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**INDONESIAN SOIL UNITS AND SUBUNITS  
FOR SURVEY AND MAPPING OF  
TRANSMIGRATION AREAS**

**BY**

**H. Suhardjo and M. Soeprattohardjo**

**1981**



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P. Buurman, 1982

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1. The soil classification system (for Indonesia) is based on morphogenesis and is a perfection of the system of Dudal and Soeprahardjo (1957, 1961).
2. In this manual, only soil units and subunits are given. The manual is an improvement upon the Soil Classification System as outlined in 'Terms of Reference Tipe A, Soil Survey, 1980'.
3. Improvements are based on experience of the staff of the Centre for Soil Research (PPT) and are the result of an evaluation of mappings that have been carried out by the 'Agricultural Research Project in support of Transmigration' (P3MT) and PPT.
4. Final definitions of Soil Units are based on the definitions of Soil Units as published in 1978, with minor changes:  
The Soil Units Trobosol and Shantung Soil are not used in this manual, while the Units Ranker and Nitosol have been added.
5. Definitions at Soil Unit level are mainly taken from the FAO-UNESCO Soil Map of the World, 1974, but adapted to Indonesian circumstances.
6. The status of sawah soils (irrigated rice soils) has not yet been considered; more research is necessary in this field.
7. All explanations concerning Soil Units and Subunits can be found in the following enclosures:
  - Enclosure 1 gives a compilation of the final Soil Units and Subunits by profile characteristics
  - Enclosure 2 contains a key for the determination of Soil Units and Subunits
  - Enclosure 3 lists the symbols and abbreviations used
  - Enclosure 4 lists all Soil Units and Subunits and their symbols
  - Enclosure 5 gives a general correlation with other soil classification systems.
8. The following terminology is mainly taken from FAO-UNESCO, Soil Map of the World, 1974; partly from USDA 1975, and part has been simplified


- albik	- hidromorfik	- ortoksik
- argilik	- histik	- sentuh paralitik
- distrik	- kambik	(paralithic contact)
- eutrik	- kalsik	- plintit
- ferik	- sentuh litik	- saprik
- fibrik	(lithic contact)	- spodik
- fragipan	- molik	- sulfurik
- gipsik	- natrik	- sulfidik
- hemik	- okrik	- umbrik
- haplik	- oksik	- vertik

9. With respect to Terms on Reference Tipe A, 1980 the following changes have been made:

- a. The definitions of Litosol, Latosol and Podsolik have been changed
- b. The units Ranker, Brunizem and Nitosol have been added

c. The following terms have been changed

- Lateritik becomes Oksisol
- Feralik becomes Oksik
- Ferek becomes Ortoksik

d. The following subunits have been changed or added:

ALUVIAL	: Aluvial Gleik Aluvial Humik	GLEISOL	: Gleisol Hidrik Gleisol Fluvik Gleisol Vertik
REGOSOL	: Regosol Gleik Regosol Humik	OKSISOL	: Oksisol Gleik Oksisol Eutrik Oksisol Kromik Oksisol Haplik
ARENOSOL	: Arenosol Gleik		
ANDOSOL	: Andosol Gleik Andosol Melanik		
LATOSOL	: Latosol Umbrik Latosol Molik Latosol Rodik Latosol Kromik Latosol Haplik	PODSOLIK	: Podsolik Kandik Podsolik Ortoksik Podsolik Rodik Podsolik Kromik Podsolik Haplik
KAMBISOL	: Kambisol Umbrik Kambisol Molik Kambisol Oksik Kambisol Rodik Kambisol Litik	MEDITERAN	: Mediteran Molik Mediteran Ortoksik Mediteran Rodik Mediteran Haplik

