

Distribution of Potassium in Selected Paddy Soils and their Variation under Different Agro-Climatic Zones, Management Practices and Soil Orders

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Potassium (K) is an essential macro nutrient for growth and production of rice (*Oryza sativa* L.). Exchangeable K fraction is the available form of K for plants. However, exchangeable K concentration in rice growing soils can vary with climatic factors, water management practices, cropping systems and soil properties. Hence, the objective of this study was to determine the variation in lowland soil exchangeable K concentration among six agro-climatic zones (ACZs), water supply systems (major irrigation, minor irrigation and rainfed), rice-based cropping systems (banana, vegetable, other filed crops and fallow) and soil orders (Vertisol, Alfisol, Entisol, Histosol, Inceptis and Ultisol). Total of 1200 paddy soil samples were collected using a stratified random sampling approach. Each sample consisted of six soil cores obtained from the top 15 cm of the soil profile of a paddy track (*Yaya*) considering topographical heterogenities. Exchangeable K in soil was extracted using 1 M ammonium acetate and determined using flame photometer. Soil exchangeable K concentration was ranged between 26.4 – 1133.8 mg kg⁻¹ with a mean concentration of 240.1 mg kg⁻¹. Exchangeable K concentration was similar among different ACZs ($p > 0.05$). When compare water sources, the highest and the lowest exchangeable K concentrations were recorded in minor irrigation and rainfed areas, respectively ($p < 0.05$). Rice-banana cropping system had higher exchangeable K concentration than continuously paddy cultivated lands ($p < 0.05$). Further, the highest exchangeable K was observed in Vertisol followed by Alfisol and Entisol ($p < 0.05$). Among all the soil orders tested, Ultisol reported the lowest exchangeable K concentration ($p < 0.05$). In summary, most of the paddy growing soils in Sri Lanka have sufficient amount of soil exchangeable K (i.e., optimum K level in soil is 40 - 80 mg/kg) without causing K deficiencies to rice plants. Exchangeable K concentration varied among water sources used, rice-based cropping systems adopted and soil orders.

Keywords: Cropping systems, Exchangeable potassium concentration, Irrigation methods, Paddy, Soil orders

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