UDC 001·4 : 631·61

(Reaffirmed 1999)

Indian Standard

TERMINOLOGY RELATED TO SOIL RECLAMATION

Soil Quality and Improvement Sectional Committee, AFDC 45 [Ref : Doc : AFDC 45 (1640)]

1. Scope — This standard prescribes the definitions of terms which are commonly used in soil reclamation and allied fields.

2. Terminology

2.1 *Acid Soil* — A soil having *p*H less than 7, but for liming purposes, a soil having *p*H less than 6·6.

2.2 *Acidity, Active* — The activity of hydrogen ions in the aqueous phase of a soil expressed as *p*H.

2.3 *Acidity, Potential* — The amount of exchangeable hydrogen and aluminium ions in a soil rendered free or active in the soil solution by cation exchange and expressed in milli equivalents (me) per 100 g of soil.

2.4 *Adsorption Complex* — The soil constituents which are capable of adsorbing cations and/or anions and/or organic liquids.

2.5 *Aeration, Porosity* — The soil volume filled with air when the moisture tension is in the range of 0 to 50 cm of water (the moisture tension is to be specified).

2.6 *Aeration, Soil* — The process by which air in the soil is replenished by air from the atmosphere through diffusion. A soil with many large open pores to permit rapid aeration is well aerated while a soil having only few large pores or having most of its pores blocked, is poorly aerated.

2.7 *Aggregate* — A group of soil particles (adhering) in a single mass or cluster to form a natural unit.

2.8 *Aggregation* — The process of forming aggregate by bonding of primary particles (sand, silt and clay) or the state of being aggregated.

2.9 *Alkali Soil* — An alkali soil has *p*Hs 8·2 (or pH_2 8·5) and exchangeable sodium saturation of 15 percent or more and/or has preponderance of salts capable of alkaline hydrolysis, namely, sodium bicarbonate, sodium carbonate and sodium silicate. Regur (black soil) Vertisol Soils with ESP of 8 or more are also termed alkali soils.

2.10 *Alkaline Soil* — A soil having *p*Hs greater than 7·0 or pH_2 greater than 7·5.

2.11 *Alkalization* — The process leading to the formation of an alkali soil.

2.12 *Amendment* — Any substance added to the soil which improves problem soils. Examples: Gypsum, pyrites, lime.

2.12.1 *Agricultural liming materials* — A calcium and/or magnesium containing material capable of neutralizing soil acidity.

2.12.2 *Air-slaked lime* — A product composed of varying proportions of the oxide, hydroxide, and carbonate of calcium, or of calcium and magnesium and derived from the exposure of quick lime to weather.

2.12.3 *By-product lime* — Any by-product or industrial waste containing calcium, or calcium and magnesium in forms that neutralizes soil acidity. It may be designated by prefixing the name of the process by which it is produced, that is, gas-house lime, press-mud or calcium carbonate sludge, tanner's lime, acetylene lime waste, etc.

2.12.4 *Dolomite* — A mineral composed chiefly of carbonates of calcium and magnesium.

2.12.5 *Ground limestone* — The product obtained by grinding either calcitic or dolomitic limestone so that 90 percent mass of the material shall pass through 2 mm sieve and 50 percent shall pass through 0·25 mm sieve.

2.12.6 *Gypsum, land plaster or crude calcium sulphate* — A material consisting chiefly of hydrated calcium sulphate ($CaSo_4.2H_2O$) having 70 to 80 percent calcium sulphate dihydrate by weight.

Adopted 30 March 1988 | | Gr 5

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2.12.7 *Hydrated lime* — A dry powder obtained by treating quick lime with water sufficient for its hydration.

2.12.8 *Magnesia (magnesium oxide)* — A product consisting chiefly of the oxide of magnesium.

2.12.9 *Pyrites* — A naturally occuring material (FeS_2) containing not less than 16 percent sulphur with the fineness of an order that 90 percent shall pass through 5-mm sieve and 50 percent shall pass through 3 mm sieve and which in the presence of air and water shall form sulphuic acid and ferrous sulphate.

