World Soil Resources Reports 12

PRELIMINARY DEFINITIONS, LEGEND and CORRELATION TABLE for the SOIL MAP OF THE WORLD

Rome, September 1964

SOIL MAP OF THE WORLD FAO/UNESCO PROJECT

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION

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Also issued in this series:

1. Report of the First Meeting of the Advisory Panel on the Soil Map of the World, Rome, 19-23 June 1961.
2. Report of the First Meeting on Soil Survey, Correlation and Interpretation for Latin America, Rio de Janeiro, Brazil, 28-31 May 1962.
3. Report of the First Soil Correlation Seminar for Europe, Moscow, U.S.S.R., 16-28 July 1962.
4. Report of the First Soil Correlation Seminar for South and Central Asia, Tashkent, Uzbekistan, U.S.S.R., 14 September-2 October 1962.
5. Report of the Fourth Session of the Working Party on Soil Classification and Survey (Subcommission on Land and Water Use of the European Commission on Agriculture), Lisbon, Portugal, 6-10 March 1963.
6. Report of the Second Meeting of the Advisory Panel on the Soil Map of the World, Rome, 9-11 July 1963.
7. Report of the Second Soil Correlation Seminar for Europe, Bucharest, Romania, 29 July-6 August 1963.
8. Report of the Third Meeting of the Advisory Panel on the Soil Map of the World, Paris, 3 January 1964.
9. Adequacy of Soils Studies in Paraguay, Bolivia and Peru, November-December 1963.
10. Report on the Soils of Bolivia. January 1964.
11. Report on the soils of Paraguay, January 1964.

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* Advance Copy. The final version will be published in the Official Languages.

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INTRODUCTION

The Soil Map of the World is a joint project of FAO and UNESCO with the co-operation of the International Society of Soil Science and other organizations. Since its inception, in May, 1961, a number of reports and documents, have been prepared. The present report summarizes some of the information contained in previous reports on the activities undertaken by the project during the past three years. It comprises three parts as follows:

1. Second Draft of Definitions for the General Legend

2. First Draft of General Legend

3. Third Draft of the Correlation Table of Soil Units used for Regional Soil Maps

1. The definitions presented in this document attempt to embody, under a preliminary unified nomenclature, related soil units appearing on soil maps of different continents. Therefore, these definitions have to be sufficiently broad to cover the range of variation of the major soils on a world-wide basis and, on the other hand, they have to be sufficiently accurate to describe the important common characteristics of those soil regions shown with the same symbol in the different parts of the world.

The definitions given below have been compiled from many of those utilized for the preparation of small scale soil maps, texts and other documents and from the field experience of a large number of soil scientists working with governmental and non-governmental organizations and with FAO.

The basic sources from which the definitions have been compiled are the following:

The Soil Map of Africa (CCTA)
The Soil Map of Australia (C.S.I.R.O.)
The Soil Map of Europe (ECA/FAO)
The Soil Maps of Europe and Asia (Dokuchaev Institute)
The General Soil Map of the U.S.A. (U.S.D.A.)
The 7th Approximation (U.S.D.A.)
Soil maps and field reports prepared by Member Governments and FAO soil scientists

The first draft definitions were prepared for submission to the Fourth Meeting of the Advisory Panel for the Soil Map of the World FAO/UNESCO project which was held in Rome in May, 1964. The suggestions and amendments made by the Panel members have been included in the present draft. The nomenclature used has been selected from a wide variety of names in present usage in different countries and continents. This provisional selection of names was agreed upon by the Advisory Panel at its Fourth Session and is the reflection of the world-wide influence which has been received by the project.

2. The list of mapping units presented in this document are those appertaining to the Soil Maps of the Near East, South America and South-East Asia and the Unified Soil Map of Europe. It is incomplete and will undergo important modifications in successive drafts.

The list illustrates the manner in which soil units, as defined in this document are combined into soil associations, corresponding to broad physiographical units with roughly similar land use pattern or capabilities.

3. In the correlation table of units used for regional soil maps, the first column indicates the soil units as defined in part I of this document and the successive columns give the equivalent units used on the legends of the soil maps of Africa (CCTA), Europe and Asia (Dokuchaev Institute), Australia (C.S.I.R.O.) and in the 7th Approximation (U.S.D.A.)

The first and second drafts of this correlation table were also discussed by the Advisory Panel for the Soil Map of the World at sessions held in June, 1963 and May, 1964. The suggestions made by members at these two sessions, together with additional field observations received, have been incorporated in this present third draft. The latter should not be considered as a final table of equivalents but as a basis for further discussion and improvement of the correlation.

