Spatial mapping of soil physical and physico-chemical properties in VR gudem village of Ponduru mandal, Srikakulam district

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ABSTRACT

The present study was undertaken to evaluate the spatial distribution of soil fertility in the soils of VR Gudem village, Ponduru mandal, Srikakulam district, Andhra Pradesh, employing geospatial analytical techniques. A total of 131 geo-referenced surface soil samples were systematically collected from VR Gudem village at a regular grid interval of 150 m^2 from the 0–25 cm depth horizon. The study area is situated within the north coastal agro-climatic zone of Andhra Pradesh and is characterised by a sub-humid to semi-arid climatic regime. Collected soil samples were subjected to standard laboratory analyses for key fertility parameters. Spatial fertility distribution maps were subsequently generated under a Geographic Information System (GIS) environment using Quantum GIS version 3.40, enabling a spatially delineated representation of fertility gradients across the village. The soil texture was ranged from clay to sandy clay, water holding capacity and bulk density were ranged from 20.0 to 61.2 per cent, 1.34 to 1.61 Mg m^{-3} respectively. Soils were strongly acidic to moderately alkaline (5.10-8.36) in soil reaction, non- saline character (0.02- 0.51 dS $m^{-1.}$) and low to medium (0.15-0.72 %) in organic carbon. Spatial variability maps generated for each fertility parameter revealed the inadequacy of uniform nutrient management strategies and necessitates site-specific interventions.

Key Words: *Geo- referenced, GIS, Grid sampling, Nutrient management, Soil fertility status, Soil properties, Spatial variability maps*