2.12.10 *Quicklime, burnt lime, caustic lime, lump lime, unslaked lime* — Calcined materials, the major part of which is calcium oxide in natural association with a smaller amount of magnesium oxide, and which are capable of slaking with water.

2.13 *Atmosphere* — A unit of pressure defined as follows:

1 atmosphere per sq-in in water column (at 20°C)	= 1·013 × 10^6 dynes per sq cm = 14·71 pounds = 76·39 cm of mercury column = 1·036 cm of = 34·01 ft of water column water and mercury

2.14 *Available Nutrient* — The quantity of nutrient elements or compound in the soil that can be absorbed and assimilated by growing plants.

2.15 *Available Water* — The portion of water in a soil that can be absorbed by plant roots. It is the amount of water released by soil when the equilibrium soil water matrix potential is decreased from field capacity (1/3 bar) to permanent wilting point (15 bar) and expressed as (*m*/*m*) percent or (*v*/*v*) percent basis.

2.15.1 *Fifteen bar percentage* — The percentage of water content in a soil that has been saturated to, and is in equilibrium with an applied pressure of fifteen bars.

2.15.2 *One-third bar percentage* — The percentage of water content in a soil that has been saturated, subjected to, and is in equilibrium with an applied pressure of one-third of a bar.

2.16 *Bar* — A unit of pressure equal to one million dynes per square centimetre (*see* **2.13**).

2.17 *Base Saturation Percentage* — The extent to which a soil adsorption complex is saturated with exchangeable cations other than hydrogen and active aluminium, expressed as percent of the cation exchange capacity.

2.18 *Basic Slag* — A by-product in the manufacture of steel from phosphate containing iron ores having 5 to 10 percent phosphorus pentoxide (P_2O_5).

2.19 *Bedrock* — The solid rock underlying the soil and the regolith, at times exposed at the surface without a cover.

2.20 *Buffer Compounds, Soil* — The clay, organic matter and other compounds like carbonates, bicarbonates and phosphates which enable the soil to resist appreciable change in *p*H.

2.21 *Bulk Density, Soil* — The mass of oven dried soil (105°C) per unit bulk volume including the air space.

2.22 *Bulk Volume* — The volume of any soil mass including solid matrix and the pores (interstices, voids).

2.23 *Calcareous Soil* — Soil containing sufficient free calcium carbonate (often with magnesium carbonate) to effervesce visibly when treated with cold dilute hydrochloric acid (1N).

2.24 *Calciphytes* — Plants that require or tolerate considerable amount of calcium or are associated with soils rich in calcium.

2.25 *Caliche* — A layer more or less impregnated with pedogenic carbonates of calcium and/or magnesium crystallized from the soil solution, and may occur as a soft, thin soil horizon or as a hard, thick bed just beneath the solum or as surface layer exposed by erosion (*see* **2.35**), not a geological deposit.

2.26 *Capillary Conductivity*

a) *Qualitative* — The physical property relating to the ease with which the soils transmit water.

b) *Quantitative* — The ratio of the water flow velocity to the driving force in soil.

2.27 *Capillary Potential* — The work required to move a unit mass of water against capillary forces in a column of soil from a free water surface to a given point above this surface.

2.28 *Cation Exchange* — The interchange between a cation in solution and another cation on the surface of any surface active material, such as, clay, organic colloids and plant roots including the interchange of cations directly between these surface active materials.

2.29 *Cation Exchange Capacity* — The sum total of exchangeable cations adsorbed by a soil, expressed in milli equivalents per 100 g of soil.

2.30 *Cemented Soil* — Soil layers/horizons having a hard brittle consistency due to the binding of the particles by substances such as calcium carbonate, magnesium carbonate, silicon oxides, and oxides/hydrous oxides of iron and aluminium. The hardness and brittleness persist even when wet.

2.31 *Chiselling* — The breaking or shattering of compact soil or sub soil layers by the use of tillage implement called chisel.

2.32 *Clay* — A mineral soil separate consisting of particles less than 0·002 mm equivalent diameter (*see* **2.148**). Soil material containing more than 40 percent clay.

