THE FAO/UNESCO SOIL MAP OF THE WORLD LEGEND

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Historical development

Before discussing the details of the FAO/UNESCO legend (1974) per se some historical review of how and why this legend was developed is necessary. In 1956, during The International Congress of Soil Science in Paris, it was decided that a commissioner of the International Soil Science Society (ISSS) would investigate and report on the problems of world soil classification and soil correlation. Soil maps at the scale of 1:5,000,000 and 1:10,000,000 were presented to the ISSS Congress in 1960. D'Hoore (1960) presented a soil map of Africa, Bramao and Lemos (1960) one for South America and Lobova and Kovda (1960) one for Asia. However, these soil maps were different in their conception and some level of standardization was obviously required.

In 1961 it was decided to prepare an international soil legend. A first draft of the soil legend was presented in 1966 and the overall philosophy and basic principles for the legend were finalized in 1968. This legend was prepared with L. Bramoa, then L.D. Swindale and finally R. Dudal as coordinators. It was published in 1974.

Purpose of the FAO/UNESCO Legend and the World Soil Map

The purpose of the legend was to establish a soil map of the world with the following objectives:

- To provide a first evaluation of the world soil resources;
- To provide a scientific basis for the transfer of technology between regions with similar environments;

- To develop a soil classification system acceptable to the world soil science community at large;
- To establish a common framework for more intensive research in developing countries;
- To serve as a basis for educational, research and development activities;
- To reinforce international contacts in the field of soil science.

Principles of the FAO/UNESCO Legend

The legend comprises 106 soil units. It is a legend for a soil map and not a classification system. The soil units were chosen on the basis of existing knowledge on the formation, characterization and distribution of the soils in all parts of the world. Subdivisions have been proposed which do not relate to equivalent categories in other soil classification systems, but, in general, it is possible to make comparisons at the great group level.

To allow for identification and reliable correlation between widely separated countries, the definition of the units relies on field observable and measurable properties. The characteristics of the soil themselves constitute the criteria for differentiation. Thus, the system is a natural scheme. The main characteristics have been chosen according to the universally agreed principles of soil formation and genesis. These have been combined into diagnostic horizons, and since many relate to land use, they have practical application.

The list of soil units is a monocategorical classing and not a taxonomic system. However, it is not only a simple listing of elements. The legend tends to make possible a creative synthesis and a concrete inventory of the soil properties and characteristics for both practical and scientific purposes.

Determination of the Soil Units

The soil units of the FAO/UNESCO legend are determined following a description of the soil profile and laboratory analyses. There are two steps; first, determination of the main profile horizons in the field; and second, recognition of a diagnostic horizon(s).

In describing the soil in the field, the initial step is to separate the different horizons and to describe their characteristics. The principal horizon designations are by capital letters A, B, C, etc., and numerals are used for subhorizons. In the FAO scheme horizons are defined as follows:

- H horizon: an organic surface horizon;
- A horizon: a mineral surface or subsurface horizon (buried soil) rich in organic matter and with well expressed pedological development;
- E horizon: a mineral horizon which is marked by an eluviation of clay and an increase in sand and silt content;
- B horizon: a mineral horizon where rock structure has virtually disappeared and in which one of the following properties is recognised;
    - a clay, iron, aluminium or humus enrichment either separately or in combination;
    - a degree of sesquioxide accumulation;
    - a degree of weathering of the original material with the formation of clays; the formation and separation of oxides; and, the development of a granular, blocky or prismatic structure;
- C horizon: a mineral horizon made up of unconsolidated materials from which the solum has formed;
- R horizon: the hard continuous rock.

Transitional horizons are recognised when they present characteristics of two different horizons, such as AE, EB, BC, etc. Letters, suffix and prefix figures are used to indicate certain pedological characteristics, subdivision of the main horizons, and lithologic discontinuities.

Diagnostic Horizons

Thirteen diagnostic horizons are defined to express the soil characteristics and to define the soil units. The diagnostic horizons have defined quantitative properties. Their definitions are similar to those of Soil Taxonomy from which they have been taken. They are:

- the Histic horizon
- the Mollic A
- the Umbric A
- the Ochric A
- the Argillic B
- the Natric B
- the Cambic B
- the Spodic B
- the Oxic B
- the Calcic horizon
- the Gypsic horizon
- the Sulphuric horizon
- the Albic E

In addition to the diagnostic horizons some additional diagnostic characters have been defined in order to distinguish some soil units or to divide them. However, these characters are not as well defined as the diagnostic horizons. They are:

- a thin iron pan which is normally a black to dark red indurated layer 2 to 70 mm thick;
- soft powdery lime;
- ferrallic character used for Cambisols with a CEC lower than 24 meq/100 g of clay;
- hydromorphic character;
- takyric character for clayey soils which crack with polygonal symmetry;
- vertic properties;
- abrupt textural change;
- soils with an exchange complex dominated by amorphous material;
- high salinity;
- interfingering;
- albic material;
- sulphuric material;
- gilgai microrelief;
- percentage weatherable minerals;
- tonguing;
- permafrost;
- plinthite;

- aridic moisture regime;
- high organic matter content in B horizons;
- smeary consistence.

