

Characterization and classification of forest soils of Nizamabad district of Andhra Pradesh

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ABSTRACT

Sixteen typical pedons representing eight forest range soils of Nizamabad district of A.P. were studied for their morphological, physical and physico-chemical characteristics. The physiography of the study area was mainly hilly terrain with steep sloppy uplands and with some extent of flat undulating plain nearly level to gently sloppy lands. The soils are shallow to deep in depth and have granular to sub angular blocky structures in surface horizons and sub angular blocky to angular blocky in sub surface horizons. The soil texture ranged from sandy loam to clayey with moderately acidic (pH 5.3) to moderately alkaline (8.6) in reaction and non saline ($<0.70 \text{ dSm}^{-1}$). The bulk density, water holding capacity, organic carbon, cation exchange capacity ranged from 1.32 to 1.75 Mg m^{-3} , 19.9 to 54.3% , 0.20 to 1.46% , 9.98 to $44.07 \text{ c mol (p+) kg}^{-1}$ soil, respectively. The dominance of exchangeable bases on exchangeable complex was in the order of $\text{Ca}^{2+} > \text{Mg}^{2+} > \text{Na}^{+} > \text{K}^{+}$. Majority of the pedons placed under Haplustalfs and others under Typic Ustifluvents, and Rhodustalfs.

Key words : Forest soils, Characterization, Classification, Nizamabad.

Forests are very important fundamental natural resources, which are very vital for the ecological development, and environmental stability. Forests in Nizamabad district of Andhra Pradesh are distributed mostly on hilly, undulating and sloppy terrain. The forest soil characterization and classification aid in determining the soil potential, which are essential for better scientific utilization of forest soil resources. Classification of forest soil in a taxonomic perspective provides information on the nature and its potential production capabilities.

Keeping in view the above facts, the present study was carried out to characterize and classify the forest range soils of Nizamabad district of Andhra Pradesh. The Nizamabad district of Andhra Pradesh, extending over an area of 7956 km^2 is bounded between $18^{\circ} 10'$ and 19° North latitude and $77^{\circ} 40'$ and $78^{\circ} 37'$ East longitudes, the river Godavari constitutes the northern boundary of Nizamabad district separating the latter from Adilabad district of Andhra Pradesh. Physiographically, the study area can be divided into Manjira zone (335 to 490 m above MSL), Central hill zone (>635 m above MSL) and Bheemnagar plateau (427 to 663 m above MSL). The main forest composition of the study area was southern tropical dry deciduous, southern dry teak, southern dry mixed deciduous, dry deciduous scrub, dry savannah, dry grasslands and secondary dry deciduous forests. The forest area is represented by a hot summer and generally dry temperate climate. The average rainfall ranges from

999 to 1101.0 mm. The mean maximum and minimum temperature ranges between 32.2 to 36.4°C and 23.4 to 26.4°C during southwest monsoon, range between 30.1 to 32.4°C and 15.4 to 21.2°C during northeast monsoon and 36.5 to 41.4°C and 19.3 to 25.3°C during hot weather period, respectively. Nizamabad district forests occupy the summit and confined to gentle and undulating slopes and plateau, hills and hill plains with upland lowland plains and high hills of forest area.

MATERIALS AND METHODS

The study area qualifies for Hyperthermic soil temperature and Ustic soil moisture regimes. Geological formation of the Nizamabad district mainly developed from the granite, gneiss of Archaean period and dharwars of precambian period. The physiographic locations of the pedons are the hill slopes and side slope of the ridges. The location and site characteristics of the sixteen-studied typical pedon are given in the Table 1. The soils are developed on granite, gneiss and basaltic parent material. The soils are classified at sub group level as per USDA soil taxonomy (Soil Survey Staff, 1998). The Sixteen soil pedons were selected for study based on physiography and morphological features. The soil samples were collected horizon wise from each pedon. The physical properties such as particle size analysis, bulk density, water holding capacity, the physico-chemical properties- pH, EC, OC, free calcium carbonate and chemical properties like exchangeable cations, cation exchange capacity were determined by adopting standard methods.