2.33 *Clay pan* — A dense, compact, slowly permeable natural deposition in distinct layers, deeper in the profile, much richer in clay contents than the overlying materials, usually hard when dry, and plastic and sticky when wet.

2.34 *Concretion* — Localized concentration of certain chemical compounds, such as calcium carbonate, iron and manganese oxides in the from of grain or nodule of varying size, shape, colour and hardness.

2.35 *Croute Calcare* — Hardened caliches, often found in thick masses or beds overlain by only a few centimetres of earth (*see* **2.25**).

2.36 *Crust Salt* — A layer of salts on soil surface of varying thickness.

2.37 *Cyclic Salt* — Salt deposited on soils near the sea or inland salt lakes by wind or backwaters.

2.38 *Decalcification* — Removal of calcium carbonates or calcium ions from the soil by leaching.

2.39 *Deflocculation* — Dispersion of individual soil particles from an aggregate or floccule by electrolyte.

2.40 *Denitrification* — The biochemical reduction of nitrate or nitrite to gaseous nitrogen either as molecular or as an oxide of nitrogen.

2.41 *Dispersed Soil* — Dispersion of soil aggregates in soil water system.

2.42 *Drain Tile* — Concrete, ceramic or PVC pipe used to conduct water from the soil.

2.43 *Drainage* — Process or natural passage of water from soils either by percolation or by surface flow.

2.44 *Drainage Requirements* — Performance and capacity specifications for a drainage system, that is, permissible depths and modes of variation of water table with respect to the root zone or soil surface, and the volume of water that the drains must convey in a given time.

2.45 *Electrical Conductivity* — The reciprocal of the electrical resistivity. The resistivity is the resistance in ohms of a conductor, metallic or electrolytic which is 1 cm long and has a cross-sectional area of 1 cm^2. Hence, electrical conductivity is expressed in reciprocal ohms per centimetre or mhos per centimetre or millisiemens per centimetre or decisiemens per metre ($dS\ m^{-1}$). The terms 'electrical conductivity' and 'specific electrical conductance' have identical meaning.

$$\text{Electrical conductivity} = \text{specific conductivity} \times \text{cell constant}$$

2.46 *Equivalent, Gram Equivalent Weight* — The weight in grams of an ion or compound that combines, replaces or reacts with 1·008 g of hydrogen or 8 g of oxygen or 35·46 g of chlorine. The weight of a compound in grams divided by its gram equivalent weight is termed as 'equivalent'.

2.47 *Evapotranspiration* — The total quantity of water lost by the combined processes of evaporation and transpiration from a particular area in a specified time.

2.48 *Exchangeable Cation* — A cation that is adsorbed on the exchange complex and which is capable of exchange with other cations.

2.49 *Exchangeable Cation Percentage (ECP)* — This term indicates the degree of saturation of soil exchange complex with cations and is expressed as follows:

$$\text{ECP} = \frac{\text{Exchangeable cations (me/100 g soil)}}{\text{Cation exchange capacity (me/100 g soil)}} \times 100$$

2.50 *Exchangeable Potassium* — The potassium which is held mainly by the colloidal portion of the soil and is easily exchanged with other cations.

2.51 *Exchangeable Sodium Percentage (ESP)* — The degree of saturation of soil exchange complex with sodium expressed as follows:

$$\text{ESP} = \frac{\text{Exchangeable sodium (me/100 g soil)}}{\text{Cation exchange capacity (me/100 g soil)}} \times 100$$

2.52 *Fertilizer* — A substance intended to be used as a source of one or more essential plant nutrients and specified in column 2 of part A of Schedule I of *Fertilizer Control Order*, 1985 and includes a mixture of fertilizers and special mixtures of fertilizers.

2.53 *Field Capacity* — The percentage of water remaining in soil 2 or 3 days after having been saturated and after free drainage has practically ceased. It is expressed as a percentage of mass of oven-dry soil; it usually approximates to 1/3 bar value.

2.54 *Fragipan* — A loamy subsurface horizon having high bulk density, hard or very hard and cemented when dry, with slow or very slow permeability to water but fairly brittle when moist, very low in organic matter content and nearly impenetrable by plant roots.

