International Conference on Frontiers in Life and Earth Science
© 2018 IJSRST | Volume 5 | Issue 1 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X

# Fluvial Soil Textural Characteristics in upper Ghod Basin using GIS and GPS Techniques

**Nilesh Pandit Kale [1], Jyotiram C. More [2]**
[1]Assistant Professor, Department of Geography, A.W. College, Otur, Pune, Maharashtra, India
[2]Head, Department of Geography, B. J. S. College, Wagholi, Pune, Maharashtra, India

## ABSTRACT

The present research paper deals a fluvial soil textural characteristics in upper watershed. GIS and GPS are essential tools for understanding the soil texture. With the help of GPS soil sample location are demarked and various maps are prepared using in GIS. The analysis of soil samples revealed that the proportion of clay (< 0.002 mm diameter) in the sample is varying between 0.25 to 49 percent, of silt and very fine sand (below 0.1 mm diameter) from 5 percent to 65 percent, of sand (0.1 to 0.2 mm diameter) from 5.54 percent and 59 percent and coarse material (above 0.2 mm diameter) from 3 percent to 75percent. On the basis of textural characteristics soil, we find out six textural class of soil. The soil texture control permeability, fertility, erodibility of soil.

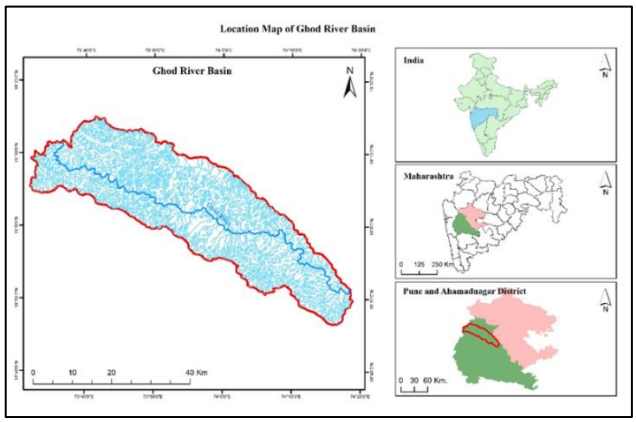
**Keywords :** Soil texture, GIS, GPS

## I. INTRODUCTION

Soil is the mixture of minerals, organic matter, gases, liquids, and the myriad of organisms that together support plant life. The addition of organic matter, water, gases and time causes the soil of a certain texture to develop into a larger soil structure called an aggregate. At that point a soil can be said to be developed, and can be described further in terms of color, porosity, consistency, reaction etc. At that point a soil can be said to be developed, and can be described further in terms of color, porosity, consistency, reaction etc.

## STUDY AREA

The study area located Ambegoan, Junner, Shirur tehsil in Pune district, Maharashtra. Ghod River is a tributary of Bhima River. The Ghod River originates on Auhpe Village, the eastern slope of the western Ghat at 1029 meters (3580ft) an above sea level. before the confluence of Bhima. The geographical location of the Study area can be expressed from $18^0$ 46' 36" to $19^0$ 15' 08"N latitude and $73^0$ 31'58" to $74^0$ 18' 52"logitude. The study area selects to study origin of river to confluence with Kukadi River. The length of the Ghod River is 126.0 km between Origen to Ghod and Kukadi river confluence.




## OBJECTIVE

- To Assess Textural characteristics of soil

- Identify distribution soil texture in study area

## METHODOLOGY

Soil samples are collected through field survey. Random sample method are used for sampling of soil. Soil samples were analyzed in the laboratory to find out texture, structure, permeability and organic matter content. Textural analysis was done using 64 International Pipette Method and the proportion of coarse material, sand, fine sand, silt, and clay was measured. Results were verified with the reports obtained from Government Soil Testing Laboratory, Government of Maharashtra.

