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SPATIAL VARIABILITY OF SOIL PROPERTIES IN A CALCIC RED LATOSOL SOIL SCAPE IN THE NOTHERN AREA OF SRI LANKA

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The information on the spatial variability of soil properties is vital for the better management of soil and to increase the crop productivity. This study was conducted to explore the short-scale spatial variability of selected chemical and physical soil properties of a Calcic Red Latosol soil scape in the Alaveddi area in the Jaffna district.

The study area consisted of 2.5 ha and samples were collected within the plough depth (0-30 cm) by using stratified random sampling scheme. This was achieved by firstly defining a sampling (spacing 29 x 29 m) grid. Subsequently, a random sample was added within each grid cell. The variability of soil clay content, silt content, sand content, organic matter (OM), pH (soil to water ratio of 1:2.5) , electrical conductivity (EC) (soil to water ratio of 1:5) were investigated for all the samples (n=40) and available phosphorous, exchangeable potassium were investigated for selected samples (n=9) by means of classical and geo statistical analysis techniques.

The coefficient of variation of properties ranged from 4% (pH) to 32% (clay content). The experimental variograms calculated for soil properties were best fitted with spherical model. According to the relative nugget effect (RNE -ratio of nugget to the sill) of variograms, the clay content, sand content, silt content, electrical conductivity and organic matter exhibited a highly spatially structured variability (RNE < 25 %), whereas a medium structured variability was observed for soil pH (RNE 25-75 %). The observed spatial dependencies of soil properties indicated that sampling space for future studies can be ranged from 20 m (pH) to 70 m (sand). The maps of texture, OM further illustrated a strong short-scale spatial variability indicating the potential of site-specific soil management in the study area.