This report has been prepared as a basic document for discussion at a special meeting of Commission V of the 8th Congress of the International Society of Soil Science, held in Bucharest, Romania from 31 August to 9 September, 1964 in agreement with recommendations made by the Advisory Panel of the Soil Map of the World Project. At the special session devoted to the project Commission V recommended that copies of the report be sent to all National Societies of Soil Science, inviting them to study the document and to make suggestions for its improvement. The amendments proposed would then be incorporated in the next draft of this document which in turn would be circulated again. It should be stressed that this set of definitions is not intended to form a new classification system but merely aims at facilitating the understanding of the mapping units of the general map.

Although the maps will serve research and educational purposes they will also have a very high value for making a preliminary assessment of soil resources in the developing regions, and provide basic information for the expansion of their agriculture. Acknowledgment is made to all the scientists who have assisted in the collection of the information here presented. Special thanks are due to the members of the Advisory Panel for the contribution they have made in the preparation of this document.

World Soil Resources Office
Land and Water Development Division
FAO
Rome, September 1964

I. DEFINITIONS FOR THE GENERAL LEGEND

Second Draft - August 1964

1. Rock and Rock Debris:

Landforms covered with consolidated or unconsolidated mineral materials showing no soil development. Included in this category are barren deserts, moving dunes, salt plains and highly gypsiferous deposits. On the map these landscapes will be shown separately.

2. Lithosols:

Soils with an (A)C profile. The (A) horizon is weakly developed, shallow, mineral, generally stony and merges into or rests upon, consolidated rock or rock debris.

3. Regosols:

Soils with an (A)C profile. The (A) horizon is weakly developed, shallow and merges into unconsolidated rock material.

4. Alluvial Soils:

Soils with an (A)C profile formed on recent deposits of fluvial, marine or lacustrine origin. The (A) horizon is weakly developed and merges into undifferentiated, wet, mineral material often showing evidence of reduction (gley). Its thickness and organic matter content vary sharply with drainage and climate.

Alluvial soils may regularly receive additions of fresh sediments.

5. Acid Sulphate Soils:

Soils with an A(C)G profile. The A horizon is generally well developed, and may have a high content of organic matter varying in colour from neutral grey to brown. It rests upon undifferentiated, wet, mineral material, showing evidence of strong reduction (gley).

Acid sulphate soils are usually formed from recent fluvial or marine deposits in brackish water or tidal flats. An important feature of these soils is their high content of sulphides which causes severe acidification upon drainage.

6. Rankers:

Soils with an AC profile. The A horizon is shallow and has a pronounced crumb structure. It shows an abrupt transition into mineral material. Its thickness and organic matter content is greater than that of Lithosols and Regosols developed from silicious rocks. The organic matter is a moder or acid mull.

Rankers develop from silicious rocks and have a low to medium base saturation.

7. Rendzinas:

Soils with an AC profile. The A horizon is shallow and has a granular structure. Its thickness and organic matter content is greater than that of Lithosols or Regosols developed from calcareous material. The organic matter is calcic mull.

Rendzinas develop from calcareous material, and calcium carbonate usually occurs throughout the profile. These soils have a high base saturation.

8. Vertisols:

Soils with an AC profile. The A horizon is thick, dark in colour but is relatively low in organic matter content. The upper part of the A horizon is generally granular when dry and sometimes develops a crust. The lower part of the A horizon usually develops a prismatic structure.

The vertisols are heavy textured and contain clay minerals which cause the soil to contract and expand with alternating wet and dry conditions. Many of these soils are self-mulching and develop a "gilgai" micro-relief. They often contain lime concretions at variable depths and salt may be found in the lower part of the profile. Vertisols are found in a wide variety of climates, usually with a marked dry season.

9. Brown Forest Soils:

Soils with an A(B)C profile. The A horizon is well developed and has a crumb to granular structure. The organic matter is a mull. The A horizon overlies a granular or sub-angular blocky brown (B) horizon with higher clay content than in the C. The (B) horizon shows no evidence of clay movement. The silicate clays are dominantly illite and poorly crystallized kaolinite. The base saturation in the (B) horizon is high to medium.

The boundaries between the horizons are gradual. The soils usually have a total depth ranging from 50 to 90 cm. Generally they contain calcium carbonate in the lower part of the (B) horizon. Brown Forest soils occur in temperate humid to sub-humid climates often having a marked dry season. In mediterranean climates, calcic brown forest soils occur which are calcareous throughout and the organic matter of which is a calcic mull.

10. Acid Brown Forest Soils:

Soils with an A(B)C profile. They have a well developed crumb structure in the A horizon. The organic matter is an acid mull or moder. The A horizon overlies a brown to dark brown granular, to sub-angular blocky (B) horizon. The (B) horizon does not show evidence of clay movement. The silicate clays are of the illite or kaolin groups. The base saturation of the (B) horizon is medium to low.

The boundaries between the horizons of these soils are gradual. They normally range from 40 to 70 cm in depth and occur in temperate humid climates without a marked dry season.

