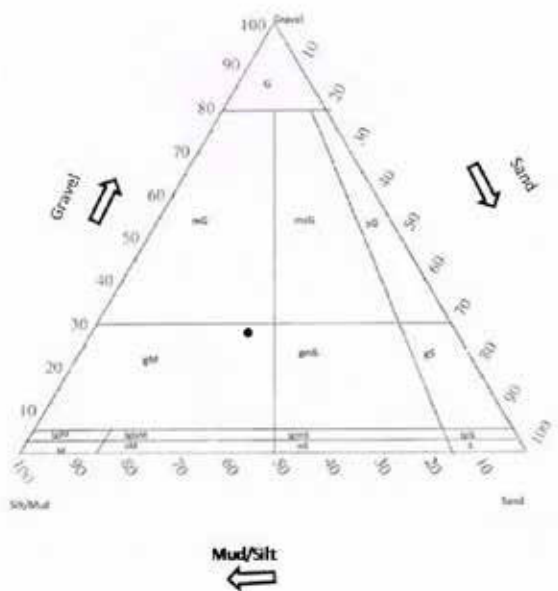
2 Sample No : 1Y P – 2

Total weight = 295gms
1 – Location

Y – Yalandur

P – Profile/ Horizon

Sieve No	Weight of soil (in grams)
1. 4.75mm	- 40g = 13.55% = 14%
2. 2.00 mm	- 43g = 14.57% = 15%
3. 1.00 mm	- 31g = 10.50% = 10%
4. 600 microns	- 17g = 5.76% = 6%
5. 425 microns	- 10g = 3.38% = 3%
6. 300 microns	- 18g = 6.10% = 6%
7. 212 microns	- 14g = 4.74% = 5%
8. 150 microns	- 07g = 2.37% = 2%
9. 75 microns	- 02g = 0.67% = 1%
10. (Receiver) clay	- 113g = 38.30% = 38%
Total	295g 100%



Gravel = 29%

Sand = 32%

Silt = 39%

Soil type ----- **Gravelly Mud**

Conclusion

Based on the mineralogical composition, soil types, grain size distribution, geomorphologic types, rock types present in the study area, the soil classification and grain size distribution of soil samples were identified with the help of Folk's classification diagram. Finally, the study helps to know the soil types and its characteristic features present in the study area.

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