Soil Units

Twenty-six main units have been defined for the FAO/UNESCO legend. They are:

- Fluvisols which are recent alluvial soils, often with some hydromorphic characteristics;
- Gleysols, are soils with well expressed hydromorphic features;
- Regosols, are soils formed on unconsolidated material except for recent alluvial deposits;
- Lithosols are very thin soils formed on hard rock;
- Arenosols, are soils with albic, argillic, cambic or oxic horizons but not well expressed;
- Rendzinas are thin soils with a mollic A horizon over limestone;
- Rankers, are thin soils with an umbric horizon;
- Andosols, are soils where mineral constituents are dominated by amorphous materials and allophane;
- Vertisols, are clay rich soils, normally black, with vertical cracks and slickensides;
- Solontchaks, are soils with high salinity;
- Yermosols, are pale coloured soils of the arid regions;
- Xerosols, are the other aridic soils;
- Kastanozems;
- Chernozems;
- Phaeozems;
- Greyzems, are the soils of the great Russian plain;
- Cambisols, are like Inceptisols with little profile differentiation except for a cambic horizon;

- Luvisols, are soils with an argillic horizon, and a base saturation greater than 50%;
- Podzoluvisols, are soils with an argillic B and a deep tonguing of an E horizon into the B horizon;
- Podzols, are soils with a spodic horizon;
- Planosols, are soils with an albic E over a weakly permeable subsoil;
- Acrisols, are soils with an argillic B horizon and a base saturation less than 50%;
- Nitosols, are soils with an argillic B but with only a slight increase of clay in the profile;
- Ferralsols, are soils with an oxic horizon;
- Histosols, are soils with a histic A horizon.

These main units can be further subdivided according to other soil parameters, also by textural classes, slope classes, or into phases which indicate characteristics important for land use, and recognising climatic factors.

Conclusion

The soil map of the world has been completed. In the Region 2 sheets cover Australia, New Zealand and some of the Pacific Islands (FAO/UNESCO, 1976). However, the map scale is 1:5,000,000 so the soils expressed are very generalised. As the system is simplistic and the names euphonic, some attempts have been made to use the system at larger scales. ORSTOM used the FAO legend for the UNESCO/UNFPA project in the outer islands of Fiji, and two maps have been drawn at scales of 1:50,000 and 1:25,000 (Denis, in press; Latham and Denis, in press). The system is easy to work with and can be easily understood by many people. However, at larger scales it lacks sufficient differentiae and could be easily subdivided to be utilised as a taxonomy.

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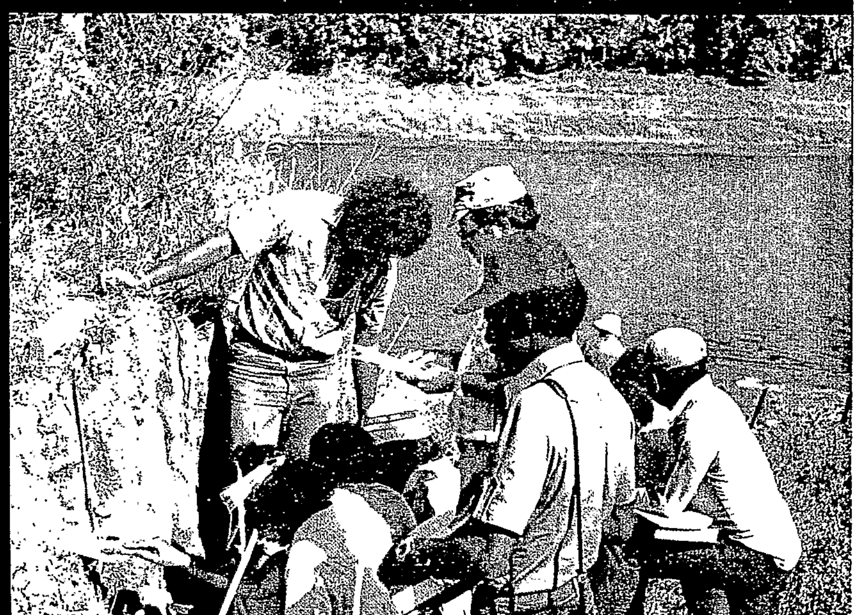
R.J. MORRISON and D.M. LESLIE (Editors)

PROCEEDINGS OF THE SOUTH PACIFIC REGIONAL FORUM ON SOIL TAXONOMY

SUVA, NOVEMBER 1981



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