

Characterization, Classification and Evaluation of Soils

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Introduction

Soil information obtained through systematic identification, grouping and delineation of various soils present in the locality are important for particular use for effective planning of different land uses, as they provides information related to potentials and constraints of the land. In addition, environmental characteristics (e.g. climate) and socio-economic factors are also important elements in pedological characterization to provide data and knowledge on soil properties related to the site characteristics (slope, soil color, vegetation). Understanding of soil genesis, morphology and other key soil properties is a pre-requisite to sustainable use of soil resources. Soil characterization provides the information for our understanding of the physical, chemical, mineralogical and microbiological properties of the soils we depend on to grow crops, sustain forests and grasslands as well as support homes and society structures.

Soil surveys help to describe and classify the soils and predict their potentials for sustainable land uses. Taxonomic classification of soils allows determining the best possible use and management of soils and exchange soil information world-wide. Soil characters that are considered for classification are furnished in the table below

Soil Characteristics	Site And Morphological Characteristics
Morphological	Slope, Erosion, Drainage, Land form
Physical	Calcareousness. Stoniness, Crops and present land use
Chemical	Soil horizons, soil colour, consistency, Soil structure and texture
Mineralogical & Biological	Soil Boundaries, cutans, distribution of coarse fragments

Physical Characteristics	Chemical Characteristics
Partical size distribution	pH , EC, CEC, CaCO ₃ , OC
Water holding capacity	Exchangeable Ca ⁺⁺ ,Mg ⁺⁺ , Na ⁺ , K ⁺ , BS
Bulk density Hydraulic conductivity	Silica Oxide (SiO ₂), Sesquioxide (R ₂ O ₃)

Soil Classification

Systematic grouping of objects into categories more orderly and logical manner on the basis of their classification:

Types

- Genetic system of classification
- FAO/UNESCO system of classification
- Comprehensive system of classification (soil taxonomy)
 - ❖ Order
 - ❖ Sub order
 - ❖ Great group
 - ❖ Sub group
 - ❖ Family

Land Evaluation Methods

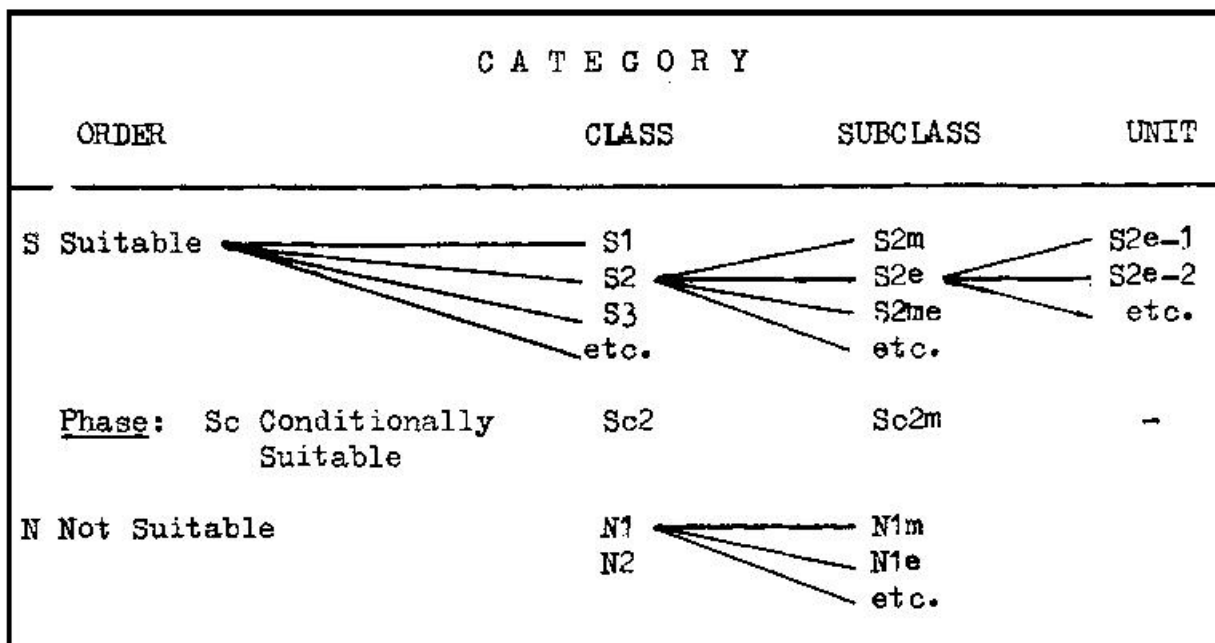
Land evaluation is defined as assessment of land performance used for specified purposes. (FAO, 2007)

- Land Capability Classification
- Soil and Land Irrigability Classification
- Land suitability classification
- Parametric methods
 - Land Productivity Index
 - Soil Productivity Index

Land Capability Classification

There are eight capability classes

- ✓ Class I to class IV : Arable land (suitable for cultivation)
- ✓ Class V to class VIII : Non-arable land (unsuitable for cultivation)



Conclusions

- Understanding of soil genesis, morphology and other key soil properties is a pre-requisite to sustainable use of soil resources.
- Studies relating to soil and site characteristics and crop requirements form the basis for soil suitability evaluation and formulation of meaningful land use plan.
- Soils are managed properly adopting improved technologies like mulching, drip irrigation, fertigation, and adopting site specific nutrient management among others may be converted to potentially productive land.