Relationships Between Soil pH, EC, and the Concentrations of Essential Macro and Micro Elements of Paddy Cultivated Lowland Soils of Sri Lanka

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Fertility of lowland paddy soils is affected by the agroclimatic conditions and agronomic management practices adopted. It is important to know this variation among administrative demarcations for effective decision making. Therefore, the variation of soil pH, electrical conductivity (EC), macro, and microelement concentrations among different administrative demarcations (i.e., districts and provinces) was studied. A total of 1024 paddy soil samples across the country were collected using a stratified random sampling approach. Soil available element concentrations (extracted in 0.01 M $CaCl_2$) were measured using an Inductive Couple Plasma Mass Spectrophotometer, and soil pH and EC were measured using the 1:5 soil: water extraction method. Soil pH of the samples had a mean value of 5.26. Jaffna had the highest pH (6.49) while Galle (4.13) had the lowest. Electrical conductivity had a mean value of 0.18 dS/m. Jaffna had the highest (0.65 dS/m) while Kegalle (0.04 dS/m) had the lowest EC. Mannar had the highest Mg (399 mg/kg) and K (116.2 mg/kg) concentrations. Kalutara had the lowest Mg (27.4 mg/kg), and Colombo had the lowest K (25.5 mg/kg) concentrations. Jaffna had lower concentrations of Zn and Mn while Gampaha had higher Zn, and Trincomalee had higher Mn. Rathnapura had higher Mo. Matale had lower Fe, while the highest Fe concentration was observed in Colombo. Soil pH, Na, Mg, K, Fe, and Mo had a (+) relationship with EC while Al, Co, Zn, and Cd had a (−) relationship. This information would be useful in the sustainable nutrient management of paddy soils in Sri Lanka.

Key words: Electrical conductivity, Microelements, Paddy soil, Soil pH, Sri Lanka

This research was partly funded by the AHEAD/RA-3/STEM/PERA/AGRO/DOR/No-16 research project, and the ICP-MS facility was provided by the Department of Geology, Faculty of Science

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