Enclosure 1: Compilation of final soil units and subunits

Sequence of Soil Unit Horizons	Soil Subunit	Soil Subunit	Sequence of Horizons	Soil Unit	Soil Subunit
R	ORGANOSOL	Organosol Fibrik Organosol Hemik Organosol Saprik	A B <sub>2</sub> C	LATOSOL	Latosol Umbrik Latosol Oksik Latosol Rodik Latosol Kromik Latosol Ortik
C	LITOSOL	( pm )		BRUNIZEM	Brunizem Molik Brunizem Oksik Brunizem Rodik Brunizem Kromik Brunizem Ortik
(A) C	ALUVIAL	Aluvial Gleiik Aluvial Tionik Aluvial Humik Aluvial Kalkarik Aluvial Distrik Aluvial Eutrik		KAMBISOL	Kambisol Gleiik Kambisol Vertik Kambisol Kalsik Kambisol Umbrik Kambisol Molik Kambisol Oksik Kambisol Rodik Kambisol Kromik Kambisol Litik Kambisol Distrik Kambisol Eutrik
	REGOSOL	Regosol Gleiik Regosol Humik Regosol Kalkarik Regosol Distrik Regosol Eutrik			
AC	RANKER	( pm )			
	RENSINA	( pm )			
	GRUMUSOL	Grumusol Pelik Grumusol Kromik	ABGC	GLEISOL	Gleisol Hidrik Gleisol Fluvik Gleisol Plintik Gleisol Molik Gleisol Humik Gleisol Kalkarik Gleisol Vertik Gleisol Distrik Gleisol Eutrik
(A B <sub>2</sub> C) <sup>*)</sup>	ARENOSOL	Arenosol Gleiik Arenosol Albik Arenosol Luvik Arenosol Oksik Arenosol Kambik			
A B <sub>2</sub> C	ANDOSOL	Andosol Gleiik Andosol Molik Andosol Humik Andosol Melanik Andosol Okrik Andosol Litik Andosol Vitrik	ABtC	NITOSOL	Nitosol Humik Nitosol Molik Nitosol Rodik Nitosol Kromik Nitosol Distrik Nitosol Eutrik
ABtC	MEDITERAN	Mediteran Plintik Mediteran Gleiik Mediteran Vertik Mediteran Kalsik Mediteran Molik Mediteran Ortoksik Mediteran Rodik Mediteran Kromik Mediteran Litik Mediteran Ortik		PODSOLIK	Podsolik Plintik Podsolik Gleiik Podsolik Humik Podsolik Kandik Podsolik Ortoksik Podsolik Rodik Podsolik Kromik Podsolik Litik Podsolik Ortik

\*) B2 horizon does not qualify for cambic B

Sequence of Horizons	Soil Unit	Soil Subunit
ABtGC	PLANOSOL	Planosol Solodik Planosol Molik Planosol Humik Planosol Distrik Planosol Eutrik
ABodC	PODSOL	Podsol Plastik Podsol Gleik Podsol Humik Podsol Ferik Podsol Leptik Podsol Ortik
ABoxC	OKSISOL	Oksisol Plintik Oksisol Gleik Oksisol Humik Oksisol Akrik Oksisol Eutrik Oksisol Rodik Oksisol Kromik Oksisol Haplik

## KEY TO SOIL UNITS AND SUBUNITS

Soils having an H horizon of 50 cm or more (60 cm or more if the organic material consists mainly of sphagnum or has a bulk density of less than 0.1), either extending down from the surface or taken cumulatively within the upper 80 cm of the soil; the thickness of the H horizon may be less when it rests on rocks or on fragmental material of which the interstices are filled with organic matter.

### ORGANOSOL (H)

Organosols that are dominated by fibric material, either to a depth of 50 cm from the surface, or with a cumulative thickness of 50 cm within a depth of 80 cm.

#### Organosol Fibrik (Hf)

Other organosols that are dominated by hemic material, either to a depth of 50 cm from the surface, or with a cumulative thickness of more than 50 cm within a depth of 80 cm.

#### Organosol Hemik (Hh)

Other Organosols

#### Organosol Saprik (Hs)

---

Other soils which are limited in depth by continuous coherent and hard rock within 20 cm of the surface

### LITHOSOL (I)

---

Other soils that are developed in recent alluvial deposits, having no diagnostic horizons other than (unless buried by 50 cm or more of new material) an Ochric A, and Umbric A (the Umbric A should be less than 25 cm thick and not overlying hard rock), a Histic H horizon or a sulfuric horizon; with more than 40% clay at depths between 25 and 100 cm or with a layered subsoil; without hydromorphic properties within 50 cm of the soil surface.

### ALUVIAL (A)

Aluvials with hydromorphic properties between 50 and 100 cm from the soil surface.

#### Aluvial Gleiik (Ag)

Other Aluvials having a sulfuric horizon or sulfidic material, or both, at less than 125 cm from the surface.

#### Aluvial Tionik (At)



Other Aluvials that have a base saturation of less than 50% ( $\text{NH}_4\text{OA}_c$ ) in some layer between depths of 25 and 100 cm, and that have an organic carbon content of 12 kg or more, exclusive of surface litter, per square metre to a depth of one metre from the surface or to a hard rock or continuously cemented layer, whichever is shallower.

Aluvial Humik (Ah)

Other Aluvials that have free  $\text{CaCO}_3$  within a depth of 20-50 cm of the surface.

