**CODES – SOIL PROFILES** [FAO (2006) *Guidelines for soil description*, 4th ed. FAO, Rome, Italy,]

**PRESENT WEATHER CONDITIONS**

|  |  |
| --- | --- |
| SU | sunny/clear |
| PC | partly cloudy |
| OV | overcast |
| RA | rain |
| SL | sleet |
| SN | snow |

**FORMER WEATHER CONDITIONS**

|  |  |
| --- | --- |
| WC 1 | no rain in the last month |
| WC 2 | no rain in the last week |
| WC 3 | no rain in the last 24 hours |
| WC 4 | rainy without heavy rain in the last 24 hours |
| WC 5 | heavier rain for some days or rainstorm in the last 24 hours |
| WC 6 | extremely rainy time or snow melting |

**MAJOR LANDFORMS**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **1st level** | **2nd level** | **Gradient** | **Relief intensity** | **Potential drainage density** |
|  |  | **(%)** | **(m km-1)** | **no** of receiving pixels within  a 10 × 10 pixels window |
| L level land | LP plain | < 10 | < 50 | 0–25 |
|  | LL plateau | < 10 | < 50 | 0–25 |
|  | LD depression | < 10 | < 50 | 16–25 |
|  | LV valley floor | < 10 | < 50 | 6–15 |
|  |  |  |  |  |
| S sloping land | SE medium-gradient escarpment zone | 10–30 | 50–100 | < 6 |
|  | SH medium-gradient hill | 10–30 | 100–150 | 0–15 |
|  | SM medium-gradient mountain | 15–30 | 150–300 | 0–15 |
|  | SP dissected plain | 10–30 | 50–100 | 0–15 |
|  | SV medium-gradient valley | 10–30 | 100–150 | 6–15 |
|  |  |  |  |  |
| T steep land | TE high-gradient escarpment zone | > 30 | 150–300 | < 6 |
|  | TH high-gradient hill | > 30 | 150–300 | 0–15 |
|  | TM high-gradient mountain | > 30 | > 300 | 0–15 |
|  | TV high-gradient valley | > 30 | > 150 | 6–15 |

**COMPLEX LANDFORMS**

|  |  |
| --- | --- |
| CU | Cuesta-shaped |
| DO | Dome-shaped |
| RI | Ridged |
| TE | Terraced |
| IN | Inselberg covered (occupying > 1% of level land) |
| DU | Dune-shaped |
| IM | With intermontane plains (occupying > 15%) |
| KA | Strong karst |
| WE | With wetlands (occupying > 15%) |

**SLOPE POSITIONS IN UNDULATING & MOUNTAINOUS TERRAIN**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CR | Crest (summit) |  | HI | Higher part (rise) |
| UP | Upper slope (shoulder) |  | IN | Intermediate part (talf) |
| MS | Middle slope (back slope) |  | LO | Lower part (and dip) |
| LS | Lower slope (foot slope) |  | BO | Bottom (drainage line) |
| TS | Toe slope |  |  |  |
| BO | Bottom (flat) |  |  |  |

**SLOPE FORMS**

|  |  |
| --- | --- |
| S | straight |
| C | concave |
| V | convex |
| T | terraced |
| X | complex (irregular) |

**SLOPE GRADIENT CLASSES**

|  |  |  |
| --- | --- | --- |
| **Class** | **Description** | **%** |
| 01 | Flat | 0–0.2 |
| 02 | Level | 0.2–0.5 |
| 03 | Nearly level | 0.5–1.0 |
| 04 | Very gently sloping | 1.0–2.0 |
| 05 | Gently sloping | 2–5 |
| 06 | Sloping | 5–10 |
| 07 | Strongly sloping | 10–15 |
| 08 | Moderately steep | 15–30 |
| 09 | Steep | 30–60 |
| 10 | Very steep | > 60 |

**LAND USE**

|  |  |  |  |
| --- | --- | --- | --- |
| A | Crop agriculture (cropping) |  |  |
|  | AA Annual field cropping | |  |
|  |  | AA1 | Shifting cultivation |
|  |  | AA2 | Fallow system cultivation |
|  |  | AA3 | Ley system cultivation |
|  |  | AA4 | Rainfed arable cultivation |
|  |  | AA5 | Wet rice cultivation |
|  |  | AA6 | Irrigated cultivation |
|  | AP Perennial field cropping | |  |
|  |  | AP1 | Non-irrigated cultivation |
|  |  | AP2 | Irrigated cultivation |
|  | AT Tree and shrub cropping | |  |
|  |  | AT1 | Non-irrigated tree crop cultivation |
|  |  | AT2 | Irrigated tree crop cultivation |
|  |  | AT3 | Non-irrigated shrub crop cultivation |
|  |  | AT4 | Irrigated shrub crop cultivation |
|  | Additional codes may be used to further specify the land-use type, e.g. | | |
|  |  | AA4 | Rainfed arable cultivation |
|  |  | AA4T | Traditional |
|  |  | AA4I | Improved traditional |
|  |  | AA4M | Mechanized traditional |
|  |  | AA4C | Commercial |
|  |  | AA4U | Unspecified |
| M | Mixed farming | |  |
|  | MF Agroforestry | |  |
|  | MP Agropastoralism | |  |
| H | Animal husbandry | |  |
|  | HE Extensive grazing | |  |
|  |  | HE1 | Nomadism |
|  |  | HE2 | Semi-nomadism |
|  |  | HE3 | Ranching |
|  | HI Intensive grazing | |  |
|  |  | HI1 | Animal production |
|  |  | HI2 | Dairying |
| F | Forestry | |  |
|  | FN Natural forest and woodland | |  |
|  |  | FN1 | Selective felling |
|  |  | FN2 | Clear felling |
|  | FP Plantation forestry | |  |
| P | Nature protection | |  |
|  | PN Nature and game preservation | |  |
|  |  | PN1 | Reserves |
|  |  | PN2 | Parks |
|  |  | PN3 | Wildlife management |
|  | PD Degradation control | |  |
|  |  | PD1 | Without interference |
|  |  | PD2 | With interference |
| S | Settlement, industry |  |  |
|  | SR Residential use | |  |
|  | SI Industrial use | |  |
|  | ST Transport | |  |
|  | SC Recreational use | |  |
|  | SX Excavations | |  |
|  | SD Disposal sites | |  |
| Y | Military area |  |  |
| O | Other land uses |  |  |
| U | Not used and not managed |  |  |