## II. RESULTS AND DISCUSSION

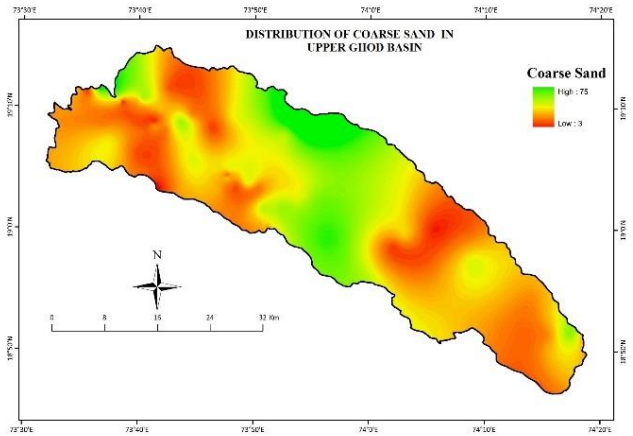
Soil samples were collected from Sixty Six sites. The care was taken so that they are widely distributed in the study area covering most of the geomorphic units from ridge to valley and from source to mouth. Soil samples were collected from top 5 cm (2 inches) layer of soil.

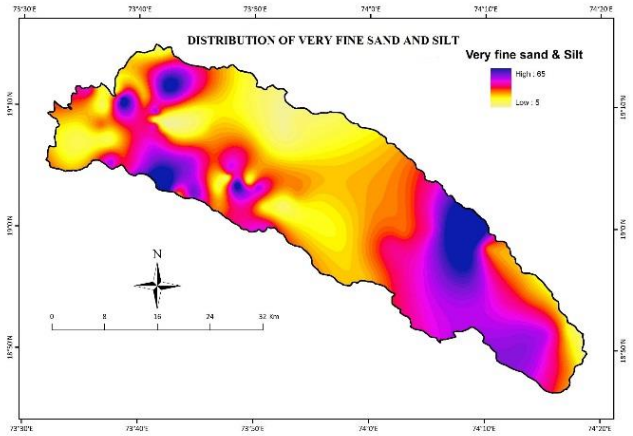
Soil profiles in Ghod basin were studied and soil samples were analyzed at 66 locations widely distributed through geomorphic units within the study area. The basin exhibits six types of textural classes of soils viz., clay, clay loam, loam, sandy clay loam, sandy loam and silt clay loam.