Aluvial Kalkarik (Ak)

Other Aluvials having a base saturation of less than 50% in some layer between a depth of 20 to 50 cm from the surface.

Aluvial Distrik (Ad)

Other Aluvials.

Aluvial Eutrik (Ae)

---

Other soils not having diagnostic horizons other than (unless buried by 50 cm or more of new material) an Ochric or an Umbric A (the Umbric A should be less than 25 cm thick and not overlying hard rock), a Histic H horizon or a sulfuric horizon; having less than 40% clay at depth between 25 and 100 cm, but not consisting of albic material.

REGOSOL (R)

Regosols with hydromorphic properties between 50 and 100 cm from the soil surface

Regosol Gleik (Rg)

Other Regosols that have a base saturation of less than 50% ( $\text{NH}_4\text{OA}_c$ ) in some layer between 25 and 100 cm from the surface, and that have an organic carbon content of 12 kg or more, exclusive of surface litter, per square metre to a depth of one metre or to a hard rock or continuously cemented layer, whichever is shallower.

Regosol Humik (Rh)

Other Regosols that have free  $\text{CaCO}_3$  within a depth of 20-50 cm of the surface.

Regosol Kalkarik (Rk)

Other Regosols having a base saturation of less than 50% in some layer between 20 and 50 cm from the surface.

Regosol Distrik (Rd)

Other Regosols.

Regosol Eutrik (Re)

---

Other soils having an Umbric A horizon that is shallower than 25 cm; having no other diagnostic horizons unless covered by 50 cm or more of new material.

RANKER (U)

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Other soils having a Mollic A horizon directly overlying calcareous rock with at least 40% CaCO<sub>3</sub> (If the A horizon contains a high amount of finely divided lime the color criteria can be waived).

RENSINA (E)

---

Other soils which, after the upper 20 cm are mixed, have 30 percent or more clay in all horizons to at least 50 cm from the surface; at some period in most years have cracks at least 1 cm wide at a depth of 50 cm, unless irrigated, and have one of more of the following characteristics: gilgai micro-relief, intersecting slickensides or wedge-shaped structural aggregates at some depth between 25 and 100 cm from the surface.

GRUMUSOL (V)

Grumusols having moist chromas of less than 1.5 dominant in the soil matrix throughout the upper 30 cm.

Grumusol Pelik (Vp)

Other Grumusols

Grumusol Kromik (Vc)

---

Other soils of coarse texture consisting of albic material occurring over a depth of at least 50 cm from the surface, or showing characteristics of argillic, cambic or oxic B horizons which, however, do not qualify as diagnostic horizons because of the textural requirements; having no other diagnostic horizons than (unless buried by 50 cm or more of new material) an ochric A horizon.

ARENOSOL (Q)

Arenosols having hydromorphic properties between 50 and 100 cm from the soil surfaces

Arenosol Gleik (Qg)

Other Arenosols consisting of albic material

Arenosol Albik (Qa)

Other Arenosols showing lamellae of clay accumulation

Arenosol Luvik (Q1)

Other Arenosols that have a CEC (NH<sub>4</sub>OAc) of less than 24 me/100 g clay in some part of the B horizon within 125 cm of the soil surface.

Arenosol Oksik (Qx)

Other Arenosols

Arenosol Kambik (Qc)

---

Other soils having either a mollic or an umbric A horizon possibly overlying a cambic B horizon, or an ochric A horizon and a cambic B horizon; having no other diagnostic horizons (unless buried by 50 cm or more of new material); having to a depth of 35 cm or more one or both of: a) a bulk density (at 1/3 bar water retention) of fine earth (less than 2 mm) fraction of the soil of less than  $0.85 \text{ g/cm}^3$  and the exchange complex dominated by amorphous material; b) 60 percent or more vitric volcanic ash, cinders, or other vitric pyroclastic material in the silt, sand and gravel fractions.