2.55 *Green Manuring* — Incorporation of fresh plant material, usually legumes, into the soil for its improvement.

2.56 *Ground Water* — The portion of water below the ground surface, the pressure of which is greater than that of the atmosphere.

2.57 *Halomorphic Soil* — Saline and alkali soil formed under imperfect drainage conditions. These include the great soil groups solonchak, solonetz and solodi.

2.57.1 *Solonchak* — An intrazonal group of soils with high concentration of neutral, soluble salts, and white salt efflorescence at the surface during dry part of the year. Flocculated and permeable soils developed under halophytes in semi-arid and sub-humid climate.

2.57.2 *Solodized soil* — A solonetz (*see* **2.57.3**) degraded through removal of excess sodium carbonate and much of the adsorbed sodium by improved drainage. The upper layers became moderately acidic.

2.57.3 *Solonetz* — An intrazonal group of soils of highly alkaline reaction, having surface horizons of varying degrees of friability underlain by dark hard soil ordinarily with columnar structure and having developed under grass or shrub vegetation mostly in sub-humid or semi-arid climate.

2.58 *Halophyte* — A plant adopted to existence in a saline environment.

2.59 *Hardpan* — A hardened soil horizon caused by cementation of soil particles with organic matter or with materials such as silica, sesquioxides, or calcium carbonate. The hardness or rigidity does not change appreciably with varying water content and pieces of the hard layer do not slake in water (*see* **2.25**).

2.60 *Heavy Soil* — A soil high in clay content and requiring a high drawbar pull while ploughing (*see* **2.152.3**).

2.61 *Humus* — A dark coloured amorphous ligno-protinex complex material, more or less stable fraction of the soil organic matter remaining after the major portion of added plant and animal residues have decomposed.

2.62 *Hydraulic Conductivity* — The volume of water flow through soil of unit cross sectional area per unit time (that is, flux density) under unit hydraulic gradient (*see* **2.63**).

2.63 *Hydraulic Gradient* — The decrease in hydraulic head per unit distance in the soil in the direction of greatest rate of decrease of hydraulic head (*see* **2.64**).

2.64 *Hydraulic Head* — The elevation with respect to a standard datum at which water stands in a riser or manometer connected to the point in question in the soil. This will include gravitational head, pressure head, and velocity head if the terminal opening of the sensing element is pointed upstream.

2.65 *Illuviation* — The process of movement of material from the upper horizon and accumulation in the lower horizon in the profile.

2.66 *Impeded Drainage* — A condition in which gravitational flow of water is hindered.

2.67 *Impervious* — Resistance to penetration of water, air and plant roots to the soil.

2.68 *Infiltration* — The time rate at which water will percolate into the soil through soil atmosphere interface.

2.69 *Infiltration Rate* — A soil characteristic determining the maximum rate at which water can enter the soil under specified conditions including the presence of an excess of water (*see* **2.70**).

2.70 *Infiltration Velocity* — The actual rate at which water enters the soil at any given time. It may be less than the maximum (the infiltration rate) because of a limited supply of water (rainfall or irrigation). It has the same unit as infiltration rate.

2.71 *Ion* — An atom or group of atoms with electrical charge.

2.72 *Ion Activity* — The effective concentration of an ion in electrolytic solution or a soil-water system

2.73 *Irrigation* — Application of water to lands for growing crops.

2.74 *Leaching* — The removal of salts in solution from surface to the sub-soil.

2.75 *Leaching Requirement* — The fraction of the water entering the soil that must pass through the root zone in order to prevent soil salinity from exceeding a specified value. Leaching requirement is used primarily under steady state.

2.76 *Light Soils* — A soil high in sand content and requiring a low drawbar pull (*see* **2.152.1**).

2.77 *Lime* — Strictly calcium oxide (CaO), but as commonly used in agriculture terminology, calcium carbonate ($CaCO_3$) and calcium hydroxide [$Ca(OH)_2$], are included. Agricultural lime refers to any of these compounds, with or without magnesium used as an amendment for acid soils.