**CROP CODES**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Ce | Cereals |  | Fo | Fodder plants |  | FiCo | Cotton |
| CeBa | Barley |  | FoAl | Alfalfa |  | FiJu | Jute |
| CeMa | Maize |  | FoCl | Clover |  | Ve | Vegetables |
| CeMi | Millet |  | FoGr | Grasses |  | Pu | Pulses |
| CeOa | Oats |  | FoHa | Hay |  | PuBe | Beans |
| CePa | Rice, paddy |  | FoLe | Leguminous |  | PuLe | Lentils |
| CeRi | Rice, dry |  | FoMa | Maize |  | PuPe | Peas |
| CeRy | Rye |  | FoPu | Pumpkins |  | Lu | Semi-luxury foods and tobacco |
| CeSo | Sorghum |  | Ro | Roots and tubers |  | LuCc | Cocoa |
| CeWh | Wheat |  | RoCa | Cassava |  | LuCo | Coffee |
| Oi | Oilcrops |  | RoPo | Potatoes |  | LuTe | Tea |
| OiCc | Coconuts |  | RoSu | Sugar beets |  | LuTo | Tobacco |
| OiGr | Groundnuts |  | RoYa | Yams |  | Ot | Other crops |
| OiLi | Linseed |  | Fr | Fruits and melons |  | OtSc | Sugar cane |
| OiOl | Olives |  | FrAp | Apples |  | OtRu | Rubber |
| OiOp | Oil-palm |  | FrBa | Bananas |  | OtPa | Palm (fibres, kernels) |
| OiRa | Rape |  | FrCi | Citrus |  |
| OiSe | Sesame |  | FrGr | Grapes, Wine, |  |
| OiSo | Soybeans |  | Raisins |  |  |
| OiSu | Sunflower |  | FrMa | Mangoes |  |
| Fi | Fibre crops |  | FrMe | Melons |  |

**HUMAN INFLUENCE**

|  |  |
| --- | --- |
| N | No influence |
| NK | Not known |
| VS | Vegetation slightly disturbed |
| VM | Vegetation moderately disturbed |
| VE | Vegetation strongly disturbed |
| VU | Vegetation disturbed (not specified) |
| IS | Sprinkler irrigation |
| IF | Furrow irrigation |
| ID | Drip irrigation |
| IP | Flood irrigation |
| IB | Border irrigation |
| IU | Irrigation (not specified) |
| AD | Artificial drainage |
| FE | Application of fertilizers |
| LF | Landfill (also sanitary) |
| LV | Levelling |
| AC | Archaeological (burial mound, midden) |
| CR | Impact crater |
| BU | Bunding |
| BR | Burning |
| TE | Terracing |
| PL | Ploughing |
| MP | Plaggen |
| MR | Raised beds (agricultural purposes) |
| ME | Raised beds (engineering purposes) |
| MS | Sand additions |
| MU | Mineral additions (not specified) |
| MO | Organic additions (not specified) |
| PO | Pollution |
| CL | Clearing |
| SC | Surface compaction |
| SA | Scalped area |
| BP | Borrow pit |
| DU | Dump (not specified) |
| MI | Mine (surface, including openpit, gravel and quarries) |

**VEGETATION**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| F | Closed forest 1 |  | D | Dwarf shrub |
| FE | Evergreen broad-leaved forest |  | DE | Evergreen dwarf shrub |
| FC | Coniferous forest |  | DS | Semi-deciduous dwarf shrub |
| FS | Semi-deciduous forest |  | DD | Deciduous dwarf shrub |
| FD | Deciduous forest |  | DX | Xeromorphic dwarf shrub |
| FX | Xeromorphic forest |  | DT | Tundra |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| W | Woodland 2 |  | | H | Herbaceous |
| WE | Evergreen woodland |  | | HT | Tall grassland |
| WS | Semi-deciduous woodland |  | | HM | Medium grassland |
| WD | Deciduous woodland |  | | HS | Short grassland |
| WX | Xeromorphic woodland |  | | HF | Forb |
| S | Shrub |  | | M | Rainwater-fed moor peat |
| SE | Evergreen shrub |  | | B | Groundwater-fed bog peat |
| SS | Semi-deciduous shrub |  |
| SD | Deciduous shrub |  |
| SX | Xeromorphic shrub |  |