ANDOSOL (T)

Andosols having hydromorphic properties between 50 and 100 cm from the surface

Andosol Gleik (Tg)

Other Andosols having a mollic A horizon

Andosol Molik (Tm)

Other Andosols having an umbric A horizon

Andosol Humik (Th)

Other Andosols that have a black or dark horizon, due to organic matter, of at least 30 cm thick, between 25 and 100 cm from the surface

Andosol Melanik (Tn)

Other Andosols having a smeary consistence and/or having a texture which is silt loam or finer on the weighted average for all horizons within 100 cm of the surface

Andosol Okrik (To)

Other Andosols that have a lithic or a paralithic contact at some depth between 20 and 50 cm

Andosol Litik (Tl)

Other Andosols

Andosol Vitrik (Tv)

---

Other soils having high clay contents, crumb to subangular blocky structures, homogeneous porosity and colour, with diffuse horizon boundaries; base saturation less than 50% (NH<sub>4</sub>OAc) in at least a part of the B horizon within 125 cm of the soil surface; without diagnostic horizons other than

(unless buried by 50 cm or more of new material) an umbric A horizon or a cambic B horizon; without plinthite within 125 cm of the surface; without vertic properties

LATOSOL (L)

Latosols having an umbric A horizon

Latosol Umbrik (Lu)

Other Latosols having having a CEC of less than 24 me/100 g clay (NH<sub>4</sub>OAc,pH7) in some part of the B horizon within 125 cm of the soil surface

Latosol Oksik (Lx)

Other Latosols having a red to dusky red B horizon (rubbed soil has a hue redder than 5YR with a moist value of less than 4 and a dry value not more than one unit higher than the moist value

Latosol Rodik (Lr)

Other Latosols having a dark brown to red B horizon (rubbed soil has a hue of 7.5YR and a chroma higher than 4, or a hue redder than 7.5 YR

Latosol Kromik (Lc)

Other Latosols

Latosol Haplik (Li)

---

Other soils that have high clay contents, crumb to subangular blocky structures, homogeneous porosity and colour, with diffuse horizon boundaries; having a base saturation of 50% or more (NH<sub>4</sub>OAc,pH7); without diagnostic horizons other than (unless buried by 50 cm or more of new material) a mollic A or a cambic B horizon; without plinthite within 125 cm of the surface, without vertic properties

BRUNIZEM (D)

Brunizems having a mollic A horizon

Brunizem Molik (Dm)

Other Brunizems having a CEC of less than 24 me/100 g clay (NH<sub>4</sub>OAc,pH7) in some part of the B horizon within 125 cm of the soil surface

Brunizem Oksik (Dx)

Other Brunizems, having a red to dusky red B horizon (rubbed soil has a hue redder than 5YR with a moist value of less than 4 and a dry value not more than one unit higher than the moist value

Brunizem Rodik (Dr)

Other Brunizems that have a dark brown to red B horizon (rubbed soil has a hue of 7.5YR and a chroma higher than 4, or a hue redder than 7.5YR

Brunizem Kromik (Dc)

Other Brunizems

Brunizem Haplik (Di)

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Other soils having a cambic B horizon, with or without a mollic or an umbric A horizon; without hydromorphic properties within 50 cm of the surface

KAMBISOL (B)

Kambisols with hydromorphic properties between 50 and 100 cm of the surface

Kambisol Gleik (Bg)

Other Kambisols, having vertic properties

Kambisol Vertik (Bv)

Other Kambisols showing one or more of the following:

a calcic horizon, a gypsic horizon or concentrations of soft, powdery lime within 125 cm of the surface when the weighted average textural class is coarse, within 90 cm for medium textures, within 75 cm for fine textures; calcareous at least between 20 and 50 cm from the surface

Kambisol Kalsik (Bk)

Other Kambisols having an umbric A horizon

Kambisol Umbrik (Bu)

Other Kambisols having a mollic A horizon

Kambisol Molik (Bm)

Other Kambisols having a CEC of less than 24 me/100g clay (NH<sub>3</sub>OAc, pH7) in some part of the B horizon within 125 cm of the soil surface

Kambisol Oksik (Bx)

Other Kambisols having a red to dusky red B horizon (rubbed soil has a hue redder than 5YR with a moist value of less than 4 and a dry value not more than one unit higher than the moist value)

Kambisol Rodik (Br)

Other Kambisols having a dark brown to red B horizon (rubbed soil has a hue of 7.5YR and a chroma higher than 4, or a hue redder than 7.5YR)

Kambisol Kromik (Bc)

Other Kambisols having a lithic or paralithic contact at some depth between 20 and 50 cm

Kambisol Litik (B1)

Other Kambisols having a base saturation of less than 50% ( $\text{NH}_4\text{OAc}$ ) in some part of the B horizon

Kambisol Distrik (Bd)

Other Kambisols

Kambisol Eutrik (Be)

---

Other soils having hydromorphic properties within 50 cm of the surface; having no diagnostic horizons other than (unless buried by 50 cm or more of new material) an A horizon, an H horizon, a cambic B horizon, a calcic or a gypsic horizon