2.78 *Lime-Concrete* — An aggregate of precipitated calcium carbonate or other material cemented by precipitated calcium carbonate.

2.79 *Lime-Pan* — A hardened layer impregnated and enriched by calcium carbonate.

2.80 *Lime Requirement* — The amount of liming material required per hectare to a soil depth of 15 cm to raise the *p*H of an acid soil to a desired value under field conditions.

2.81 *Liquid-Limit* — The minimum percentage (by weight) of moisture at which a small sample of soil will barely flow under a standard treatment. Also known as upper plastic limit.

2.82 *Macronutrient* — An element essential for plant growth in relatively large amounts.

2.83 *Manure* — The excreta of animals, with or without the admixture of bedding or litter, in varying stages of decomposition.

2.84 *Marl* — Soft and unconsolidated calcium carbonate usually mixed with clay or other impurities.

2.85 *Marsh* — Continuously flooded or wet area with the surface not deeply submerged. Covered dominantly with sedges, cat tails, rushes or other hydrophytic plants.

2.86 *Micronutrient* — An element essential for growth in extremely small amount.

2.87 *Milliequivalent* — One thousandth of an equivalent (*see* **2.46**).

2.88 *Mineral* — A natural inorganic compound usually having definite physical properties, crystalline structure, and chemical composition (within the limits of isomorphism).

2.89 *Mineral Soil* — A soil consisting predominantly of and having its properties determined chiefly by mineral matter, usually containing less than 20 percent organic carbon and the mineral soil material less than 2 mm makes up more than half the thickness of the upper 80 cm column. If the soil is shallower than 40 cm, the mineral soil is either 10 cm or more thick or more than half the thickness of the overlying organic soil material.

2.90 *Mineralization* — The conversion of an element from an organic form to an inorganic state as a result of microbial decomposition.

2.91 *Moisture Equivalent* — The weight percentage of water retained by a previously saturated sample of soil 1 cm in thickness after it has been subjected to a centrifugal force of 1 000 times the gravity for 30 minutes.

2.92 *Moisture Tension Soil* — The equivalent negative pressure or suction of water in the soil. Suction of water in the, soil is the pressure difference required across a permeable membrane to produce hydraulic equilibrium between the soil water and the free water.

2.93 *Neutral Soil* — Soil which is neither acid nor alkaline in reaction. For practical purposes, soils having *p*H in the range of 6·5 to 7·5 are considered neutral soil.

2.94 *Nitrate Reduction* — The biological reduction of nitrates to the nitrate form or other nitrogenous forms.

2.95 *Nitrification* — The biological oxidation of ammonium ions to nitrites and the further oxidation of nitrites to nitrates.

2.96 *Nutrient Fixation*— The process of conversion of a nutrient in the soil from water soluble to insoluble or from exchangeable to non-exchangeable form.

2.97 *Organic Soil* — A soil more than half of the upper 80 cm of which is organic soil material (18 percent or more organic carbon, if the mineral fraction is 60 percent or more clay; 12 percent or more organic carbon, if the mineral fraction has no clay; and proportional organic carbon content with varying clay content). If the soil material rests on rock or on fragmental material, the organic soil has interstices filled with organic materials.

2.98 *Pans* — Horizons or layers in soils that are strongly compacted, indurated, or very rich in clay content (*see* **2.25**, **2.54** and **2.59**).

2.99 *Pan, Genetic* — A natural subsurface soil horizon of low permeability and with particle size composition and chemical properties differing from horizon immediately above or below the pan (*see* **2.33**, **2.54** and **2.59**).

2.100 *Pan, Pressure or Induced* — A subsurface soil horizon or layer having a higher bulk density and lower total porosity than the soil material directly above and below but similar in particle size composition and chemical properties. The pressure pan is variously called as ploughpan, plough-sole or a tillage or traffic pan or sole.

2.101 *Part per Million* (ppm) — Units of any given substance per million.

2.102 *Particle Density* — The mass per unit volume of the soil particles usually expressed as gram per cubic centimetre.

