

Research Article

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Development of optimum land use plan and carrying capacity assessment through land characterization and soil site suitability evaluation in Pratapgarh district of Rajasthan

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Summary

A soil survey study deploying soil resource mapping unit was conducted during 2011 in Pratapgarh district of Rajasthan to evaluate land characteristics and soil site suitability for major field and fruit crops as well as to develop optimum land use plan. Soils of eight pedons adequately representing the district belonged to *Entisols*, *Inceptisols* and *Vertisols* orders and widely varied in slope (<1 to 30%), texture (sandy loam to clay), soil depth (30-80 cm), available soil water (0.13 to 0.22 M³ M⁻³), CaCO₃ content (0 to 126.21 g kg⁻¹), pH (6.04 to 7.55), organic carbon (0.24 to 0.79%), cation exchange capacity (12.90 to 36.81 Cmol, p+, kg⁻¹) and exchangeable sodium percentage (1.69 to 4.58%). However, chemical and physical properties were largely affected by position of land form and regional geology. In general, deep, fine textured and dark coloured soils of plain landform constituted higher suitability class for different field crops followed by valley soils (relatively less developed than plain landform) that were of intermediate value in physical and chemical properties (coarser textured, lower water and nutrient holding capacity, high calcium carbonate), weathering and suitability for crops. Grain and dry fodder productivity of different field crops was maximum at plain landform followed by valley, hill slope and hills except wheat and chickpea had higher productivity on valley soils. Among different crop suitability classes (highly suitable, suitable, moderately suitable, marginally suitable and not suitable); highly suitable crops on soils of different pedons comprised of maize, wheat and chickpea on P₃; rice, maize and chickpea on P₄; soybean on P₇ and rice, maize, green gram, soybean and chickpea on P₈. Among different crops, maize was suitable on soils of all pedons except P₇ while wheat was found suitable on five pedons (P₂, P₃, P₄, P₇ and P₈); chickpea and mustard on four pedons (P₃, P₄, P₇ and P₈); garlic and isabgol on three pedons (P₄, P₇ and P₈); mango on all pedons except P₈; aonla on all pedons except P₇ and P₈ and guava on six pedon (P₁, P₂, P₄, P₅ and P₈). Carrying capacity of Pratapgarh soils estimated in terms of total production of cereals, pulses, oil seed and dry and green fodder indicated a surplus 55836.2, 11584.35, 133966.1, 5529284 and 3491432 tons in 2011 and 20369.5, 7748.92, 130707.19, 5114305 and 1968001 tons in 2020, respectively.

Key words : Optimum land, Carrying capacity, Soil site suitability evaluation

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