GLEISOL (G)

Gleysols that are always saturated with water and consisting of un-ripened sediment; with a bulk density of approximately  $0.6 \text{ g/cm}^3$ , a water content of more than 100% and an n (ripening) factor of more than 0.7

Gleisol Hidrik (Gw)

Other Gleisols consisting of stratified sediments, or with organic matter content that does not regularly decrease with depth

Gleisol Fluvik (Gf)

Other Gleisols having plinthite within 125 cm of the surface

Gleisol Plintik (Gp)

Other Gleisols having a mollic A or a eutric histic H horizon

Gleisol Molik (Gm)

Other Gleisols having an umbric A or a dystric histic H horizon

Gleisol Humik (Gh)

Other Gleisols having one or more of the following: a calcic or a gypsic horizon within 125 cm of the surface, or are calcareous at least between 20 and 50 cm from the surface

Gleisol Kalkarik (Gk)

Other Gleisols having vertic properties

Gleisol Vertik (Gv)

Other Gleisols having a base saturation of less than 50% ( $\text{NH}_4\text{OAc}$ ) in some layer between 20 and 50 cm from the surface

Gleisol Distrik (Gd)

Other Gleisols

Gleisol Eutrik (Ge)

---

Other soils having an argillic B horizon with a clay distribution where the percentage of clay does not decrease from its maximum amount by as much as 20 percent within 150 cm of the surface; with less than 10% of weatherable material in the upper 50 cm; having no plinthite within 125 cm of the surface; without vertic or orthoxic properties

NITOSOL (N)

Nitols having a base saturation of less than 50% ( $\text{NH}_4\text{OAc}$ ) in some part of the B horizon within 125 cm of the soil surface; having an umbric A horizon or having having more than 12 kg organic C per square metre to a depth of one metre or to a hard rock or continuously cemented layer, whichever is shallower

Nitosol Humik (Nh)

Other Nitols having a mollic A horizon

Nitosol Molik (Nm)

Other Nitols having a red to dusky red B horizon (rubbed soil has a hue redder than 5YR with a moist value of less than 4 and a dry value not more than one unit higher than the moist value

Nitosol Rodik (Nr)

Other Nitols having a base saturation of less than 50 percent ( $\text{NH}_4\text{OAc}$ ) in some part of the B horizon within 125 cm of the soil surface

Nitosol Distrik (Nd)

Other Nitols having a dark brown to red B horizon (rubbed soil has a hue of 7.5YR and a chroma higher than 4, or a hue redder than 7.5YR)

Nitosol Kromik (Nc)

Other Nitols

Nitosol Eutrik (Ne)

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Other soils having an argillic B horizon, having a base saturation of less than 50 percent ( $\text{NH}_4\text{OAc}$ ) in some part of the B horizon within 125 cm of the soil surface; lacking an albic horizon that abruptly overlies an

argillic B or a fragipan

PODSOLIK (P)

Podsoliks having plinthite within 125 cm of the soil surface

Podsolik Plintik (Pp)

Other Podsoliks having hydromorphic properties within 50 cm of the soil surface

Podsolik Gleik (Pg)

Other Podsoliks having an umbric A horizon or having more than 12 kg organic C per square metre to a depth of one metre or to hard rock or continuously cemented layer, whichever is shallower

Podsolik Humik (Ph)

Other Podsoliks having a CEC of less than 16 me/100 g clay ( $\text{NH}_4\text{OAc}, \text{pH}7$ ) in some part of the B horizon within 125 cm of the surface

Podsolik Kandik (Pk) \*

Other Podsoliks that have a CEC of less than 24 me/100 g clay ( $\text{NH}_4\text{OAc}, \text{pH}7$ ) in some part of the B horizon within 125 cm of the surface

Podsolik Ortoksik (Px) \*\*

Other Podsoliks having a red to dusky red B horizon (rubbed soil has a hue redder than 5YR with a moist value of less than 4 and a dry value not more than one unit higher than the moist value

Podsolik Rodik (Pr)

Other Podsoliks that have a dark brown to red B horizon (rubbed soil has a hue of 7.5YR and a chroma higher than 4, or a hue redder than 7.5YR)

Podsolik Kromik (Pc)

Other Podsoliks having a lithic or paralithic contact at some depth between 20 and 50 cm

Podsolik Litik (Pl)

Other Podsoliks

Podsolik Haplik (Pi)

\* Most of the argillic horizon will have a CEC ( $\text{NH}_4\text{Cl}$ ) of less than 10 me/100 g clay

