

Assessment of soil physical and physico-chemical properties under major cropping systems of Jaggaihpeta mandal, NTR district, Andhra Pradesh using geospatial tools

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ABSTRACT

Random soil survey was conducted in Jaggaihpeta mandal, NTR district and collected 150 representative surface soil samples (0-30 cm) with GPS locations in 24 villages of the mandal covering the major cropping systems *viz.* rice-rice, rice-fallow, cotton-maize, chilli-fallow, fallow-pulse and assessed for soil physical and physico-chemical properties. Soil physical properties like soil texture, bulk density, water holding capacity, hydraulic conductivity and aggregate stability and physico-chemical properties like soil reaction (pH), electrical conductivity, organic carbon and CEC were analysed. The analytical data was statistically interpreted for range and mean and delineated spatial variability maps for soil reaction (pH), electrical conductivity and organic carbon was made by using QGIS 3.42 software. Soils were neutral to slightly alkaline with most being non-saline. The majority of soil contain low to high organic carbon content. The variability in cation exchange capacity was ranged from 9.07 to 67.41(c mol (p⁺) kg⁻¹). The majority of the soils were clay textured (82.6%) with WHC ranging from 21.78 to 66.94 per cent. The wide variation observed in WHC could be due to differences in sand, silt, clay and organic carbon contents Hydraulic conductivity varied between 0.22 and 2.58 cm h⁻¹. Among the system studied, the fallow-pulse system recorded the lowest mean bulk density (1.15 Mg m⁻³) likely due to the greater biomass contribution from leguminous crops. The rice-fallow system exhibited the highest mean aggregate stability at 62.88 per cent which might be due natural restoration processes or consistent addition of organic matter from crop residues that help in bind soil particles together.

Keywords: *Stability, Organic carbon and Spatial variability*