11. Andosols:

Soils with an AC or an A(B)C profile. The A horizon is relatively thick, friable and dark. It is high in organic matter and in absorptive capacity. Bulk density and stickiness are low. The (B) horizon shows no evidence of significant clay movement.

In the Andosols the clay fraction is dominated by amorphous material (about 50 percent). They vary in depth from 30 to 100 cm. They are found in humid to sub-humid conditions.

12. Paramo Soils:

Soils with an AC or ABC profile. The prominent A horizon has a coarse granular structure. It has a medium to high organic matter content. The organic matter is an acid mull. If present, the B horizon is brown to yellow, heavy textured but with clay coatings absent or only weakly developed. The C horizon is normally yellowish and compact.

The Paramo soils develop in peculiar cold, humid to sub-humid climates of the Andes, typically under grass or sub-alpine vegetation.

13. Desert Soils:

Soils with an AC or an ABC profile. The A horizon is light coloured, often vesicular, weakly platy with a very low organic matter content (less than 0.5 percent). The B horizon, if present, is finer textured than the A horizon and has a prismatic or columnar structure.

The younger soils are usually calcareous throughout, show accumulation of soluble salts and gypsum, and are shallow (20-40 cm). The older soils on residual landscapes are usually deeper and less calcareous. Desert soils are dry most of the time but may be occasionally wetted to considerable extent by infrequent but heavy rains or surface floods.

14. Sierozems:

Soils with an AC or an A(B)C profile. The A horizon is weakly developed, light greyish brown or light grey, vesicular, weakly platy, with a low to moderate content of organic matter (less than 2 percent). The B horizon, if present, is finer textured and has a prismatic structure.

These soils are commonly weakly calcareous in the surface horizons, become highly calcareous in depth and the horizon of lime accumulation may be hardened. Soluble salts are lacking in the A horizon but may be present in the (B) while a gypsiferous horizon is usually present in the subsoil. These soils occur in semi-arid climates with cool to cold winters and rainfall occurring during the cool season. The soils are dry for a major part of the year and are only occasionally moistened throughout.

15. Brown Soils:

Soils with an A(B)C profile. The A horizon (10-25 cm) has a distinct crumb structure with a moderate content of organic matter. It grades into a brown to dark brown coarse sub-angular blocky (B) horizon.

Brown soils are generally calcareous throughout and frequently the B horizon overlies a horizon of lime accumulation. The silicate clays are dominantly of the illite and montmorillonite groups. These soils vary in depth from 30 to 50 cm. These soils occur in semi-arid climatic conditions with cool to cold winters and rainfall occurring in the warm season. The soils are dry for a major part of the year and are only occasionally moistened throughout.

16. Tropical (Arid) Brown Soils:

Soils with an AC or an A(B)C profile. They have a well developed crumb structured A horizon (20-30 cm); the organic matter content is low (about 1 percent) but is evenly distributed in depth. A weakly platy structure may develop at the surface. The (B) horizon has a weak, sub-angular and blocky structure. Its colour is brown to reddish brown reflecting a segregation of iron in the profile.

Tropical Brown soils may be weakly calcareous and show accumulation of $CaCO_3$ in depth. The silicate clays are composed of a mixture of kaolinite, illite and montmorillonite. The depth of these soils range from 50 to 80 cm. They occur in semi-arid tropical climates and the soil is dry for a major part of the year. The short rainy season occurs in the hot period of the year during which the soil is occasionally moistened throughout.

17. Yellow Soils:

Soils with an A(B)C profile. The A horizon is moderately well developed (10-2 cm), brown, coarse granular with moderately high organic matter content. The (B) horizon is brown to yellowish brown, sub-angular blocky and has more clay than the C horizon but shows little or no evidence of clay movement. The sub-angular structure is sometimes combined into prisms. The (B) horizon may overlie a layer of $CaCO_3$ accumulation.

Yellow soils range from 40 to 80 cm in depth and are usually calcareous. They are found in warm sub-humid mediterranean climates in which the soil is dry for several months a year. Rainfall occurs during the cool season during which the soil is moistened throughout for a brief period.

18. Chestnut Soils:

Soils with an A(B)C or ABC profile. The A horizon is relatively thick (30-50 cm) granular, with a moderately high content of organic matter which is mull. The A horizon grades into a dark brown to reddish brown B horizon with a prismatic structure. These soils often have a B horizon showing evidence of clay movement. Its base saturation is generally higher than 80 percent while the ratio of bivalent to monovalent cations decreases with depth. The B horizon may overlie a horizon of lime accumulation which is often hardened.

18. Chestnut Soils: (cont'd)

These soils are moderately calcareous and the content of calcium carbonates increases in the lower horizons. The silicate clays are dominantly of the illite group. They occur in sub-humid to semi-arid climates in which the soil is dry for several months a year and is only occasionally moistened throughout during the rainy season.

