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SPATIAL CHARACTERIZATION OF SOME PROPERTIES OF REDDISH BROWN EARTH SOIL TO SUPPORT FIELD CROP RESEARCH PLANNING

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Soil properties can show considerably shorter scale spatial variability. This spatial variability may affect the quality of research activities conducted in a research field. This phenomenon has not been considered in research planning. The main reasons are the absence of detailed soil maps and limited understanding about the level of short scale soil variability. Therefore, the current study was aimed at investigating the short scale soil variability of Reddish Brown Earth soil (Typic Haplustalfs) in the Dry zone of Sri Lanka to support planning of the field crops research.

A field of 5 ha in the Mahailluppallama Field Crops Research and Development Institute was selected as the study site (Central coordinates: 8^0 6' 39'' N, $80^0$27' 29'' E). The soil of the area belongs to the Reddish Brown Earth Great Soil Group and classified as Typic Haplustalfs according to the USDA Classification of Soil Taxonomy. The spatial variability of soil texture, Electrical Conductivity (EC) and pH of the top soil (0-30cm) were determined using 65 soil samples obtained from geo-referenced locations on a 30 m regular grid following a random sampling scheme. Soil particle size distribution, pH and EC were determined respectively by the pipette method, glass electrode pH meter at 1:2.5 soil to KCl ratio and using an EC meter (1:5 soil water suspensions). Exploratory data analysis was carried out with the SPSS. Geostatistical analysis was done using Variowin software. Idrisi Kilimanjaro software was used to map different properties using ordinary kriging.

Among the measured properties, EC showed the highest CV of 32% indicating the largest variability. EC values was distributed between 0.02 and 0.09 dS/m. ECe values ranged between 0.28- 1.27 dS/m. The pH of the soil ranged between 4.32 and 6.17 with the lowest CV (7%). Skewness and Kurtosis values of EC and soil pH indicated that they are not normally distributed. Non-normality of soil properties can result from the spatial clusters of extreme values and management practices. The coefficient of variation of soil properties ranged from 7% (pH) to 32% (EC). The experimental semivariograms indicated strongly structured spatial variability for clay and EC, while soil pH showed a random variability. Clear spatial patterns were identified from the interpolated maps of all the measured properties except soil pH.

This study indicated considerable short scale soil property variability within the studied field. These data can be incorporated in to field crop research planning to increase the statistical efficiency of field crop experiments.