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Soil Informatics for Evaluating and Mapping Soil Productivity Index in an Intensively Cultivated Area of Punjab, India

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ABSTRACT

Soil Informatics, the GIS-based decision-support system, helps to establish the potentials and limitations of different soils for crop production. A new methodology combining soil survey indices with available nutrients (P and K) was developed to evaluate soil productivity. Physiographic-soil map was generated by interpretation of IRS 1C/1D LISS III satellite data and soil survey in an agricultural region of Punjab, India. Georeferenced surface (0 m - 0.15 m) soil samples were collected from 267 sites using Global Positioning System (GPS). Available P (Olsen P) content varied from 5.49 kg?ha⁻¹ to 67.0 kg?ha⁻¹ and available K (1N NH₄OAc extractable K) from 44.8 kg?ha⁻¹ to 784 kg?ha⁻¹. The nutrient maps (P and K) generated using ArcGIS clearly point out the specific locales where deficiency of nutrients constrained crop production. Multi nutrient (PK) map indicated that the combined P and K deficiency at a single place was negligible. The productivity index was computed by taking into account soil texture and available nutrients to evaluate the productivity of soils in each mapping unit. This approach is proposed as a method for the evaluation of sustainable soil management.

KEYWORDS

Macro Nutrient; Soil; GIS; Remote Sensing; Soil Productivity

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