

SPATIAL VARIABILITY OF SELECTED SOIL CHEMICAL PROPERTIES FOR AGRICULTURAL LAND MANAGEMENT

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Soil spatial variation data of chemical parameters are needed for better agricultural management, sustainable land use management and soil conservation. There is a need to produce accurate soil maps of chemical parameters cost effectively. This study was undertaken to quantify spatial variability of soil properties by a kriging method. Seventy sampling points were selected for this research using stratified random sampling method. Stratification was based on the type of land cover patterns, which were designated as forest patches, agriculture land patches, grass land patches and catchments. Sampling points were randomly selected from each land cover type. Minimum distance between two adjacent sampling points was 500 m. Soil samples were analyzed for pH, EC, exchangeable K and available P. In each location, soils were collected from top to - 30 cm depth (root zone) using a core sampler and sub soil samples were collected around the geo-referenced point to obtain a composite sample. Geostatistical software was used to construct semi-variograms and spatial structure analysis for the variables. Geostatistical estimation had done by kriging. Acidic soil was identified in agriculture land around 13% of area, 6% alkaline soil, and 13% of agriculture land area was identified as saline soil. Accordingly, 32% of agriculture land area was identified as problem soils. Fourteen percentage of agriculture lands contain more available P concentration than the optimum range of 15- 22 ppm and 4% agriculture lands contain higher exchangeable K concentration than the optimum range of 78-97.5 ppm suitable for crop cultivation. Ninety eight percentage of forest lands and 100% of grass lands contain available P concentration higher than the optimum range. But forest lands and catchments showed lower level of exchangeable K concentration. Twenty percentages of grass lands contain higher exchangeable K than the optimum level. Agriculture practices leads to changes in the soil. Hence, identified soil problems should be reclaimed to maintain the fertility of soil for sustainable production. Proper management of soil can be a better solution for supporting the successful agricultural activity of a community in future and socio-economic development in a sustainable way.