19. Brunizems:

Soils with an A(B)C or ABC profile. The A horizon is thick (30-60 cm) and has a crumb or granular structure with a high content of organic matter which is mull. The base saturation of the horizon underlying the A horizon is generally less than 80 percent. The ratio of bivalent to monovalent exchangeable ions remains stable throughout the profile or increases with depth. These soils often have a B horizon showing evidence of clay movement.

Brunizems are not generally calcareous but may contain calcium carbonates in the lower part of the profile. These soils have a depth ranging from 1 to 2 m. They occur in sub-humid climates in which the soil is dry for several months a year. During the rainy season the soil is moistened throughout.

20. Chernozems:

Soils with an AC or A(B)C profile. The A horizon is deep (40-100 cm), granular, dark coloured to nearly black, with a high content of organic matter which is mull. The A horizon generally shows a high biological activity. It grades into the C or into a light brown to brown (B) horizon.

Chernozems may be calcareous throughout or have a horizon of lime accumulation the depth of which varies with the $CaCO_3$ content of the parent material and climatic conditions. Chernozems have a high base saturation. They develop in temperate to cool sub-humid climates in which the soil is dry for several months a year but may be moistened throughout during the rainy season.

21. Grey Brown Podzolic Soils:

Soils with an ABC profile. The A_1 horizon has a well developed crumb structure with a moderate content of organic matter which is mull. It overlies a lighter coloured A_2 horizon (unless removed by erosion), which merges into a brown, sub-angular, blocky textural B horizon. Clay movement is indicated by coatings on structural ped surfaces. The clay is dominantly of the illite group. The base saturation of the B horizon exceeds 35 percent and increases with depth.

The Grey Brown Podzolic soils range in depth from 80 cm to 2 meters. They occur mostly in temperate humid climates where the soil is generally moist throughout the year.

22. Derno Podzolic Soils:

Soils with an ABC profile. The A_1 horizon has a well developed crumb structure and contains a moderate amount of organic matter. The organic matter is a mull. It overlies a pale, often strongly bleached, A_2 horizon which in turn merges into a brown to dark brown sub-angular, blocky textural B horizon. The latter is often very compact. Clay movement is indicated by coatings on structural ped surfaces. The A_2 tongues into the B horizon and the contact is often marked by mottling and the presence of iron and manganese concretions. The clay is of the illite and kaolin groups. The base saturation of the B horizon is low but increases with depth.

Derno Podzolic soils have a depth ranging from 1 to 2 meters. They occur in cool temperate humid climates and the soil is generally moist throughout the year.

23. Red-Brown Mediterranean Soils: (Including non-calcic brown soils)

Soils with an ABC profile. The A_1 horizon is well developed and has a moderately high organic matter content which is mull. The A_1 horizon merges into a red or brown angular blocky, textural B horizon. 1/ Clay movement is indicated by coatings on structural ped surfaces. The clays are of the illite and kaolin groups. The base saturation is higher than 35 percent and increases with depth. During the dry period of the year the A and B horizons become hard and in some soils hard pans have been reported to occur below the B horizon. 2/ The boundaries between the horizons are distinct.

The Red-Brown Mediterranean soils range from 40 cm to 1 meter in depth; they may occasionally be deeper. They occur in humid and sub-humid climates with a marked dry season. The soil is dry for several months of the year but is moistened throughout during the rainy season in the cool period of the year.

24. Red-Yellow Podzolic Soils:

Soils with an ABC profile. The A_1 horizon has a weakly developed crumb structure. It overlies a pale A_2 horizon (unless removed by erosion) which merges into a strong red to strong yellow, sub-angular, blocky textural B horizon. The horizon boundaries are distinct. Clay movement is indicated by coatings on structural ped surfaces. The clay is of the kaolin group. The base saturation is lower than 35 percent and decreases with depth. The lower part of the profile often shows mottling and may contain iron concretions.

The depth of the Red-Yellow Podzolic soils ranges from 100 to 200 cm. They occur in humid, warm, temperate to tropical climates where the soil is generally moist throughout the year.

1/ A weakly developed A_2 horizon may be present

2/ Non-calcic brown soils of California

25. Rubrozems:

Soils with an ABC profile. The A horizon is strongly developed (30-50 cm), very dark brown or black, coarse, granular with a high content of organic matter. It overlies a brown to red sub-angular, blocky textural B horizon with coatings on structural ped surfaces. The clay is mainly of the illite group. The base saturation in the B horizon is very low (5-10 percent), but increases with depth. Rubrozems range in depth from 80 to 150 cm. They occur in humid to warm temperate humid climates, under evergreen forest or forest grass vegetation (Araucaria angustifolia).