\*\* Most of the argillic horizon will have a CEC ( $\text{NH}_4\text{Cl}$ ) of less than 12 me/100 g clay

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Other soils having an argillic horizon but without an albic horizon that abruptly overlies an argillic horizon or a fragipan

MEDITERAN (M)

Mediterans that have plinthite within 125 cm of the soil surface

Mediteran Plintik (Mp)

Other Mediterans having hydromorphic properties within 50 cm of the soil surface

Mediteran Gleik (Mg)

Other Mediterans having vertic properties

Mediteran Vertik (Mv)

Other Mediterans having a calcic horizon or concentrations of soft powdery lime within 125 cm of the surface when the weighted average textural class is coarse, within 90 cm for medium textures, within 75 cm for fine textures

Mediteran Kalsik (Mk)

Other Mediterans having a mollic A horizon or having more than 12 kg organic carbon, exclusive of surface litter, per square metre to a depth of one metre or to a hard rock or a continuously cemented layer, whichever is shallower

Mediteran Molik (Mm)

Other Mediterans having a CEC of less than 24 me/100 g clay ( $\text{NH}_4\text{OAc}$ , pH7) in some part of the B horizon within 125 cm of the soil surface

Mediteran Ortoksik (Mx)\*

Other Mediterans having a red to dusky red B horizon (rubbed soil has a hue redder than 5YR with a moist value of less than 4 and a dry value not more than one unit higher than the moist value

Mediteran Rodik (Mr)

Other Mediterans having a dark brown to red B horizon (rubbed soil has a hue of 7.5YR and a chroma higher than 4, or a hue redder than 7.5YR)

Mediteran Kromik (Mc)

\* Most of the argillic horizon will have a CEC ( $\text{NH}_4\text{Cl}$ ) of less than 12 me/100 g clay

Other Mediterans having a lithic or paralithic contact at some depth between 20 and 50 cm

Mediteran Litik (Ml)

Other Mediterans

Mediteran Haplik (Mi)

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Other soils having an albic horizon overlying a slowly permeable horizon (for example, and argillic or natric B horizon showing an abrupt textural change, a heavy clay, a fragipan) within 125 cm of the surface; showing hydromorphic properties at least in a part of the E horizon

PLANOSOL (W)

Planosols having more than 6 percent sodium in the exchange complex of the slowly permeable horizon

Planosol Solodik (Ws)

Other Planosols having a mollic A horizon or a eutric histic H horizon

Planosol Molik (Wm)

Other Planosols having an umbric A horizon or a dystric histic H horizon

Planosol Humik (Wh)

Other Planosols having a base saturation of less than 50 percent in some part of the slowly permeable horizon within 125 cm of the soil surface

Planosol Distrik (Wd)

Other Planosols

Planosol Eutrik (We)

---

Other soils having a spodic B horizon

PODSOL (Z)

Podsoils having a thin iron pan in or over the spodic B horizon

Podsol Plasik (Zp)

Other Podsoils showing hydromorphic properties within 50 cm of the surface

Podsol Gleik (Zg)

Other Podsoils having a B horizon with dispersed organic matter and with a low content of free iron

Podsol Humik (Zh)

Other Podsoles in which the ratio of percentage of free iron to percentage of carbon is 6 or more in all subhorizons of the B horizon

Podsol Ferik (Zf)

Other Podsoles lacking or having only a thin (2 cm or less) and discontinuous albic E horizon; lacking a subhorizon within the B horizon which is visibly more enriched with carbon

Podsol Leptik (Zl)

Other Podsoles

Podsol Ortik (Zo)

---

Other soils having an oxic B horizon

OKSISOL (O)

Oksisols having plinthite within 125 cm of the surface

Oksisol Plintik (Op)

Other Oksisols showing hydromorphic properties within 50 cm of the surface

Oksisol Gleik (Og)

Other Oksisols having a base saturation of less than 50 percent (by  $\text{NH}_4\text{OAc}$ ) in at least part of the B horizon within 100 cm of the soil surface; having an umbric A horizon or having more than 12 kg organic carbon, exclusive of surface litter, per square metre to a depth of one metre or to a hard rock or continuously cemented layer, whichever is shallower

Oksisol Humik (Oh)

Other Oksisols having a CEC ( $\text{NH}_4\text{Cl}$ ) of less than 1.5 me/100 g clay in some part of the B horizon within 125 cm of the soil surface

Oksisol Akrik (Oa)

Other Oksisols having a base saturation of 35 percent or more ( $\text{NH}_4\text{OAc}$ ) in all horizons to a depth of 125 cm

Oksisol Eutrik (Oe)

Other Oksisols having a red to dusky red B horizon (rubbed soil has a hue redder than 5YR with a moist value of less than 4 and a dry value not more than unit higher than the moist value)

Oksisol Rodik (Or)

Other Oksisols having a dark brown to red B horizon  
(rubbed soil has a hue of 7.5YR and a chroma higher than 4,  
or a hue redder than 7.5YR)

Oksisol Kromik (Oc)

Other Oksisols

Oksisol Haplik (Oi)

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Enclosure 3.