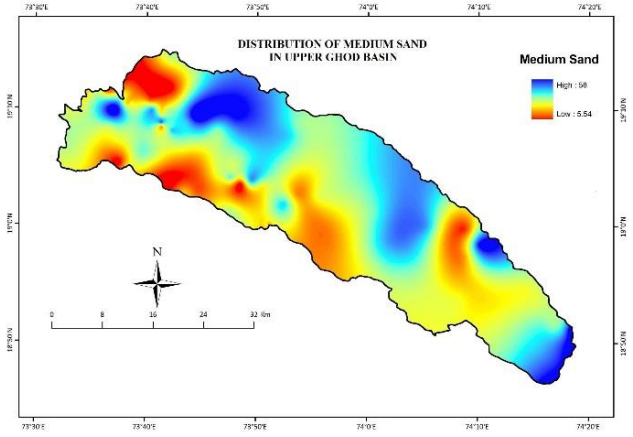
**Table 1.** Soil Texture Parameter

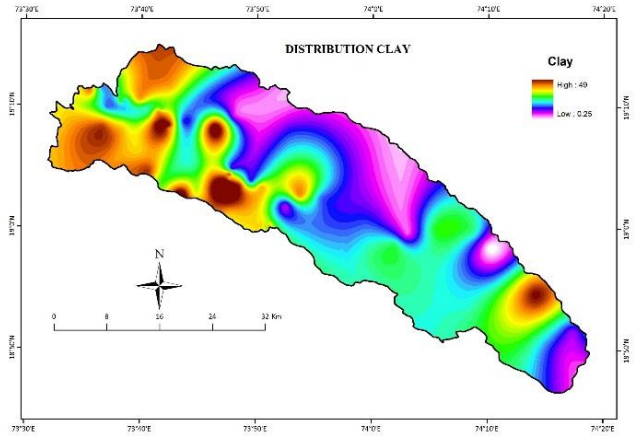
| Soil Series | Textural Class | Coarse Sand % | Sand % | Silt & V. Fine sand | Clay % |
|---|---|---|---|---|---|
| **1** | Sandy Silt Clay | 25.33 | 26.05 | 28.77 | 19.69 |
| **2** | Silt Clay Loam | 17.94 | 17.39 | 29.08 | 35.43 |
| **3** | Sandy Loam | 38.1 | 24.39 | 12.42 | 25.02 |
| **4** | Sandy Clay | 36.81 | 31.61 | 11.44 | 17.87 |
| **5** | Silt Clay Loam | 13.45 | 23.98 | 32.34 | 30.1 |
| **6** | Sandy Clay | 32.63 | 42.64 | 10.36 | 11.87 |
| **7** | Clay | 19.86 | 19.14 | 11.29 | 48.72 |
| **8** | Silt | 10.23 | 8.06 | 44.94 | 36.68 |
| **9** | Sandy Loam | 29.51 | 27.49 | 29.56 | 11.33 |
| **10** | Sandy Clay | 23.6 | 35.98 | 6.67 | 30.21 |
| **11** | Sandy Silt Clay | 32.56 | 16.75 | 31.53 | 19 |
| **12** | Clay | 12.74 | 31.05 | 20.83 | 35.28 |
| **13** | Clay | 7.74 | 32.97 | 15.26 | 42.92 |
| **14** | Sandy Clay | 17.04 | 56.84 | 9.43 | 13.82 |
| **15** | Sandy clay | 17.5 | 35.43 | 5.12 | 40.06 |
| **16** | Sandy Clay | 41.17 | 39.5 | 5.07 | 11.9 |
| **17** | Sandy Silt clay | 21.62 | 29.3 | 24.65 | 24.32 |
| **18** | Sandy Clay | 15.19 | 40.24 | 7.5 | 34.64 |
| **19** | Silt Clay Loam | 16.31 | 22.84 | 33.52 | 31.6 |
| **20** | Sandy Silt Clay | 17.65 | 42.68 | 21.62 | 18.84 |
| **21** | Sandy Clay | 39.46 | 13.09 | 16.51 | 30.19 |
| **22** | Clay | 22.56 | 22.23 | 25.83 | 31.05 |
| **23** | Sandy clay Loam | 5.77 | 46.92 | 9.05 | 36.01 |
| **24** | Silt Clay Loam | 16.81 | 16 | 27.55 | 39.53 |
| **25** | Clay | 11.65 | 30.71 | 22.86 | 35.04 |
| **26** | Clay | 20.85 | 21.73 | 25.77 | 28.12 |
| **27** | Silt Clay Loam | 7.89 | 29.3 | 28.72 | 33.46 |
| **28** | Sandy Clay | 59.41 | 11.38 | 13.65 | 15.48 |
| **29** | Silt Clay Loam | 51.9 | 22.51 | 13.7 | 22.06 |
| **30** | Silt Clay Loam | 24.78 | 20.07 | 31.92 | 23.16 |
| **31** | Sandy Clay | 17.04 | 57.89 | 9.43 | 13.82 |
| **32** | Silt | 5.91 | 24.96 | 51.4 | 16.3 |
| **33** | Clay | 15.86 | 31.16 | 22.15 | 27.84 |
| **34** | Sandy Clay | 28.59 | 24.08 | 8.82 | 35.36 |
| **35** | Clay | 16.26 | 28.5 | 19.62 | 35.47 |
| **36** | Clay | 9.99 | 34.15 | 26.24 | 29.44 |
| **37** | Silt Clay Loam | 26.64 | 9.35 | 31.83 | 32.07 |
| **38** | Clay | 22.38 | 20.55 | 23.85 | 32.8 |
| **39** | Silt Clay Loam | 11.15 | 15.31 | 37.14 | 36.29 |
| **40** | Clay | 3.14 | 5.54 | 64.97 | 23.34 |
| **41** | Clay | 17.67 | 20.41 | 19.03 | 42.65 |
| **42** | Clay | 15.28 | 30.79 | 22.38 | 29.42 |
| **43** | Silt Clay Loam | 22.04 | 12.86 | 36.07 | 26.69 |
| **44** | Sandy clay | 42.03 | 38.35 | 7.55 | 8.28 |
| **45** | Clay | 30.67 | 16.32 | 17.07 | 32.22 |
| **46** | Sandy Silt Clay | 50.86 | 13.11 | 21.82 | 14 |
| **47** | Sandy clay | 45.77 | 25.13 | 14.5 | 14.46 |
| **48** | Sandy clay Loam | 39.33 | 39.83 | 5.12 | 11.93 |
| **49** | Sandy Clay | 28.35 | 50.8 | 13.59 | 6.9 |
| **50** | Clay | 10.68 | 10.84 | 45.21 | 30.99 |
| **51** | Clay | 21.44 | 26.64 | 13.33 | 35.17 |
| **52** | Sandy Clay | 74.98 | 32.37 | 7.17 | 9.17 |
| **53** | Sandy Silt Clay | 5.42 | 42.44 | 27.84 | 21.3 |
| **54** | Sandy clay Loam | 25.25 | 46.21 | 20.28 | 5.06 |
| **55** | Sandy Clay | 36.02 | 33.41 | 18.09 | 9.4 |
| **56** | Sandy Clay | 55.12 | 15.05 | 12.98 | 14.46 |
| **57** | Sandy Clay | 37.86 | 25.85 | 16.6 | 18.5 |

