

**DEVELOPMENT OF A SOIL CHEMICAL CHARACTERIZATION  
LAYOUT FOR EFFECTIVE SUGARCANE RESEARCH AND  
PRODUCTION AT UDAWALAWE, SRI LANKA**

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This study was conducted to investigate short scale spatial variability of selected soil chemical properties in support of developing a reliable layout for effective field research and site-specific nutrient management in the sugarcane research institute (SRI) farm area (92 ha), *Udawalawe*, Sri Lanka. Soils in the study site belong to alfisols and 76 samples (0 – 30 depth) were collected randomly. Each soil sample was analysed for pH, electrical conductivity (EC), total nitrogen (TN), available phosphorus (Av. P), exchangeable potassium (Ex. K), exchangeable calcium (Ex. Ca), exchangeable magnesium (Ex. Mg), available fraction of the selected micronutrients (Fe, Mn, Zn and Cu) and organic carbon percentage (OC%). Spatial variability maps of the measured soil properties were prepared using ordinary kriging procedure. Potential management zones (PMZs) were delineated using Fuzzy *k*-mean spatial cluster analysis techniques. Significant differences of the investigated chemical parameters between the delineated PMZs were identified using t test. Exploratory data analysis revealed high spatial variability in EC and pH (CV>60%), low spatial variability in pH (CV< 12%) and moderate soil variability (12%<CV<60%) in other measured soil properties within the study field. Fuzzy *k*-mean algorithm identified two PMZs in the study field. Soil TN, Ex. K, Av. P, Av. Zn and OC % were significantly ( $p<0.05$ ) different among two PMZs ( $p<0.05$ ). However, other measured soil properties were not significantly ( $p<0.05$ ) different between two PMZs. These results revealed the existence of a considerable soil spatial variability within the field emphasizing greater potential to develop a layout for effective field research as well as site-specific soil management.

**Keywords:** Potential management zones, Short-scale spatial variability, Soil chemical properties, Sugarcane