1 Continuous tree layer, crowns overlapping, large number of tree and shrub species in distinct layers.

2 Continuous tree layer, crowns usually not touching, understorey may be present.

**LITHOLOGY**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Major class** | | **Group** | | **Type** | |
| I | igneous rock | IA | acid igneous | IA1 | diorite |
| IA2 | grano-diorite |
| IA3 | quartz-diorite |
| IA4 | rhyolite |
| II | intermediate igneous | II1 | andesite, trachyte, phonolite |
| II2 | diorite-syenite |
| IB | basic igneous | IB1 | gabbro |
| IB2 | basalt |
| IB3 | dolerite |
| IU | ultrabasic igneous | IU1 | peridotite |
| IU2 | pyroxenite |
| IU3 | ilmenite, magnetite, ironstone, serpentine |
| IP | pyroclastic | IP1 | tuff, tuffite |
| IP2 | volcanic scoria/breccia |
| IP3 | volcanic ash |
| IP4 | ignimbrite |
| M | metamorphic rock | MA | acid metamorphic | MA1 | quartzite |
| MA2 | gneiss, migmatite |
| MA3 | slate, phyllite (pelitic rocks) |
| MA4 | schist |
| MB | basic metamorphic | MB1 | slate, phyllite (pelitic rocks) |
| MB2 | (green) schist |
| MB3 | gneiss rich in Fe–Mg minerals |
| MB4 | metamorphic limestone (marble) |
| MB5 | amphibolite |
| MB6 | eclogite |
| MU | ultrabasic metamorphic | MU1 | serpentinite, greenstone |
| S | sedimentary rock consolidated | SC | clastic sediments | SC1 | conglomerate, breccia |
| SC2 | sandstone, greywacke, arkose |
| SC3 | silt-, mud-, claystone |
| SC4 | shale |
| SC5 | ironstone |
| SO | carbonatic, organic | SO1 | limestone, other carbonate rock |
| SO2 | marl and other mixtures |
| SO3 | coals, bitumen and related rocks |
| SE | evaporites | SE1 | anhydrite, gypsum |
| SE2 | halite |
| U | sedimentary rock unconsolidated | UR | weathered residuum | UR1 | bauxite, laterite |
| UF | fluvial | UF1 | sand and gravel |
| UF2 | clay, silt and loam |
| UL | lacustrine | UL1 | sand |
| UL2 | silt and clay |
| UM | marine, estuarine | UM1 | sand |
| UM2 | clay and silt |
| UC | colluvial | UC1 | slope deposits |
| UC2 | lahar |
| UE | eolian | UE1 | loess |
| UE2 | sand |
| UG | glacial | UG1 | moraine |
| UG2 | glacio-fluvial sand |
| UG3 | glacio-fluvial gravel |

UK \* cryogenic UK1 periglacial rock debris

UK2 periglacial solifluction layer

**AGE OF LAND SURFACE**

|  |  |
| --- | --- |
| vYn | Very young (1–10 years) natural: with loss by erosion or deposition of materials such as on tidal flats, of coastal dunes, in river valleys, landslides or desert areas. |
| vYa | Very young (1–10 years) anthropogeomorphic: with complete disturbance of natural surfaces (and soils) such as in urban, industrial and mining areas with very early soil development from fresh natural or technogenic or mixed materials. |
| Yn | Young (10–100 years) natural: with loss by erosion or deposition of materials such as on tidal flats, of coastal dunes, river valleys, landslides or desert areas. |
| Ya | Young (10–100 years) anthropogeomorphic: with complete disturbance of any natural surfaces (and soils) such as in urban, industrial and mining areas with early soil development from fresh natural, technogenic or a mixture of materials, or restriction of flooding by dykes. |
| Hn | Holocene (100–10 000 years) natural: with loss by erosion or deposition of materials such as on tidal flats, of coastal dunes, in river valleys, landslides or desert areas. |
| Ha | Holocene (100–10 000 years) anthropogeomorphic: human-made relief modifications, such as terracing of forming hills or walls by early civilizations or during the Middle Ages or earlier, restriction of flooding by dykes, or surface raising. |
| lPi | Late Pleistocene, ice covered, commonly recent soil formation on fresh materials. |
| lPp | Late Pleistocene, periglacial, commonly recent soil formation on preweathered materials. |
| lPf | Late Pleistocene, without periglacial influence. |
| oPi | Older Pleistocene, ice covered, commonly the recent soil formation on younger over older, preweathered materials. |
| oPp | Older Pleistocene, with periglacial influence, commonly the recent soil formation on younger over older, preweathered materials. |
| oPf | Older Pleistocene, without periglacial influence. |
| T | Tertiary land surfaces, commonly high planes, terraces or peneplains, except incised valleys, frequent occurrence of palaeosoils. |
| O | Older, pre-Tertiary land surfaces, commonly high planes, terraces or peneplains, except incised valleys, frequent occurrence of palaeosoils. |

**ROCK OUTCROPS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Surface cover** | | **(%)** |  | **Distance between rock outcrops (m)** | |
| N | None | 0 |  |  |  |
| V | Very few | 0–2 |  | 1 | > 50 |
| F | Few | 2–5 |  | 2 | 20–50 |
| C | Common | 5–15 |  | 3 | 5–20 |
| M | Many | 15–40 |  | 4 | 2–5 |
| A | Abundant | 40–80 |  | 5 | < 2 |
| D | Dominant | > 80 |  |  |  |

