

IDENTIFICATION AND MAPPING OF EXISTING LAND USES AND ASSESSMENT OF THEIR SOIL FERTILITY PARAMETERS IN UDUNUWARA DS DIVISION

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Agricultural development requires a thorough understanding of soil characteristics and their spatial distributions. Creating cropland suitability maps through land evaluation is essential for effective land management. A study was conducted to develop a cropland suitability map with “Highly suitable”, “Moderately suitable”, and “Currently not Suitable” categories for the Udunuwara Divisional Secretariat Division (UDSD) which covers 68 km² of land by analyzing soil quality parameters. Sixty-two sampling locations were selected to analyze nine soil parameters. Weather data, such as rainfall and temperature was collected from secondary sources. A slope map was created using the Digital Elevation Model file, and the constructed questionnaire was used to obtain the drainage details. The collected soil samples were analyzed to determine parameters such as soil pH, EC, exchangeable potassium (K), available phosphorus (P), organic matter (OM), and soil texture. Each parameter was classified using ArcGIS™ 10.7.1 to create parameter maps. Results revealed that soil pH varied from 4.3 to 7.3 indicating conditions from strongly acidic to slightly alkaline. Soil EC values were within the range from 0.018 to 0.278 mS m⁻¹ showing no potential for salinity development. Soil OM content varied from 0.64% to 6.0% indicating a wide distribution range within UDSD. The available P and exchangeable K contents were within the range of 1.03 to 47.69 mg kg⁻¹ and 40.6 to 480.2 mg kg⁻¹, respectively. The soil texture varied from sandy loam to light clay loam. When these results were compared with FAO’s 1993 crop requirement criteria, it was revealed that the study area is highly suitable for home gardens and paddy cultivation, while it is moderately suitable for tea cultivation. The cropland suitability map developed in this study, provides valuable information for land use planning and decision-making, facilitating better agricultural management in the region.

Keywords: Cropland suitability, GIS, Land evaluation