2.103 *Particle Size Distribution* — The amount of various soil separates in a soil sample usually by sedimentation, sieving, micrometry or combinations of these methods.

2.104 *Percolation* — A qualitative term applied to the downward movement of water through soil, specially the downward flow of water in saturated or nearly saturated soil at hydraulic gradients of the order of 1·0 or less.

2.105 *Permeability* — The ease with which air, water or plant roots penetrate into or pass through a bulkmass of soil or a layer of soil. The proportion of the soil being discussed should be designated. Example: 'The permeability of a horizon'.

2.106 *p*H, *Soil* — The negative logarithm of the hydrogen-ion activity of a soil solution (soil: water is defined).

2.107 *Plastic Limit* — Minimum moisture percentage by weight permitting deformation of a small sample of soil material without rupture, at times called lower plastic limit.

2.108 *Plasticity* — It is the property of a soil by virtue of which it is capable of undergoing deformation by an external force without rupture but not capable of regaining the original shape when the external force is withdrawn.

2.109 *Plasticity Index or Plasticity Number* — The numerical difference between the liquid and the plastic limits, or synonymously between the upper plastic limit and the lower plastic limit.

2.110 *Pore Size Distribution* — The volume of different sized pores in a soil. It is expressed as percentage of the bulk volume (soil plus pore space).

2.111 *Pore Space* — Total space not occupied by soil particles in a bulk volume of the soil.

2.112 *Porosity* — The volume percentage of the total bulk not occupied by solid particles.

2.113 *Potassium Adsorption Ratio* (*PAR*) — Ratio for soil extracts and irrigation water used to express the relative activity of potassium ions in relation to divalent cations.

$$\text{PAR} = \frac{K^{+}}{\sqrt{\frac{Ca^{++} + Mg^{++}}{2}}}$$

where concentrations are expressed in milliequivalent per litre (me/l).

2.114 *Pressmud* — A by-product of the sugar industry containing phosphoric acid (4 to 5 percent) and lime (3 to 5 percent). Sulphitation pressmud is used as an amendment for alkali soil while carbonation pressmud is used for acid soil.

2.115 *Productivity, Soil* — Soil productivity is the capacity of a soil in its normal environment for producing a specified plant or sequence of plants under a specified system of management. Productivity is measured in terms of yields per unit area.

2.116 *Reaction, Soil* — The degree of acidity or alkalinity of a soil, usually expressed as *p*H value.

2.117 *Reclamation, Soil* — The process of removing excess soluble salts, excess exchangeable sodium or correction of soil acidity.

2.118 *Regolith* — The unconsolidated mantle of weathered rock and soil material on the earth's surface; loose earth materials above solid rock.

2.119 *Rhizosphere* — The zone of soil where the microbial population is altered both quantitatively and qualitatively by the presence of plant roots.

2.120 *Rock* — An aggregate of one or more minerals

2.121 *Saline-Alkali Soils* — A soil with electrical conductance of the saturation extract more than 4 dS m^{-1} at 25°C, exchangeable sodium percentage more than 15 and *p*H less than 8·2 initially but increases on salt leaching. Neutral salts are dominant but sodium bicarbonate and carbonate occur in sizeable quantity. Vertisols have exchangeable sodium percentage of 8 or more in addition to other characteristics.

2.122 *Saline Soil* — Saline soils have electrical conductance of the saturation extract more than 4 dS m^{-1} at 25°C and pH_s less than 8·2 (pH_2 8 5); neutral salts (chlorides and sulphates of sodium, magnesium and calcium excluding gypsum) are predominant.

2.123 *Salinization* — The natural process of accumulation of neutral (chlorides and sulphates) salts in soil.

2.124 *Salt-Affected Soil* — Soil that has been adversely modified for growth of most crop plants by the presence of toxic effects of the ions of soluble salts. The term includes soils having excess salts or excess exchangeable sodium, or both (*see* **2.121, 2.122** and **2.127**).

2.125 *Silica-Alumina Ratio* (SiO_2/Al_2O_3):

a) The molecular ratio of silica to alumina in a soil, clay, or other alumino-silicate mineral.

b) The quotient obtained when the number of mol-fractions of silica is divided by the number of mol-fractions of alumina, both determined by standard fusion analysis of the soil or some part of it.