SYMBOLS USED

1. SOIL UNITS

Aluvial	: A	Kambisol	: B	Oxisol	: O
Andosol	: T	Latosol	: L	Planosol	: N
Arenosol	: O	Litosol	: I	Podsol	: Z
Brunizem	: D	Mediteran	: M	Podsolik	: P
Gleisol	: G	Nitosol	: N	Ranker	: U
Grumusol	: V	Organosol	: H	Regosol	: R
				Rensina	: E

2. ADDITIONAL SYMBOLS

albak	] : a	hidrik	: w	okrik	] : o
abak		haplik	: i	ortik	
argilik		kandik	] : k	pelik	] : p
distrik	: d	kalkarik		plastikan	
eutrik	: e	kalsik		plintik	
fibrik	] : f	kambik	] : c	rodik	: r
ferik		kromik		saprik	: s
fluvik		leptik		solodik	
gleiik	: g	litik	: l	oksik	
hemik	] : h	luvik		ortoksik	: x
histik		melanik	: n	tionik	: t
humik		molik	: m	vertik	: v
				vitrik	: v
				umbrik	: u

Enclosure 4.

SUMMARY OF THE KEY TO SOIL UNIT & SUBUNITS

ORGANOSOL (H)	- Organosol Fibrik (Hf)	GLEISOL (G)	- Gleisol Hidrik (Gw)
	- Organosol Hemik (Hh)		- Gleisol Fluvik (Gf)
	- Organosol Saprik (Hs)		- Gleisol Plintik (Gp)
LITOSOL (I)			- Gleisol Molik (Gm)
ALUVIAL (A)	- Aluvial Gleiik (Ag)		- Gleisol Humik (Gh)
	- Aluvial Tionik (At)		- Gleisol Kalkarik (Gk)
	- Aluvial Humik (Ah)		- Gleisol Vertik (Gv)
	- Aluvial Kalkarik (Ak)		- Gleisol Distrik (Gd)
	- Aluvial Distrik (Ad)		- Gleisol Eutrik (Ge)
	- Aluvial Eutrik (Ae)	NITOSOL (N)	- Nitosol Humik (Nh)
REGOSOL (R)	- Regosol Gleiik (Rg)		- Nitosol Molik (Nm)
	- Regosol Humik (Rh)		- Nitosol Rodik (Nr)
	- Regosol Kalkarik (Rk)		- Nitosol Kromik (Nc)
	- Regosol Distrik (Rd)		- Nitosol Distrik (Nd)
	- Regosol Eutrik (Re)		- Nitosol Eutrik (Ne)
RANKER (U)		PODSOLIK (P)	- Podsolik Plintik (Pp)
RENSINA (E)			- Podsolik Gleiik (Pg)
GRUMUSOL (V)	- Grumusol Pelik (Vp)		- Podsolik Humik (Ph)
	- Grumusol Kromik (Vc)		- Podsolik Kandik (Pk)
ARENOSOL (Q)	- Arenosol Gleiik (Qg)		- Podsolik Ortoksik (Px)
	- Arenosol Albik (Qa)		- Podsolik Rodik (Pr)
	- Arenosol Luvik (Ql)		- Podsolik Kromik (Pr)
	- Arenosol Oksik (Qx)		- Podsolik Litik (Pl)
	- Arenosol Kambik (Qc)		- Podsolik Haplik (Pi)
ANDOSOL (T)	- Andosol Gleiik (Tg)	MEDITERAN (M)	- Mediteran Plintik (Mp)
	- Andosol Molik (Tm)		- Mediteran Gleiik (Mg)
	- Andosol Humik (Th)		- Mediteran Vertik (Mv)
	- Andosol Melanik (Tn)		- Mediteran Kalsik (Mk)
	- Andosol Okrik (To)		- Mediteran Molik (Mm)
	- Andosol Litik (Tl)		- Mediteran Ortoksik (Mx)
	- Andosol Vitrik (Tv)		- Mediteran Rodik (Mr)
LATOSOL (L)	- Latosol Umbrik (Lu)		- Mediteran Kromik (Mc)
	- Latosol Oksik (Lx)	PLANOSOL (W)	- Mediteran Litik (Ml)
	- Latosol Rodik (Lr)		- Mediteran Haplik (Mi)
	- Latosol Kromik (Lc)		- Planosol Solodik (Ws)
	- Latosol Distrik (Ld)		- Planosol Molik (Wm)
	- Latosol Haplik (Li)		- Planosol Humik (Wh)
BRUNIZEM (D)	- Brunizem Molik (Dm)		- Planosol Distrik (Wd)
	- Brunizem Oksik (Dx)		- Planosol Eutrik (We)
	- Brunizem Rodik (Dr)	PODSOL	- Podsol Plasik (Zp)
	- Brunizem Kromik (Dc)		- Podsol Gleiik (Zg)
	- Brunizem Haplik (Di)		- Podsol Humik (Zh)
KAMBISOL (B)	- Kambisol Gleiik (Bg)		- Podsol Ferik (Zf)
	- Kambisol Vertik (Bv)		- Podsol Leptik (Zl)
	- Kambisol Kalsik (Bk)		- Podsol Ortik (Zo)
	- Kambisol Umbrik (Bu)	OKSISOL (O)	- Oksisol Plintik (Op)
	- Kambisol Molik (Bm)		- Oksisol Gleiik (Og)
	- Kambisol Oksik (Bx)		- Oksisol Humik (Oh)
	- Kambisol Rodik (Br)		- Oksisol Akrik (Oa)
	- Kambisol Kromik (Bc)		- Oksisol Eutrik (Oe)
	- Kambisol Litik (Bl)		- Oksisol Rodik (Or)
	- Kambisol Distrik (Bd)		- Oksisol Kromik (Oc)
	- Kambisol Eutrik (Be)		- Oksisol Haplik (Oh)

