

Spatial variation of soil properties in paddy fields of Polonnaruwa district

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Abstract

Identification of spatial variation of soil chemical properties in paddy fields and adoption of remedial measures are needed to maintain a good soil health. It has been well accepted that thematic maps of soil properties can use to identify the variations and introduce soil test based fertilizer recommendations for optimum crop yield while conserving the environment. Therefore, this study was conducted to prepare thematic maps of soil parameters in Polonnaruwa district. Soil samples in depth of 0-15 cm were collected from 2.5 km by 2.5 km grids. Sampling points were demarcated by Global Positioning System (GPS). Collected soil samples were analyzed for available soil P by Olsen's method, exchangeable-K by 1N NH₄OAc (pH=7) extraction method, exchangeable Zn by EDTA extraction, soil pH by 1:2.5 (soil:water), electrical conductivity by 1:5 (soil:water) and soil organic carbon contents by Walkley-Black method. Tested values were mapped using ArcGIS 10.5 and legends were prepared based on the optimum and critical values of each parameters. Available soil phosphorous maps of Polonnaruwa district showed that 32% of land have optimum P content and 58% of them have excess of P. Soil exchangeable K is low (< 80 mg/ kg) as 98% of land area and only 2% of area is in the optimum K level. About 32% of the land has low Soil pH and soil salinity is not critical in 98% of paddy field in the district. About 82% of the area shows critical level of Zn (<1 mg/kg) and 98% of them show very low level of organic matter (< 3%). The land parcels where remedial measures should be applied can be easily identified through the prepared maps even without analyzing soil samples in each field at any time.

Key words: Rice, Soil chemical properties, Spatial variation, Polonnaruwa