2.126 *Slick Spots* — Small areas in a field that are slicked when wet, due to a high content of alkali or exchangeable sodium.

2.127 *Sodic Claypan* — A claypan containing alluvial clay and having more than 15 percent exchangeable sodium.

2.128 *Sodic Soil* — A non-saline soil containing sufficient exchangeable sodium to adversely affect crop production and soil structure. The lower limit of SAR of saturation extract is conventionally set at 13.

2.129 *Sodium Adsorption Ratio* — A ratio of sodium to divalent soluble cations in soil extract/ irrigation waters, used in evaluating exchangeable sodium percentage of the soil complex or estimating the sodium hazard when a specific water is used. It is expressed as:

$$SAR = \frac{Na^{+}}{\sqrt{\frac{Ca^{++} + Mg^{++}}{2}}}$$

where the ionic concentrations are expressed in milliequivalent per litre (me/l).

2.130 *Soil* — Soil is a natural 3-dimensional body composed of mineral and organic matter, occupying parts of the earth's surface that supports plants and that has properties due to the integrated effect of climate and living matter acting upon the parent material, as conditioned by relief, over a period of time.

2.131 *Soil Alkalinity* — The degree of intensity of alkalinity of a soil expressed by a *p*Hs value greater than 7·5 on the *p*H scale (*see* **2.93**).

2.132 *Soil Association* — A group of defined and named taxonomic soil units occurring together in a characteristic pattern over a geographic region, comparable to plant associations in many ways. A mapping unit based on reconnaisance or general soil map preparation.

2.133 *Soil Auger* — A tool for boring into the soil and withdrawing a small sample for field or laboratory observation. Augers are of two general types, post hole type and screw type.

2.134 *Soil Characteristic* — A feature of a soil that can be seen and/or measured in the field or in the laboratory. Examples of soil characteristic include soil slope, stoniness, texture, structure, colour, and physico-chemical characteristics.

2.135 *Soil Classification* — The systematic arrangement of soils into groups or categories on the basis of their characteristics. Broad grouping are made on the basis of general characteristics and subdivisions on the basis of more detailed differences in specific properties.

2.136 *Soil Fertility* — The quality of a soil that enables it to provide nutrients in adequate amounts and in proper balance for the growth of specified plants when other growth factors, such as light, moisture, temperature and the physical condition of the soil are favourable.

2.137 *Soil Horizon* — A layer of soil material approximately parrallel to the land surface and differing from adjacent, genetically related layers in any of the properties, such as colour, structure, texture, consistency and chemical charateristics.

2.138 *Soil Improvement* — The practice for making the soil more productive for growing plants by fertilization, reclamation, drainage, addition of organic matter, irrigation and the like.

2.139 *Soil Management Groups* — Groups of taxonomic soil units with similar adaptations or management requirements for one or more specific purpose, such as adapted crops or crop rotations, drainage practice, fertilization, forestry, highway engineering, etc.

2.140 *Soil Map* — A map showing distribution of different soils in relation to the prominent physical features.

2.141 *Soil Morphology* — The constitution of the soil, including the texture, structure, consistence, colour and other physical, chemical and biological properties of the various soil horizons that make up the soil profile.

2.142 *Soil Organic Matter* — The organic fraction of the soil that includes plant and animal residues at various stages of decomposition, and cells and tissues of soil organisms and substances synthesized by the microbial population.

2.143 *Soil Phase* — The subdivision of a soil type having variation in characteristics not significant to soil classification in its natural landscape but significant to its use and management. Examples of variations recognized by the phase of soil types include differences in slope, stoniness, and thickness resulting from accelerated erosion.

2.144 *Soil Porosity* — The volume percentage of the total bulk not occupied by solid particles (*see* **2.112**).

2.145 *Soil Profile* — A vertical section of the soil from the surface through all its horizons, including *C* horizons and extending up to the parent material.

2.146 *Soil Salinity* — The amount of soluble salts in a soil, expressed in terms of milli equivalents per litre, percentage, parts per million, or other convenient unit.