| | | | | | |
|---|---|---|---|---|---|
| **58** | Sandy Silt Clay | 7.96 | 42.98 | 24.92 | 20.26 |
| **59** | Sandy silt | 32.46 | 17.8 | 41.75 | 9.16 |
| **60** | Sandy Silt Clay | 24.2 | 24.42 | 32.3 | 17.67 |
| **61** | Sandy clay Loam | 23.7 | 54.42 | 7.17 | 11.96 |
| **62** | Sandy clay | 44.55 | 32.36 | 11.76 | 8.66 |
| **63** | Clay | 17.12 | 24.41 | 17.58 | 38.73 |
| **64** | Sandy Silt Clay | 24.94 | 52.36 | 20.86 | 0.25 |
| **65** | Silt | 12.53 | 11.43 | 56.98 | 18.63 |
| **66** | Sandy Silt Clay | 17.53 | 35.51 | 29.65 | 15.45 |




The basin exhibits six types of textural classes of soils viz., clay, clay loam, loam, sandy clay loam, sandy loam and silt clay loam. The analysis of soil samples revealed that the proportion of clay (< 0.002 mm diameter) in the sample is varying between 0.25 to 49 percent, of silt and very fine sand (below 0.1 mm diameter) from 5 percent to 65 percent, of sand (0.1 to 0.2 mm diameter) from 5.54 percent and 59 percent and coarse material (above 0.2 mm diameter) from 3 percent to 75percent. The soil texture is determined by the relative proportions of sand, silt, and clay in the soil. The addition of organic matter, water, gases and time causes the soil of a certain texture to develop into a larger soil structure called an aggregate.

## III. CONCLUSION

Water may infiltrate into very coarse-textured soils or well-aggregated soils so readily that none is lost in runoff even under the heaviest downpour. In contrast the surface layer of a bare clay soil may soak up the first moisture that falls; then it may swell and become a dense waterproof layer that sheds the remainder of the water. The soil texture is determined by the relative proportions of sand, silt, and clay in the soil. The above maps shows distribution of Coarse sand, medium sand, silt and clay in Ghod watershed. The highest 71 percent coarse sand lowest 3 percent coarse sand found in study area.

## IV. REFERENCES


1. S. J. Deore (2005), "Prioritization of Micro watershed of upper Bhama River on the basis of soil erosion Risk using remote sensing and GIS techniques. A thesis submitted to department of Geography, University Pune, Pune.
2. K Z. and S. Hazbavi (2013), "Creating surface soil texture map with indicator kriging techniques: A case study of central Iran Soil" AJACS, ISSN 2227-67ox.
3. V. S. Kale and Gupta A. (2001), "Introduction to Geomorphology." Orient Longman Ltd. Calcutta.
4. M. Delbari (2011), "Geostatistical Analysis of soil texture fraction on the field scale, soil and water res,6 (4), 173-189.
5. S. Singh (2012), "Physical Geography" Prayagpustakbhavan, Alhabad, India."
6. T. N Nath (2015), "physiochemical properties and its relationship with water holding capacity of roadside Tea cultivated soil in Dibrugadh, Assam , India. IJACS 3(3), 288-292.