**COURSE SURFACE FRAGMENTS**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Surface cover** | | **(%)** |  | **Size classes (indicating the greatest dimension)(cm)** | | |
| N | None | 0 |  | F | Fine gravel | 0.2–0.6 |
| V | Very few | 0–2 |  | M | Medium gravel | 0.6–2.0 |
| F | Few | 2–5 |  | C | Coarse gravel | 2–6 |
| C | Common | 5–15 |  | S | Stones | 6–20 |
| M | Many | 15–40 |  | B | Boulders | 20–60 |
| A | Abundant | 40–80 |  | L | Large boulders | 60–200 |
| D | Dominant | > 80 |  |  |  |  |

**EROSION CATEGORY**

|  |  |  |
| --- | --- | --- |
| N |  | No evidence of erosion |
| W |  | Water erosion or deposition |
| WS | Sheet erosion |
| WR | Rill erosion |
| WG | Gully erosion |
| WT | Tunnel erosion |
| WD | Deposition by water |
| WA |  | Water and wind erosion |
| A |  | Wind (aeolian) erosion or deposition |
| AD | Wind deposition |
| AM | Wind erosion and deposition |
| AS | Shifting sands |
| AZ | Salt deposition |
| M |  | Mass movement (landslides and similar phenomena) |
| NK |  | Not known |

**TOTAL AREA AFFECTED BY EROSION AND DEPOSITION**

|  |  |
| --- | --- |
|  | **%** |
| 0 | 0 |
| 1 | 0–5 |
| 2 | 5–10 |
| 3 | 10–25 |
| 4 | 25–50 |
| 5 | > 50 |

**DEGREE OF EROSION**

|  |  |  |
| --- | --- | --- |
| S | Slight | Some evidence of damage to surface horizons.  Original biotic functions largely intact. |
| M | Moderate | Clear evidence of removal of surface horizons.  Original biotic functions partly destroyed. |
| V | Severe | Surface horizons completely removed and subsurface horizons exposed.  Original biotic functions largely destroyed. |
| E | Extreme | Substantial removal of deeper subsurface horizons (badlands).  Original biotic functions fully destroyed. |

**SURFACE SEALING**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Thickness** | | **(mm)** |  | **Consistence** | |
| N | None |  |  | S | Slightly hard |
| F | Thin | < 2 |  | H | Hard |
| M | Medium | 2–5 |  | V | Very hard |
| C | Thick | 5–20 |  | E | Extremely hard |
| V | Very thick | > 20 |  |  |  |

**SURFACE CRACKS**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Width** | | | **(cm)** |  | **Distance between cracks** | | **(m)** |
| F | Fine | | < 1 |  | C | Very closely spaced | < 0.2 |
| M | Medium | | 1–2 |  | D | Closely spaced | 0.2–0.5 |
| W | Wide | | 2–5 |  | M | Moderately widely spaced | 0.5–2 |
| V | Very wide | | 5–10 |  | W | Widely spaced | 2–5 |
| E | Extremely wide | | > 10 |  | V | Very widely spaced | > 5 |
|  |  | |  |  |  |  |  |
| **Depth** | | | **(cm)** |
| S | | Surface | < 2 |
| M | | Medium | 2–10 |
| D | | Deep | 10–20 |
| V | | Very deep | > 20 |

**SALT CHARACTERISTICS**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Cover** | | **(%)** |  | **Thickness** | | **(mm)** |
| 0 | None | 0–2 |  | N | None |  |
| 1 | Low | 2–15 |  | F | Thin | < 2 |
| 2 | Moderate | 15–40 |  | M | Medium | 2–5 |
| 3 | High | 40–80 |  | C | Thick | 5–20 |
| 4 | Dominant | > 80 |  | V | Very thick | > 20 |

**BLEACHED SAND CHARACTERISTICS**

|  |  |  |
| --- | --- | --- |
|  |  | **%** |
| 0 | None | 0–2 |
| 1 | Low | 2–15 |
| 2 | Moderate | 15–40 |
| 3 | High | 40–80 |
| 4 | Dominant | > 80 |

**HORIZON BOUNDARIES**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Distinctness** | | **(cm)** |  | **Topography** | |  |
| A | Abrupt | 0–2 |  | S | Smooth | Nearly plane surface |
| C | Clear | 2–5 |  | W | Wavy | Pockets less deep than wide |
| G | Gradual | 5–15 |  | I | Irregular | Pockets more deep than wide |
| D | Diffuse | > 15 |  | B | Broken | Discontinuous |

**ABUNDANCE OF ROCK FRAGMENTS & ARTEFACTS, BY VOLUME**

|  |  |  |
| --- | --- | --- |
|  |  | **%** |
| N | None | 0 |
| V | Very few | 0–2 |
| F | Few | 2–5 |
| C | Common | 5–15 |
| M | Many | 15–40 |
| A | Abundant | 40–80 |
| D | Dominant | > 80 |
| S | Stone line any content, but concentrated at a distinct depth of a horizon | |

**ROCK FRAGMENTS & ARTEFACTS**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Rock fragments** | | **(mm)** |  | **Artefacts** | | **(mm)** |
| F | Fine gravel | 2–6 |  | V | Very fine artefacts | < 2 |
| M | Medium gravel | 6–20 |  | F | Fine artefacts | 2–6 |
| C | Coarse gravel | 20–60 |  | M | Medium artefacts | 6–20 |
| S | Stones | 60–200 |  | C | Coarse artefacts | > 20 |
| B | Boulders | 200–600 |  |  |  |  |
| L | Large boulders | > 600 |  |  |  |  |

|  |  |
| --- | --- |
| **Combination of classes** | |
| FM | Fine and medium gravel/artefacts |
| MC | Medium and coarse gravel/artefacts |
| CS | Coarse gravel and stones |
| SB | Stones and boulders |
| BL | Boulders and large boulders |