26. Reddish-Brown Lateritic Soils: (low base status)

Soils with an ABC profile. The A_1 horizon is moderately developed (10-25 cm), dark reddish-brown, granular and overlies a dark, reddish-brown to dark red, sub-angular blocky, weakly developed, B horizon. An A_3 horizon may be present. Clay movement is indicated by coatings on structural ped surfaces. The clay is commonly of the kaolin group. The base saturation of the B horizon is low to medium. The reddish brown lateritic soils range in depth from 180 to 300 cm. They occur mainly in humid, sub-tropical and tropical climates and develop under forest vegetation from parent materials high in ferro-magnesian minerals.

27. Reddish-Brown Lateritic Soils: (medium to high base status)

Soils with an ABC profile comparable to that described above, but in this case the base saturation of the B horizon is medium to high.

These soils occur in humid to semi-humid climatic conditions with a marked dry season. They develop mainly under a forest vegetation from parent materials rich in ferro-magnesian minerals.

28. Ferruginous Tropical Soils:

Soils with an ABC profile. The A_1 horizon is relatively thick but is low in organic matter content. It overlies a pale coarse textured A_2 horizon which merges into a reddish brown or greyish brown, weakly sub-angular, blocky textural B horizon, with clay coatings (often weakly developed) on structural ped surfaces. The B horizon is often mottled, iron stained, and may contain iron manganese concretions. The concretionary layer may be deep and grade into a strongly mottled clay (plinthite). The clays are of the illite and kaolin groups. The exchange capacity of the B horizon is low but the base saturation is higher than 35 percent or increases with depth. The boundaries between the horizons are distinct.

Ferruginous Tropical soils range in depth from 1 to 2 m. The depth at which plinthite is formed may vary according to drainage conditions. These soils occur normally under Savanna or dry forest vegetation, in warm temperate and sub-tropical to tropical sub-humid climates with a marked dry season, during which the A_1 horizons become very hard. The soil is dry for several months of the year but is moistened throughout during the rainy season.

29-33. Ferralsols:

Soils with an ABC profile. The A horizon is granular, varies widely in organic matter content and merges into a deep friable, porous (sometimes fluffy) B horizon of high sesquioxide content, low silt content, low base exchange capacity and with very fine, stable aggregation. The B horizon ranges in colour from red to yellow and brown. It does not show evidence of clay movement although clay content may increase in depth. An important characteristic of these soils is their indistinct horizon boundaries.

The reserve of weatherable minerals in Ferralsols is very low. These soils are deep (from 2 to 15 m and more in certain areas). They occur in humid and sub-humid tropical and equatorial climates. The colour, base status and sesquioxide content of these soils vary widely, according to the length of the dry season, nature of the parent material, and other factors. They are therefore subdivided further as shown below:

29. Ferralsols Roxo:

Soils with a red to dusky-red colour. Under virgin conditions these soils may have a thick A horizon with a high content of organic matter (about 6 percent) and very coarse granular structure. There is a high percentage of sesquioxides in the clay fraction of the B horizon and it has a low base status. These soils approach the end product of Ferralsols formation.

The soil mass is characterized by a fine granular structure, highly porous and fluffy, very friable and with low bulk density. They develop under forest from parent materials rich in ferro-magnesian minerals under equatorial or humid tropical climatic conditions with a dry season varying from two to five months. Closely related soils are also found under grassland vegetation. They are then more compact and have been separated as a grassland phase.

30. Dark-Red Ferralsols:

Soils with dark reddish brown to dark red colour, a moderately high percentage of sesquioxides in the clay fraction of the B horizon and a low to medium base status. These soils develop under forest, from parent materials rich in ferro-magnesian minerals, in humid tropical and equatorial climates.

31. Red-Yellow Ferralsols:

Soils with a range of colours varying from deep red to strong brown, a moderately high percentage of sesquioxides in the clay fraction of the B horizon and a low base status. These soils develop under forest vegetation from parent materials low in ferro-magnesian minerals, in humid tropical climates with a dry period ranging from one to four months.

32. Arenoferralsols:

Soils with a strong red to strong yellow colour, a moderately high percentage of sesquioxides in the clay fraction of the B horizon and a medium base status. These soils develop under savanna or thorn brush vegetation from parent materials low in ferro-magnesian minerals in sub-humid tropical climates with a dry period ranging from four to seven months.

33. Pale Yellow Ferralsols:

Soils with a strong brown, yellowish brown or brownish yellow colour. They have a B horizon of medium porosity, friable occasionally with a weakly developed blocky structure, a medium base status, a low percentage of iron sesquioxides and a high percentage of kaoline minerals in the clay fraction. These soils develop under rain forests from a wide range of parent material with a low content of ferro-magnesian minerals. They are found in humid equatorial climates with short or no dry periods.

34. Podzols:

Soils with an ABC profile. The A_1 horizon is of variable thickness and the organic matter is in the form of mor. In virgin soils an A_0 horizon, composed of raw organic matter is present. The A_1 horizon overlies a strongly bleached A_2 horizon the thickness of which varies widely. 1/ The B horizon has a very low base saturation, an accumulation of iron, organic matter or both, and varies in thickness from 20 to 40 cm. Podzols develop from highly siliceous parent materials under a wide range of climates.