2.147 *Soil Saturation Extract* — Solution extracted from a moisture saturated soil.

2.148 *Soil Separates* — Mineral particles, less than 2·0 mm in equivalent diameter, ranging between specified size limits. The names and size limits of separates recognized are:

Very coarse sand (2·0-1·0 mm); coarse sand (1·0-0 5 mm); medium sand (0·5-0·25 mm); fine sand (0·25-0·10 mm); very fine sand (0·10-0·05 mm); silt (0·05-0·002 mm); and clay (<0·002 mm)

These are based on USDA classification. The separates recognized by the International Society of Soil Science are:

Coarse sand, 2·0-0·2 mm; fine sand 0·2-0·02 mm; silt 0·02-0·002 mm; and clay <0·002 mm.

2.149 *Soil Solution* — The aqeuous liquid extract of the soil and the solutes consisting of ions dissociated from the surfaces of the soil particles and of other soluble materials.

2.150 *Soil Structure* — The combination or arrangement of primary soil particles into secondary particles or clusters that are separated from adjoining aggregates and have properties like those of an equal mass of unaggregated primary soil particles.

2.151 *Soil Survey* — Systematic examination, description, classification and mapping of soil in an area and interpretation for different purposes.

2.152 *Soil Texture* — It refers to the relative proportions of various sizes of particles in a given soil, called soil separates, such as sand, silt and clay.

2.152.1 *Coarse texture* — The texture exhibited by sands, loamy sand and sandy loams.

2.152.2 *Medium texture* — Intermediate between fine textured and coarse textured soils. It includes very fine sandy loam, loam, silt loam, and silt.

2.152.3 *Fine texture* — The soils exhibited by sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay and clay.

2.153 *Soluble Sodium Percentage (SSP)* — The proportion of sodium ions in solution in relation to the total cation concentration, expressed as follows:

$$SSP = \frac{\text{Soluble sodium concentration (me/litre)} \times 100}{\text{Total cation concentration (me/litre)}}$$

2.154 *Specific Gravity* — The ratio of the mass of a dry bulk volume of oven dried (105°C) soil to he mass of an equal volume of water at 4°C.

2.155 *Specified Ion Effect* — Any effect of a salt constituent in the substrate on plant growth that is not caused by the osmotic properties of the substrate.

2.156 *Structureless Soil* — A soil showing no observable aggregation or no definite and orderly arrangement of natural lines of weakness.

2.157 *Sub-Soiling* — Breaking of compact subsoils without inverting them, with a special equipment (chisel) which is pulled through the soil at depths usually of 30 to 60 cm and at spacings usually of 60 to 150 cm.

2.158 *Surface Sealing* — The orientation and packing of dispersed soil particles in the immediate surface layer of the soil, rendering it relatively impermeable to water.

2.159 *Top Soil* — The surface plough layer of a soil (*syn* surface soil).

2.160 *Waste Land* — Waste land may be defined as lands producing much less than their potential (less than 20 percent), or which are ecologically unsuitable and degrading and undergoing environmental retrogression for various reasons.

2.161 *Water Table* — The upper surface of ground water or that level below which the soil is saturated with water; locus of points in soil water at which the hydraulic pressure is equal to the atmospheric pressure.

2.162 *Weathering* — All physical, chemical and biological changes at or near the earth's surface, by atmospheric agents (natural forces), like rainfall, temperature, vegetation, micro-organism, etc, which result in disintegration and decomposition of rocks and constituent minerals and thereby in soil formation.

2.163 *Zeta Potential* — In a colloidal system, the difference in potential between the immovable liquid layer attached to the surface of the dispersed phase and the dispersion medium.

EXPLANATORY NOTE

The definitions of various terms that are used in the field of soil amendments and soil reclamation are available. However, connotations vary from person to person and from place to place. Therefore, an attempt has been made in this standard to evolve definitions of various terms clearly and minimize the scope for varied interpretations and use. It is hoped that this standard would help in adoption of uniform terminology in the country.

Printed at New India Printing Press, Khurja, India