**SHAPE OF ROCK FRAGMENTS**

|  |  |
| --- | --- |
| F | Flat |
| A | Angular |
| S | Subrounded |
| R | Rounded |

**WEATHERING OF COARSE FRAGMENTS**

|  |  |  |
| --- | --- | --- |
| F | Fresh or slightly weathered | Fragments show little or no signs of weathering. |
| W | Weathered | Partial weathering is indicated by discoloration and loss of crystal form in the outer parts of the fragments while the centres remain relatively fresh and the fragments have lost little of their original strength. |
| S | Strongly weathered | All but the most resistant minerals are weathered, strongly discoloured and altered throughout the fragments, which tend to disintegrate under only moderate pressure. |

**CODES FOR PRIMARY MINERAL FRAGMENTS**

|  |  |
| --- | --- |
| QU | Quartz |
| MI | Mica |
| FE | Feldspar |

**ABUNDANCE OF MOTTLES**

|  |  |  |
| --- | --- | --- |
|  |  | % |
| N | None | 0 |
| V | Very few | 0–2 |
| F | Few | 2–5 |
| C | Common | 5–15 |
| M | Many | 15–40 |
| A | Abundant | > 40 |

**SIZE OF MOTTLES**

|  |  |  |
| --- | --- | --- |
|  |  | mm |
| V | Very fine | < 2 |
| F | Fine | 2–6 |
| M | Medium | 6–20 |
| A | Coarse | > 20 |

**CONTRAST OF MOTTLES**

|  |  |  |
| --- | --- | --- |
| F | Faint | The mottles are evident only on close examination.Soil colours in both the matrix and mottles have closely related hues, chromas and values. |
| D | Distinct | Although not striking, the mottles are readily seen. The hue, chroma and value of the matrix are easily distinguished from those of the mottles. They may vary by as much as 2.5 units of hue or several units in chroma or value. |
| P | Prominent | The mottles are conspicuous and mottling is one of the outstanding features of the horizon. Hue,chroma and value alone or in combination are at least several units apart. |

**BOUNDARY BETWEEN MOTTLE AND MATRIX**

|  |  |  |
| --- | --- | --- |
|  |  | **mm** |
| S | Sharp | < 0.5 |
| C | Clear | 0.5–2 |
| D | Diffuse | > 2 |

**CARBONATE REACTION IN THE SOIL MATRIX**

|  |  |  |  |
| --- | --- | --- | --- |
|  | % |  |  |
| N | 0 | Non-calcareous | No detectable visible or audible effervescence. |
| SL | 0–2 | Slightly calcareous | Audible effervescence, but not visible. |
| MO | 2–10 | Moderately calcareous | Visible effervescence. |
| ST | 10–25 | Strongly calcareous | Strong visible effervescence. Bubbles form a low foam. |
| EX | > 25 | Extremely calcareous | Extremely strong reaction. Thick foam forms quickly. |

**FORMS OF SECONDARY CARBONATES**

|  |  |
| --- | --- |
| SC | soft concretions |
| HC | hard concretions |
| HHC | hard hollow concretions |
| D | disperse powdery lime |
| PM | pseudomycelia\* (carbonate infillings in pores, resembling mycelia) |
| M | marl layer |
| HL | hard cemented layer or layers of carbonates (less than 10 cm thick) |

**FORMS OF SECONDARY GYPSUM**

|  |  |
| --- | --- |
| SC | soft concretions |
| D | disperse powdery gypsum |
| G | “gazha” (clayey water-saturated layer with high gypsum content) |
| HL | hard cemented layer or layers of gypsum (less than 10 cm thick) |

**SALT CONTENT**

|  |  |  |
| --- | --- | --- |
| N | (nearly)Not salty | < 0.75 |
| SL | Slightly salty | 0.75–2 |
| MO | Moderately salty | 2–4 |
| ST | Strongly salty | 4–8 |
| VST | Very strongly salty | 8–15 |
| EX | Extremely salty | > 15 |

**STRUCTURE (TYPES)**

|  |  |
| --- | --- |
| Blocky | Blocks or polyhedrons, nearly equidimensional, having flat or slightly rounded surfaces that are casts of the faces of the surrounding aggregates. Subdivision is recommended into angular, with faces intersecting at relatively sharp angles, and subangular blocky faces intersecting at rounded angles. |
| Granular | Spheroids or polyhedrons, having curved or irregular surfaces that are not casts of the faces of surrounding aggregates. |
| Platy | Flat with vertical dimensions limited; generally oriented on a horizontal plane and usually overlapping. |
| Prismatic | The dimensions are limited in the horizontal and extended along the vertical plane; vertical faces well defined; having flat or slightly rounded surfaces that are casts of the faces of the surrounding aggregates. Faces normally intersect at relatively sharp angles. Prismatic structures with rounded caps are distinguished as Columnar. |
| Rock structure | Rock structure includes fine stratification in unconsolidated sediment, and pseudomorphs of weathered minerals retaining their positions relative to each other and to unweathered minerals in saprolite from consolidated rocks. |
| Wedge-shaped | Elliptical, interlocking lenses that terminate in sharp angles, bounded by slickensides; not limited to vertic materials. |
| Crumbs, lumps and clods Mainly created by artificial disturbance, e.g. tillage. | |