35. Organic Soils:

Soils with an AG profile. The A horizon is thick (at least 30 cm) and has a high organic matter content (at least 30 percent). The organic matter is usually raw humus. The A horizon overlies wet, mineral material showing evidence of pronounced reduction (gley). The base saturation of these soils varies and a subdivision may be made into oligotrophic and eutrophic organic soils.

36. Solonetz:

Soils with an ABC profile. The A_1 horizon is usually well developed with a moderately high organic matter content. A thin, light coloured A_2 horizon overlies a dark coloured columnar or prismatic textural B horizon. Clay movement is indicated by thick continuous coatings on structural ped surfaces and pores. The clays are of the illitic and montmorillonitic groups. The base saturation of the B horizon is high. A substantial percentage of the exchangeable bases consist of sodium (15 percent or more) and of magnesium. The lower part of the profile is generally calcareous and the soil may also be calcareous throughout. The upper horizons are often alkaline. In the solonetz the upper horizons are acid.

1/ Sometimes this horizon is very thin and masked by organic matter - for example in the Brown Podzolic Soils - and sometimes it has a thickness of several meters as in the case of the so-called giant Podzols.

36. Solonetz: (cont'd)

These soils occur in sub-humid to arid climates in which the soils are dry for a major part of the year.

37. Saline, Alkali and Saline-Alkali Soils:

Saline soils show conductivity values in the saturation extract exceeding 4 millimhos at 25° C. Alkali soils have 15 percent or more of the exchange capacity saturated with sodium (if the alkali horizon is a textural B horizon the soils are classified as solonetz). Saline-Alkali soils have both these characteristics.

II. GENERAL LEGEND

1st Draft - August 1964

		Europe	Near East	S.E. Asia	S. America (*)
1.	Rock and Rock Debris				
2.	Lithosols	x	x		x
3.	Lithosols and Podzolised Soils	x			x
4.	Lithosols, Rankers and Podzolised soils	x	x		x
5.	Lithosols and Rendzinas	x		x	x
6.	Lithosols and Brown Forest soils				x
7.	Lithosols and Andosols				x
8.	Lithosols and Paramo soils				x
9.	Lithosols and Brown Semi-Desertic soils				x
10.	Lithosols and Sierozems				x
11.	Lithosols and Desert Soils		x		x
12.	Lithosols, Ferralsols and Red-Yellow Podzolic Soils			x	
13.	Brown Forest Soils and Rendzinas	x	x		
14.	Acid Brown Forest Soils and Rankers	x			x
15.	Grey Brown Podzolic Soils and Lithosols	x	x		x
16.	Red-Brown Mediterranean Soils and Lithosols	x	x	x	x
17.	Red Mediterranean soils and Rubrozems	x			
18.	Red-Yellow Podzolic Soils and Lithosols	x	x	x	x
19.	Grey Forest Soils, Brunizems and Lithosols	x			
20.	Chestnut Soils and Lithosols	x			x
21.	Yellow Soils and Lithosols	x	x		x

(*) The crosses indicate the occurrence of the different soil associations in the regions listed.

	Europe	Near East	S.E. Asia	S. America
22. Brown Semi-Desertic Soils and Lithosols	x			
23. Desert Soils and Lithosols		x		x
24. Arctic Soils and Arctic Organic Soils	x			
25. Tundra Soils	x			
26. Tundra Organic Soils	x			
27. Organic Soils	x		x	x
28. Organic Soils and Saline Soils		x		
29. Organic Soils and Podzolised Soils	x			
30. Podzolised Soils	x			x
31. Podzolised Soils and Organic Soils	x		x	x
32. Podzolised Surface Gley Soils and Organic Soils	x			
33. Acid Brown Forest Soils	x			x
34. Derno Podzolic and Derno Podzolic Gley Soils	x			
35. Grey Brown Podzolic Soils and Podzolised Soils	x			
36. Grey Brown Podzolic Soils	x			x
37. Grey Brown Podzolic Soils and Brown Forest Soils	x			x
38. Grey Brown Podzolic Soils and Pseudo-gley Soils	x			
39. Brown Forest Soils and Regosols	x			
40. Red-Brown Mediterranean Soils	x	x	x	x
41. Grey Forest Soils and Grey Brown Podzolic Soils	x			
42. Grey Brown Podzolic Soils and Brunizems	x			
43. Brunizems				x
44. Brunizems and Hydromorphic Soils				x
45. Chernozems and Brunizems	x			

