

---

# SOILS OF CEYLON

---

## CHAPTER I

### INTRODUCTION

OUR approach in this study is based on the **morphological system of soil classification** in which the inherent morphological characteristics of the soils units are identified and studied in the field, while their chemical and physico-chemical properties are determined in the laboratory. Environmental factors which have caused a soil to acquire its properties do not enter into consideration in the classification proper\*. Thus for instance, the concept of 'wet patana soils' is not acceptable since several morphologically different soils are found under wet montane grassland; namely, red-yellow podzolic soils, meadow podzolic soils and bog or peaty soils. Similarly, terms such as paddy soils, coconut soils, rubber soils, etc., are not appropriate because these crops are grown on soils of different morphology, or else quite often some of these crops occur together on soils with similar features.

The principal morphological features used in defining the soil units are the nature and arrangement of the genetic soil horizons, their color, texture, structure and consistence. Other diagnostic characteristics are the content and nature of organic matter, and the presence of lime, soluble salts and concretions of different nature. The water regime of the soil is also considered an important diagnostic feature both in relation to soil climate and to the presence of a permanent or periodic water table.

Chemical and physico-chemical properties which are used as diagnostic characteristics include the pH in water and 1N KCl; cation exchange capacity; base saturation expressed as the sum of cations; conductivity which is indicative of the amount of soluble salts; and free calcium carbonate content. The diagnostic mineralogical features are the nature of the clay minerals and both the nature and approximate content of minerals other than quartz in the coarser fractions. Clay mineralogical data are yet incomplete in this study, although in a few cases the  $(\text{SiO}_2/\text{R}_2\text{O}_3)$  and  $(\text{SiO}_2/\text{Al}_2\text{O}_3)$  ratio of the clay fractions are quoted.

---

\* This statement does not hold entirely true for the distinction between alluvial soils and regosols, which groups are separated not so much based on differences in soil morphology but on differences in geology and topography.

In this classification of Ceylon soils, the diagnostic features are described in accordance with the methods developed in the United States of America (12,13) which have been adopted by several countries and also by the F. A. O.

In the morphological system of classification, the soil profiles are classified in increasingly broader categories ; namely soil types, soil series, families, great soil groups, suborders and orders. Sometimes intermediate categories have to be adopted. In this study, the category of generalization used is that of the **great soil group** as proposed by Thorp and Smith (15). An intermediate category of the **subgroup** is introduced in order to classify soils which differ from the modal soils of the great soil group in one important feature. Categories higher than that of the great soil group level have not been introduced in this paper. Although the principles of zonality which are adopted to classify soils in the category of the orders and suborders may prove valuable in understanding the relation between soils and their environment on a continental scale, the implementation of these principles become increasingly difficult on the scale of a country the size of Ceylon.

In recognizing and naming the great soil groups of Ceylon, we have based ourselves mainly on the classification developed by Thorp and Smith (15) in the U. S. A. which in turn derives both from earlier American work and also from the classical studies of the Russian pedologists. However, since all the great soil groups of Ceylon could not find a place in the above classification system, other sources have been resorted to, notably the classification developed by Stephens (14) for Australian soils and also the miscellaneous classifications used by F. A. O. experts in tropical countries.

Of great interest for modern soil classification is the taxonomic system developed in recent years by American soil scientists assisted by pedologists of several other countries. The results of this new approach were recently published (12) in a 7th approximation\*. In this system the taxonomic units are determined according to observable, and if possible, measurable properties in as much as these properties affect soil genesis or result from soil genesis. In determining the great soil groups of Ceylon, the methods of diagnosis of the 7th approximation have been followed as closely as possible. Furthermore, in Chapter III, an attempt has been made to group the soils of Ceylon according to this new classification system. It will be observed that most Ceylon soils can be satisfactorily arranged within the categories of the new system. Although in a few cases it has proved to be incomplete, it should be borne in mind that this new system is yet an approximation and that new units could be introduced as they become known.

---

\* In this paper this system is referred to as " 7th approximation ".

To illustrate the soil units which will be discussed in this paper, detailed descriptions and analytical data are given for most of the great soil groups and some of the subgroups. For readers who are not familiar with the physical geography of the island, we refer to the maps at the end of the text.

The authors wish to present this study as a manual of the soils of Ceylon, which might serve as a guide for recognizing the main soils of the country. Since several of the great soil groups are inadequately studied and their subdivision at the subgroup and lower levels of classification has yet to be undertaken, the nature of this paper is essentially provisional. With further observational and analytical data the definition of the units could be made more exact. Information from further soil surveys could result in the introduction of other groups and also in the modification of the definition and nomenclature of the present groups.

## CHAPTER II

### GREAT SOIL GROUPS OF CEYLON

Following great soil groups are described in this chapter :—

1. Reddish brown earths
2. Noncalcic brown soils
3. Reddish brown lateritic soils
4. Red-yellow podzolic soils
5. Red-yellow latosols
6. Immature brown loams
7. Rendzina soils
8. Grumusols
9. Solodized solonetz
10. Low-humic gley soils
11. Meadow podzolic soils
12. Bog and half-bog soils
13. Alluvial soils
14. Regosols

Furthermore, some remarks are made on the laterite and lateritic formations observed in Ceylon.