**STRUCTURE (CODES)**

|  |  |  |  |
| --- | --- | --- | --- |
| RS | Rock structure |  |  |
| SS | Stratified structure |
| SG | Single grain |  |  |
| MA | Massive |  |  |
| PM | Porous massive |  |  |
| BL | Blocky |  |  |
| AB | Angular blocky |
| AP | Angular blocky (parallelepiped) |
| AS | Angular and subangular blocky |
| AW | Angular blocky (wedge-shaped) |
| SA | Subangular and angular blocky |
| SB | Subangular blocky |
| SN | Nutty subangular blocky |
| PR | Prismatic |  |  |
| PS | Subangular prismatic |
| WE | Wedge-shaped |  |  |
| CO | Columnar |  |  |
| GR | Granular |  |  |
| WC | Worm casts |  |  |
| PL | Platy |  |  |
| CL | Cloddy |  |  |
| CR | Crumbly |  |  |
| LU | Lumpy |  |  |

**STRUCTURE (STRENGTH)**

|  |  |
| --- | --- |
| WE | Weak aggregates are barely observable in place and there is only a weak arrangement of natural surfaces of weakness. When gently disturbed, the soil material breaks into a mixture of few entire aggregates, many broken aggregates, and much material without aggregate faces. Aggregate surfaces differ in some way from the aggregate interior. |
| MO | Moderate Aggregates are observable in place and there is a distinct arrangement of natural surfaces of weakness. When disturbed, the soil material breaks into a mixture of many entire aggregates, some broken aggregates, and little material without aggregates faces. Aggregates surfaces generally show distinct differences with the aggregates interiors. |
| ST | Strong Aggregates are clearly observable in place and there is a prominent arrangement of natural surfaces of weakness. When disturbed, the soil material separates mainly into entire aggregates. Aggregates surfaces generally differ markedly from aggregate interiors. |

**STRUCTURE SIZE CLASSES**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | | Granular/platy | Prismatic/columnar/wedge-shaped | Blocky/crumbly/lumpy/cloddy |
| (mm) | (mm) | (mm) |
| VF | Very fine/thin | < 1 | < 10 | < 5 |
| FI | Fine/thin | 1–2 | 10–20 | 5–10 |
| ME | Medium | 2–5 | 20–50 | 10–20 |
| CO | Coarse/thick | 5–10 | 50–100 | 20–50 |
| VC | Very coarse/thick | > 10 | 100–500 | > 50 |
| EC | Extremely coarse | – | > 500 | – |

**STRUCTURE COMBINED SIZE CLASSES**

|  |  |
| --- | --- |
| FF | Very fine and fine |
| VM | Very fine to medium |
| FM | Fine and medium |
| FC | Fine to coarse |
| MC | Medium and coarse |
| MV | Medium to very coarse |
| CV | Coarse and very coarse |

**CONSISTENCE – DRY SOIL MASS**

|  |  |  |
| --- | --- | --- |
| LO | Loose | Non-coherent. |
| SO | Soft | Soil mass is very weakly coherent and fragile; breaks to powder or individual grains under very slight pressure. |
| SHA | Slightly hard | Weakly resistant to pressure; easily broken between thumb and forefinger. |
| HA | Hard | Moderately resistant to pressure; can be broken in the hands; not breakable between thumb and forefinger. |
| VHA | Very hard | Very resistant to pressure; can be broken in the hands only with difficulty. |
| EHA | Extremely hard | Extremely resistant to pressure; cannot be broken in the hands. |

|  |  |
| --- | --- |
| SSH | Soft to slightly hard |
| SHH | Slightly hard to hard |
| HVH | Hard to very hard |

**CONSISTENCE – MOIST SOIL MASS**

|  |  |  |
| --- | --- | --- |
| LO | Loose | Non-coherent. |
| VFR | Very friable | Soil material crushes under very gentle pressure, but coheres when pressed together. |
| FR | Friable | Soil material crushes easily under gentle to moderate pressure between thumb and forefinger, and coheres when pressed together. |
| FI | Firm | Soil material crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable. |
| VFI | Very firm | Soil material crushes under strong pressures; barely crushable between thumb and forefinger. |
| EFI | Extremely firm | Soil material crushes only under very strong pressure; cannot be crushed between thumb and forefinger. |

|  |  |
| --- | --- |
| VFF | Very friable to friable |
| FRF | Friable to firm |
| FVF | Firm to very firm |

**SOIL STICKINESS**

|  |  |  |
| --- | --- | --- |
| LO | Loose | Non-coherent. |
| VFR | Very friable | Soil material crushes under very gentle pressure, but coheres when pressed together. |
| FR | Friable | Soil material crushes easily under gentle to moderate pressure between thumb and forefinger, and coheres when pressed together. |
| FI | Firm | Soil material crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable. |
| VFI | Very firm | Soil material crushes under strong pressures; barely crushable between thumb and forefinger. |
| EFI | Extremely firm | Soil material crushes only under very strong pressure; cannot be crushed between thumb and forefinger. |

|  |  |
| --- | --- |
| SSS | Slightly sticky to sticky |
| SVS | Sticky to very sticky |

**SOIL PLASTICITY**

|  |  |  |
| --- | --- | --- |
| NPL | Non-plastic | No wire is formable. |
| SPL | Slightly plastic | Wire formable but breaks immediately if bent into a ring; soil mass deformed by very slight force. |
| PL | Plastic | Wire formable but breaks if bent into a ring; slight to moderate force required for deformation of the soil mass. |
| VPL | Very plastic | Wire formable and can be bent into a ring; moderately strong to very strong force required for deformation of the soil mass. |

|  |  |
| --- | --- |
| SPP | Slightly plastic to plastic |
| PVP | Plastic to very plastic |