		Europe	Near East	S.E. Asia	S. America
46.	Chernozems	x			
47.	Chernozems with Pseudomycelium	x			
48.	Chernozems and Chestnut Soils	x			
49.	Chestnut Soils	x	x		x
50.	Chestnut Soils and Saline Soils	x			x
51.	Yellow Soils	x	x		x
52.	Brown Semi-Desertic Soils	x			x
53.	Sierozems	x	x		x
54.	Desert Soils		x		x
55.	Vertisols	x	x	x	x
56.	Andosols (humid)			x	x
57.	Andosols (sub-humid)				x
58.	Andosols and Hydromorphic Soils				x
59.	Andosols and Ferralsols			x	x
60.	Paramo Soils				x
61.	Red-Yellow Podzolic Soils			x	x
62.	Red-Yellow Ferralsols and Red Yellow Podzolic Soils			x	x
63.	Red-Yellow Podzolic Soils, Red Yellow Ferralsols, Groundwater Laterites and Podzols				x
64.	Ferruginous Tropical Soils			x	x
65.	a) Reddish Brown Lateritic Soils (low base status)				x
	b) Reddish Brown Lateritic Soils (medium to high base status)				x
66.	Dark Red Ferralsols			x	
67.	Red-Yellow Ferralsols				x
68.	Areno Ferralsols				x
69.	Pale Yellow Ferralsols				x
70.	Ferralsols Roxo				x

		Europe	Near East	S.E. Asia	S. America
71.	Solonetz and Saline Soils	x	x		x
72.	Regosols				x
73.	Regosols (coastal sands)	x		x	x
74.	Regosols (volcanic ash)			x	x
75.	Regosols and Vertisols	x		x	
76.	Regosols and Rendzinas	x		x	
77.	Alluvial Soils and Low Humic Gley Soils	x		x	x
78.	Alluvial Soils and Saline Soils		x	x	x
79.	Acid Sulphate Soils			x	
80.	Low Humic Gley Soils and Grey Hydromorphic Soils			x	

