

**INVESTIGATION OF SHORT-SCALE SPATIAL VARIABILITY OF A
SALT-AFFECTED LAND ALLOTMENT IN MAHA-ILLUPPALLAMA,
SRI LANKA**

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Salt-affected soil occurs due to excess accumulation of water-soluble salts in the soil. These soils are highly diverse highlighting the requirement of specific approaches to reclaim and manage them for long-term productivity. This study was conducted to investigate short-scale spatial variability of a salt-affected land allotment for implementing the appropriate site-specific management practices. Seventy soil samples were randomly collected from the study site as at a depth of 0 – 30 cm located at *Maha-Illuppallama*, Sri Lanka. Each sample was analysed for Electrical Conductivity (EC), pH, Cation Exchange Capacity (CEC), Exchangeable Na (Ex. Na), (Ex. K), (Ex. Mg), and (Ex. Ca). Spatial variability maps of all the measured soil parameters, Sodium Adsorption Ratio (SAR) and Exchangeable Sodium Percentage (ESP) and Base Saturation (BS) were prepared using Inverse Distance Weighting (IDW) procedure. Delineation of potential management zones (PMZs) based on the spatial variability of soil pH, EC, SAR and ESP was performed using Fuzzy k mean spatial cluster analysis technique. Significant differences of the investigated chemical parameters among PMZs were identified using Tukey's post hoc test. The results revealed the occurrence of sodium-rich salt-affected (sodic) soil in the study site. Exploratory data analysis revealed high spatial variability in EC, Ex. Na, Ex. K, Ex. Ca (CV>60%) and moderate spatial variability (12 %< CV<60%) in soil pH, CEC and Ex. Mg. Fuzzy k mean algorithm identified three PMZs in the study field. Soil pH, EC, Ex. Na, SAR, BS and CEC were significantly different between PMZ1 and PMZ3 ($p<0.05$). Soil BS and CEC were significantly different between PMZ2 and PMZ3 ($p<0.05$). Thus, significant differences in the investigated soil chemical characteristics were observed among the delineated PMZs. These results emphasize high potential to apply site-specific soil management on the basis of the delineated PMZs in the study site.

Keywords: Potential management zones (PMZs), Site-specific management, Sodic soil