**POROSITY**

|  |  |  |
| --- | --- | --- |
|  |  | % |
| 1 | Very low | < 2 |
| 2 | Low | 2–5 |
| 3 | Medium | 5–15 |
| 4 | High | 15–40 |
| 5 | Very high | > 40 |

**CLASSIFICATION OF VOIDS**

|  |  |
| --- | --- |
| I | Interstitial  Controlled by the fabric, or arrangement, of the soil particles, also known as textural voids. Subdivision possible into simple packing voids, which relate to the packing of sand particles, and compound packing voids, which result from the packing of non-accommodating peds. Predominantly irregular in shape and interconnected, and hard to quantify in the field. |
| B | Vesicular  Discontinuous spherical or elliptical voids (chambers) of sedimentary origin or formed by compressed air, e.g. gas bubbles in slaking crusts after heavy rainfall. Relatively unimportant in connection with plant growth. |
| V | Vughs  Mostly irregular, equidimensional voids of faunal origin or resulting from tillage or disturbance of other voids. Discontinuous or interconnected. May be quantified in specific cases. |
| C | Channels  Elongated voids of faunal or floral origin, mostly tubular in shape and continuous, varying strongly in diameter. When wider than a few centimetres (burrow holes), they are more adequately described under biological activity. |
| P | Planes  Most planes are extra-pedal voids, related to accommodating ped surfaces or cracking patterns. They are often not persistent and vary in size, shape and quantity depending on the moisture condition of the soil. Planar voids may be recorded, describing width and frequency. |

**DIAMETER OF VOIDS**

|  |  |  |
| --- | --- | --- |
|  |  | mm |
| V | Very fine | < 0.5 |
| F | Fine | 0.5–2 |
| M | Medium | 2–5 |
| C | Coarse | 5–20 |
| VC | Very coarse | 20–50 |
| FM | Fine & medium | |
| FF | Fine & very fine | |
| MC | Medium & coarse | |

**ABUNDANCE OF PORES**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | < 2 mm (number) | > 2 mm (number) |
| N | None | 0 | 0 |
| V | Very few | 1–20 | 1–2 |
| F | Few | 20–50 | 2–5 |
| C | Common | 50–200 | 5–20 |
| M | Many | > 200 | > 20 |

**ABUNDANCE OF COATINGS**

|  |  |  |
| --- | --- | --- |
|  |  | % |
| N | None | 0 |
| V | Very few | 0–2 |
| F | Few | 2–5 |
| C | Common | 5–15 |
| M | Many | 15–40 |
| A | Abundant | 40–80 |
| D | Dominant | > 80 |

**CONTRAST OF COATINGS**

|  |  |  |
| --- | --- | --- |
| F | Faint | Surface of coating shows only little contrast in colour, smoothness or any other property to the adjacent surface.  Fine sand grains are readily apparent in the cutan.  Lamellae are less than 2 mm thick. |
| D | Distinct | Surface of coating is distinctly smoother or different in colour from the adjacent surface.  Fine sand grains are enveloped in the coating but their outlines are still visible.  Lamellae are 2–5 mm thick. |
| P | Prominent | Surface of coatings contrasts strongly in smoothness or colour with the adjacent surfaces.  Outlines of fine sand grains are not visible.  Lamellae are more than 5 mm thick. |

**NATURE OF COATINGS**

|  |  |
| --- | --- |
| C | Clay |
| S | Sesquioxides |
| H | Humus |
| CS | Clay and sesquioxides |
| CH | Clay and humus (organic matter) |
| CC | Calcium carbonate |
| GB | Gibbsite |
| HC | Hypodermic coatings |
| JA | Jarosite |
| MN | Manganese |
| SL | Silica (opal) |
| SA | Sand coatings |
| ST | Silt coatings |
| SF | Shiny faces (as in nitic horizon) |
| PF | Pressure faces |
| SI | Slickensides, predominantly intersecting |
| SP | Slickensides, partly intersecting |
| SN | Slickensides, non intersecting |

**FORM OF COATINGS**

|  |  |
| --- | --- |
| C | Continuous |
| CI | Continuous irregular (non-uniform, heterogeneous) |
| DI | Discontinuous irregular |
| DE | Dendroidal |
| DC | Discontinuous circular |
| O | Other |

**LOCATION OF COATINGS & CLAY ACCUMULATIONS**

|  |  |
| --- | --- |
| P | Pedfaces |
| PV | Vertical pedfaces |
| PH | Horizontal pedfaces |
| CF | Coarse fragments |
| LA | Lamellae (clay bands) |
| VO | Voids |
| BR | Bridges between sand grains |
| NS | No specific location |

**CONTINUITY OF CEMENTATION / COMPACTION**

|  |  |  |
| --- | --- | --- |
| B | Broken | The layer is less than 50 percent cemented or compacted, and shows a rather irregular appearance. |
| D | Discontinuous | The layer is 50–90 percent cemented or compacted, and in general shows a regular appearance. |
| C | Continuous | The layer is more than 90 percent cemented or compacted, and is only interrupted in places by cracks or fissures. |