III. CORRELATION TABLE OF SOIL UNITS USED FOR REGIONAL SOIL MAPS - Third Draft, August, 1964

Soil Map of Europe (ECA-FAO) Soil Map of South America (FAO) Soil Map of the Near East (FAO) Soil Map of South-East Asia (FAO)	Soil Map of Africa (CCTA)	Soil Map of Europe (Dokuchaiev Institute) Soil Map of Asia (Dokuchaiev Institute)	Soil Map of Australia (C.S.I.R.O.)	7th Approximation (U.S.D.A.)
1. Rock and rock debris	Rock and rock debris - rich in ferromg. min. (Aa) - ferrug. and calc. crusts (Ab) Desert detritus - sands (An) - clay plains (Ac) - desert pavements (Ap)	Extra Desertic Soils		Non Soils
2. Lithosols	Lithosols and Lithosolic Soils - on lava (Ba) - rocks rich in ferromg. min. (Bb) - ferruginous crusts (Bc)? - calcareous crusts (Bd)?	Mountain Soils	Skeletal Soils	Ustents (lithic) Udents (lithic)
3. Regosols	Juvenile Soils - on volcanic ash (Bn) - on wind-borne sands (Bg) Weakly developed soils - loose sediments (Bm)?		Calcareous Coastal Dunes	Ustents Udents Psamments
4. Alluvial Soils	Juvenile Soils - on riverine and lacustrine alluvium (Bo)	Alluvial Soils Valley Alluvial Tropical Soils	Alluvial Soils	Aquents Udents Ustents
5. Acid Sulphate Soils	Juvenile Soils - on marine alluvium (mangrove) (Bp)	Mangrove Soils		Hydraquent
6. Rankers	Organic Soils non hydromorphic (Oa)			Lithic hapludents Lithic haplumbrepts
7. Rendzinas	Calcimorphic Soils (C) p.p.	Rendzinas Derno-Calcareous Soils	Rendzinas	Rendolls
8. Vertisols	Vertisols - lithomorphic (DI) - topomorphic (DII)	Regurs Margalite Soils Black Oilgai Soils Smolnitzy Compact chernozems p.p.	Black earths Grey and Brown Soils of heavy texture p.p.	Usterts Aquerts
9. Brown Forest Soils	Eutrophic Brown Soils - on rocks rich in ferromg. min. (Hb) - on alluvial deposits (Ho)	Brown Forest Soils typical Brown Forest Dark Soils	Brown Forest Soils	Eutrochrept Haplumbrept Entic Hapludoll
10. Acid Brown Forest Soils				Dystrochrept
11. Andosols	Eutrophic Brown Soils on volcanic ash (H2) p.p. Soil Associations of volcanic islands Sols ferralitiques humifères (Ls) p.p.			Andepts
12. Paramo Soils				
13. Desert Soils	Sub Desert Soils	Primitive Desert Soils Grey-Brown Desert Soils (rich or poor in carbonates) Reddish Soils of Deserts	Calcareous Desert Soils Desert Loams Arid Red earths Desert sandhills Stony desert tableland Soils	Aridisols
14. Sierozems		Sierozems (rich or poor in carbonates)		Calcorthids Camborthids
15. (Arid) Brown Soils		Semi-Desertic Brown Soils (alkaline or not) Light Chestnut Soils of desertic steppe (?)	Solonized Brown Soils p.p.	Camborthids
16. Tropical (Arid) Brown Soils	Brown Soils of arid and semi-arid tropical regions (GI)	Red-Brown Savanna Soils	Brown Soils of light texture	?
17. Yellow Soils	Brown and Reddish Brown Soils of arid and semi-arid Mediterranean regions (GII)	Cinnamonic Soils of semi-savanna		Ustochrept
18. Chestnut Soils		Chestnut Soils of dry steppes Chestnut Soils (non alkaline) Light Chestnut Soils (non alkaline) Southern Chernozems (?)		Haplustolls Argustolls
19. Brunizems		Leached or Podzolized Chernozems Dark Grey Forest Soils p.p. Meadow Chernozem	Prairie Soils	Argudolls Hapludolls
20. Chernozems		Chernozems		Vermudolls Vermustolls
21. Grey Brown Podzolic Soils	Highveld Pseudo Podzolic Soils	Weakly Derno Podz. Soils Derno Pale Podzolic Soils Brown Forest Podzolized Soils Light Grey Forest Soils p.p.	Grey Brown Podzolic Soils	Typudalf Albaqualific Typudalf(?)
22. Derno Podzolic Soils		Derno Podzolic Soils		Glossaltalfs Glossudalfs
23. Brown and Red Mediterranean Soils	Red and Brown Mediterranean Soils (I)	Cinnamonic Soils of thorn forests and shrubs (leached or podzolized)	Terra Rossa Non-Calcic Brown Soils Red earths (p.p.)	Rhodustalf Typustalf
24. Red Yellow Podzolic Soils		Yeltozem podzolized Yeltozem p.p. Krasnozem p.p.	Yellow Podzolic Soils Red Podzolic Soils	Typochrults
25. Rubrozems				Umbrults
26. Reddish Brown Lateritic Soils (low base status)			Krasnozems	Rhodochrults Udox p.p.
27. Reddish Brown Lateritic Soils (medium to high base status)	Ferrisols on rocks rich in ferro-magnesian minerals (Kb) p.p. Ferruginous Tropical Soils on rocks rich in ferromagnesian minerals (Je) p.p.		Krasnozems (of low rainfall areas) Lateritic Krasnozems p.p.	Idox p.p. Ustox p.p.
28. Ferruginous (Tropical) Soils	Ferruginous Tropical Soils (leached) - on sandy material (Ja) - on crystalline basic rocks (Jb)	Red and Yellow Tropical Soils with iron concretions?	Lateritic Podzolic Soils	Ultustalf Ochrultic typustalf
29. Ferralsols Roxo	Ferralitic Soils, Red, on rocks rich in ferromagnesian minerals (Lm) p.p.?			Acrox p.p. Ustox p.p.
30. Dark Red Ferralsols	Ferralitic Soils, Red, on rocks rich in ferromagnesian minerals (Lm) p.p. Soil Associations of Volcanic Islands (Ra) p.p.			Udox
31. Red Yellow Ferralsols	Ferralitic Soils, Red, on loose sediments (Ll)	Red and Yellow Laterized Soils	Red earths p.p. Yellow earths p.p.	Udox Ustox
32. Areno Ferralsols	Ferralitic Soils Yellowish Brown p.p. - on loose sediments (La) - on clayey sediments (Le)		Lateritic red earths	Ustox Idox p.p. ?
33. Pale Yellow Ferralsols	Ferralitic Soils Yellowish Brown - on loose sediments (La) - on clayey sediments (Le)		Yellow earths	Udox
34. Podzols	Podzolic Soils (Ea)	Podzols Podzolic Illuvial Humic Podzolic Illuvial Iron Podzolic Illuvial Humic-Iron	Podzols	Orthods Humods Aquods
35. Organic Soils	Organic Hydromorphic Soils (Hb)	Fen Soils Raised Highmoor Boggy Soils (tundra, boreal, tropical)	High Moor Peats Alpine humus soils	Histosols
36. Solonetz	Solonetz and Solodized Solonetz (Ma)	Solonetz Solodised Solonetz	Solonetz, Solodic soils Solodized Solonetz	Natrustalf
37. Saline, Alkali and Saline-Alkali Soils	Saline Soils, Alkali Soils and Saline-Alkali Soils (Mb)	Solonchak Soloths Takyr	Solonchak	Natrustent

p.p. pro parte

SOIL MAP OF THE WORLD FAO/UNESCO PROJECT

World Soil Resources Office

Land and Water development Division, FAO-Rome