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BASELINE CONCENTRATIONS OF CADMIUM AND LEAD IN SELECTED RICE GROWING SOILS IN THE DRY ZONE OF SRI LANKA

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Rice has been identified as one of the major sources of Cd and Pb intake for humans. The long term application of inorganic fertilizers and pesticides can contribute to the accumulation of Cd and Pb in rice fields. The objectives of this study were to determine and compare the baseline concentrations of Cd and Pb under rice cultivation and non-agricultural soils in a selected area of the dry zone and to investigate relationships between metal concentrations and basic soil properties.

Samples of soil were collected from the rice-rice cropping system and from non-agricultural lands as the control samples in a selected area of the dry zone. The total concentrations of Cd and Pb in soils were determined after digesting the soil with 4 M HNO_3 acid. Soil pH, electrical conductivity (EC), available phosphorous, cation exchange capacity, soil organic matter (OM) % and clay % were determined as the basic soil properties.

The Cd and Pb concentrations were in the range of 0.89 - 1.21 and 2.81 - 8.89 mg kg^{-1} respectively in the rice soil while the range of non-agricultural soils was 0.02 - 0.43 and 3.92 - 17.32 mg kg^{-1}. Three samples from paddy soils had Cd concentrations which were higher than the lower limit (1 mg kg^{-1}) of standard set by the European Community. Mean Pb concentration in the non-agricultural soils were greater than that of rice soils by two-fold, indicating that non-agricultural lands have either geological or non-agricultural activities as the source of Pb.

All soils studied had Cd and Pb concentrations that were below the upper limits of the standards set by the European Community. The baseline concentrations of Cd and Pb ranged from 0.05 to 3.68 and from 2.28 to 12.40 mg kg^{-1} for rice soils and from 0.02 to 1.18 mg $kg^{-1}$and from 2.98 to 24.05 mg kg^{-1} in non-agricultural soils, respectively. Among the tested soil properties pH (r=0.46*), EC (r=0.59*) and OM % (r=-0.53*) were significantly positively correlated with Cd. The metal concentrations in both land uses are below the upper baseline concentration limits indicating that there were no significant contaminations.

The results of the study provided initial evidence of Cd and Pb status in rice soils of selected locations in the dry zone emphasizing the importance of further investigations.