Enclosure 5.

COMPARISON OF SOIL NAMES IN VARIOUS CLASSIFICATION SYSTEMS  
(Simplified)

Dudal/Soepraptohardjo (1957, 1961)	Modification 1978/81	FAO/Unesco 1979	USDA Soil Taxonomy (1975)
1. Organosol	- Organosol	- Histosol	- Histosol
2. Litosol	- Litosol - Ranker	- Litosol - Ranker	- Litosol - Lithic Sub Group
3. Aluvial	- Aluvial	- Fluvisol	- Entisol
4. Regosol	- Kambisol - Regosol - Kambisol	- Cambisol - Regosol - Cambisol	- Inceptisol - Entisol - Inceptisol
5. Renzina	- Renzina	- Renzina	- Rendoll
6. Grumusol	- Grumusol	- Vertisol	- Vertisol
7. Andosol	- Andosol	- Andosol	- Inceptisol
8. Podsolik Coklat	- Andosol	- Andosol	- Inceptisol
9. Podsolik Coklat Kekelabuan	- Podsolik	- Acrisol	- Ultisol
10. Brown Forest soil	- Kambisol	- Cambisol	- Inceptisol
11. Latosol	- Kambisol - Latosol - Brunizem - Nitosol	- Cambisol - Cambisol - Cambisol - Nitosol - Phaeozem	- Inceptisol - Inceptisol - Inceptisol - Ultisol - Alfisol - Mollisol - Oxisol
12. -	- Oksisol - Kambisol Molik /Brunizem Molik	- Ferralsol - Greyzem/Cherno- zem/Kastanozem	- Mollisol
13. Podsolik Merah Kuning	- Podsolik	- Acrisol	- Ultisol
14. Mediteran Merah Kuning	- Mediteran - Mediteran Molik	- Luvisol - Phaeozem	- Alfisol - Mollisol
15. Podsol	- Podsol	- Podsol	- Spodosol
16. Podsol Air Tanah	- Podsol Humik	- Humic Podsol	- Spodosol
17. Laterit Air Tanah	- Oksisol Gleik /Plintik	- Plinthic Ferralsol	- Aquox
18. Gleis Humus	- Gleisol Humik	- Gleisol	- Aquept
19. Gleis Humus Rendah	- Gleisol	- Gleisol	- Aquept
20. Hidromorf Kelabu	- Podsolik Gleik	- Gleyik Acrisol	- Aquult
21. Aluvial Hidromorf	- Gleisol Hidrik	- Fluvisol	- Hydraquent
22. Planosol	- Planosol	- Planosol	- Aqualf

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