

Research Article

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Soil resource inventory and land evaluation using GIS techniques of some black soils, red and red laterite soils in semi arid tropical region of Tamil Nadu

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Summary

The study was carried out in the three new research stations with varied soil types with an objective to develop a strong soil resource database for proper appraisal of their productivity potential and land use pattern by preparing thematic maps using GIS tools. The soils are shallow (27 cm) to very deep (>170 cm). The surface horizons exhibited mostly medium fine granular to weak sub angular blocky structures whereas in subsurface horizons have shown medium fine granular to medium strong sub angular blocky structures in red and red laterite soil pedons. The black soil pedons had coarse strong angular blocky structure. The textural class of fine earth fraction was clayey (52.9 to 64.3%) in black soils, whereas in red and red laterite soil pedons it was coarse textured gravelly sandy loam to sandy clay loam in the surface horizons, sandy loam, sandy clay loam and sandy clay in sub-surface horizons (54.5 to 73.7% sand and 16.5 to 40.9% clay). The moisture retention at field capacity (33 kpa), permanent wilting point (1500 kpa) and available water capacity were high in black soils. Thematic maps of three different Research Stations were prepared by employing GIS techniques for different classes viz., on soil depth, gravelliness, bulk density, available water holding capacity, soil reaction, EC, soil organic carbon, CEC, BSP, available macro and micro nutrients status of surface soil classes were generated. The limitations in the soils of the study area were due to slope, shallow depth, soil erosion, gravelliness, low water holding capacity, low and high pH, calcareousness, low organic carbon, low CEC and low BSP and low availability of macro and micronutrients.

Key words : Soil resource inventory, Land suitability evaluation, GIS techniques, Red, Red laterite, Black soils, Semi arid tropical region

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