**FABRIC OF THE CEMENTED/COMPACTED LAYER**

|  |  |  |
| --- | --- | --- |
| P | Platy | The compacted or cemented parts are platelike and have a horizontal or subhorizontal orientation. |
| V | Vesicular | The layer has large, equidimensional voids that may be filled with uncemented material. |
| P | Pisolithic | The layer is largely constructed from cemented spherical nodules. |
| D | Nodular | The layer is largely constructed from cemented nodules or concretions of irregular shape. |

**NATURE OF CEMENTATION/COMPACTION**

|  |  |
| --- | --- |
| K | Carbonates |
| Q | Silica |
| KQ | Carbonates–silica |
| F | Iron |
| FM | Iron–manganese (sesquioxides) |
| FO | Iron–organic matter |
| I | Ice |
| GY | Gypsum |
| C | Clay |
| CS | Clay–sesquioxides |
| M | Mechanical |
| P | Ploughing |
| NK | Not known |

**DEGREE OF CEMENTATION/COMPACTION**

|  |  |
| --- | --- |
| N | Non-cemented and non-compacted  Neither cementation nor compaction observed (slakes in water). |
| Y | Compacted but non-cemented  Compacted mass is appreciably harder or more brittle than other comparable soil mass (slakes in water). |
| W | Weakly cemented  Cemented mass is brittle and hard, but can be broken in the hands. |
| M | Moderately cemented  Cemented mass cannot be broken in the hands but is discontinuous (less than 90 percent of soil mass). |
| C | Cemented  Cemented mass cannot be broken in the hands and is continuous (more than 90 percent of soil mass). |
| I | Indurated  Cemented mass cannot be broken by body weight (75-kg standard soil scientist) (more than 90 percent of soil mass). |

**ABUNDANCE OF MINERAL CONCENTRATIONS, BY VOLUME**

|  |  |  |
| --- | --- | --- |
|  |  | % |
| N | None | 0 |
| V | Very few | 0–2 |
| F | Few | 2–5 |
| C | Common | 2–15 |
| M | Many | 15–40 |
| A | Abundant | 40–80 |
| D | Dominant | > 80 |

**KINDS OF MINERAL CONCENTRATIONS**

|  |  |  |
| --- | --- | --- |
| T | Crystal |  |
| C | Concretion | A discrete body with a concentric internal structure, generally cemented. |
| SC | Soft concretion |  |
| S | Soft segregation (or soft accumulation) | Differs from the surrounding soil mass in colour and composition but is not easily separated as a discrete body. |
| N | Nodule | Discrete body without an internal organization. |
| IP | Pore infillings | Including pseudomycelium of carbonates or opal. |
| IC | Crack infillings |  |
| R | Residual rock fragment | Discrete impregnated body still showing rock structure. |
| O | Other |  |

**SIZE & SHAPE OF MINERAL CONCENTRATIONS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Size | | (mm) |  | Shape | |
| V | Very fine | < 2 |  | R | Rounded (spherical) |
| F | Fine | 2–6 |  | E | Elongated |
| M | Medium | 6–20 |  | F | Flat |
| C | Coarse | > 20 |  | I | Irregular |
| A | Angular |  |  |  |  |

**HARDNESS OF MINERAL CONCENTRATIONS**

|  |  |  |
| --- | --- | --- |
| H | Hard | Cannot be broken in the fingers. |
| S | Soft | Can be broken between forefinger and thumb nail. |
| B | Both hard and soft. |  |

**NATURE OF MINERAL CONCENTRATIONS (examples)**

|  |  |
| --- | --- |
| K | Carbonates (calcareous) |
| KQ | Carbonates–silica |
| C | Clay (argillaceous) |
| CS | Clay–sesquioxides |
| GY | Gypsum (gypsiferous) |
| SA | Salt (saline) |
| GB | Gibbsite |
| JA | Jarosite |
| S | Sulphur (sulphurous) |
| Q | Silica (siliceous) |
| F | Iron (ferruginous) |
| FM | Iron–manganese (sesquioxides) |
| M | Manganese (manganiferous) |
| NK | Not known |

**DIAMETER OF ROOTS**

|  |  |  |
| --- | --- | --- |
|  |  | mm |
| VF | Very fine | < 0.5 |
| F | Fine | 0.5–2 |
| M | Medium | 2–5 |
| C | Coarse | > 5 |

|  |  |
| --- | --- |
| FF | Very fine and fine |
| FM | Fine and medium |
| MC | Medium and coarse |

**ABUNDANCE OF ROOTS**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | < 2 mm | > 2 mm |
| N | None | 0 | 0 |
| V | Very few | 1–20 | 1–2 |
| F | Few | 20–50 | 2–5 |
| C | Common | 50–200 | 5–20 |
| M | Many | > 200 | > 20 |

**ABUNDANCE OF BIOLOGICAL ACTIVITY**

|  |  |
| --- | --- |
| N | None |
| F | Few |
| C | Common |
| M | Many |

**BIOLOGICAL FEATURES (examples)**

|  |  |
| --- | --- |
| A | Artefacts |
| B | Burrows (unspecified) |
| BO | Open large burrows |
| BI | Infilled large burrows |
| C | Charcoal |
| E | Earthworm channels |
| P | Pedotubules |
| T | Termite or ant channels and nests |
| I | Other insect activity |

**HUMAN ARTEFACTS (example)**

|  |  |
| --- | --- |
| AN | Artesanal natural material |
| ID | Industrial dust |
| MM | Mixed material |
| OG | Organic garbage |
| PS | Pavements and paving stones |
| SL | Synthetic liquid |
| SS | Synthetic solid |
| WL | Waste liquid |