

## VOCABULARY GUIDE

**Adhesion** – In soil science, the attraction of a soil water to soil particles.

**Aeration** – A process by which air is circulated through, mixed with, or dissolved in a substance. In treating soils, mechanized equipment is used to either puncture the soil with spikes (spike aeration) or remove small cores of soil from the ground (core aeration) to reduce soil compaction and improve drainage.

**Aggregate (soil)** – A cluster of soil granules that clump or bind together, creating an arrangement of pore spaces between them.

**Anion** – An ion that bears a negative charge. Common soil anions include: chlorine ( $\text{Cl}^-$ ), nitrate ( $\text{NO}_3^-$ ), sulfate ( $\text{SO}_4^{2-}$ ) and phosphate ( $\text{PO}_4^{3-}$ ).

**Cation** – An ion that bears a positive charge. The most common soil cations are: calcium ( $\text{Ca}^{+2}$ ), magnesium ( $\text{Mg}^{+2}$ ), potassium ( $\text{K}^+$ ), ammonium ( $\text{NH}_4^+$ ), hydrogen ( $\text{H}^+$ ) and sodium ( $\text{Na}^+$ ).

**Cation exchange capacity (CEC)** – The maximum quantity of total cations that a soil is capable of holding. CEC is used as a measure of fertility, nutrient retention capacity, and the capacity to protect groundwater from cation contamination.

**Chelate** – A chemical compound in the form of a heterocyclic ring, containing a metal ion attached by coordinate bonds to at least two nonmetal ions. Chelates are relevant to the mobilization of metals in the soil and the uptake and accumulation of metals into plants and micro-organisms.

**Chemical Weathering** – The process of weathering or decomposition by which chemical reactions involving water, carbon dioxide, oxygen, and acids transform and break down rocks, minerals, and soils found at or near the earth's surface.

**Cohesion** – In soils, the shear strength or the force that binds together like particles in the structure of a soil. Examples of cohesive soils are clay-like silt, sandy silt, silty clay, and organic clay. Water plays a vital role in soil cohesion because of its surface tension.

**Compactability** – A property of soils or sedimentary material that permits it to decrease in volume or thickness under load, usually as a function of the size, shape, and hardness of the constituent particles.

**Cover crop** – A crop planted primarily to manage soil fertility, soil quality, and other soil conditions between regular crop production cycles. A cover crop, such as winter rye or clover, may prevent soil erosion and provide humus or nitrogen to the soil.

**Drainage** – The manner by which surface and subsurface water is removed from an area by natural or artificial means. In agriculture, soils need drainage to improve production or to manage water supplies.

**Electrical conductivity (EC)** – Measures a material's ability to conduct an electric current. In soils, EC measures the level of salt (nutrients) in a soil and is used to identify potential conditions that may affect plant growth.

**Evaporation** – The process by which a liquid is changed into a gaseous state; in particular, the process by which liquid water enters the atmosphere as water vapor.

**Geographic Information System (GIS)** – A system of hardware and software that combines cartography and databases to store, retrieve, map, and analyze geographic data.

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**Global Positioning System (GPS)** – A space-based system of global navigation satellites that provide location and time information anywhere on or near the Earth.

**Humus** – The generally dark-brown, more or less stable, organic component of soil that is derived from well decomposed plant and animal remains. Humus improves the water-retaining properties and texture of soils, adds nutrients, and makes it more workable.

**Hydraulic conductivity** - The rate at which water can move through a permeable soil or rock layer in a direction parallel to the flow of groundwater.

**Infiltration** – The process by which water on the ground surface enters the soil. Infiltration rate in soil science is a measure of the rate at which soil is able to absorb rainfall or irrigation.

**Liming** – The application to the soil of calcium in various forms, generally as ground limestone, but also as marl, chalk, shells, or hydrated lime.

**Macronutrients (soil)** – A nutrient required in large amounts. In soil science, the first 9 of 16 essential elements for plant growth, including oxygen (O), hydrogen (H), and carbon (C) obtained from water; nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), and sulfur (S) obtained from soil or soil additives.

**Mechanical (Physical) weathering** – The process of weathering by which frost action, salt crystal growth, absorption of water, contact abrasion, exfoliation, and other physical forces break down a rock into fragments.

**Micronutrients (soil)** – Elemental minerals that are needed by plants in minute amounts but are still essential for healthy growth and development. These include: manganese (Mn), zinc (Zn), boron (B), copper (Cu), iron (Fe), molybdenum (Mo) and chlorine (Cl).

**Organic matter (soil)** – Carbon-based matter in soil derived from decomposing plants and animals, specifically those that have decayed to the point where they are no longer recognizable.

**Osmosis** – The physical process whereby any solvent moves, without input of energy, across a semi-permeable membrane separating two solutions of different concentrations. Responsible for the ability of plant roots to draw water from the soil.

**Parent rock (substratum)** – The upper layer of rock on which soil forms under the influence of biological and biochemical processes and human activity. The third layer underneath topsoil and subsoil.

**Permeability** – The capacity of a porous rock, sediment, or soil for transmitting a fluid. A measure of the relative ease of fluid flow under unequal pressure.

**pH** – A measure of hydrogen ion concentration; a measure of the acidity or alkalinity of a solution. Aqueous solutions at 25°C with a pH less than seven are acidic, while those with a pH greater than seven are basic or alkaline.

**Porosity** – The ratio of the volume of pore spaces to the volume of matter within a rock or soil, expressed as a percentage.

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**Precision agriculture** – The use of modern computing and satellite technologies, along with soil science principles, to manage all aspects of agricultural production for the purpose of improving crop yield and environmental quality.

**Runoff** – Water from rainfall, snow melt, or irrigation that does not soak into the soil but flows into surface waters.

**Sediment** – Solid fragmental material that is broken down by processes of weathering and erosion, and then transported by the action of wind, water, or ice, and/or by the force of gravity.

**Soil** – The unconsolidated mineral or organic material on the immediate surface of the Earth that serves as a natural medium for the growth of land plants.

**Soil horizon** – A layer of mineral or organic soil or soil material approximately parallel to the land surface that has characteristics altered by processes of soil formation. It differs from adjacent horizons in properties such as color, structure, texture, and consistence, and in chemical, biological, and mineralogical composition.

**Soil profile** – A vertical section of the soil through all its horizons and extending into the parent material.

**Soil series** – A group of soils having similar profiles and developing from similar original materials under the influence of similar climate and vegetation. The soil series is the lowest category of the national soil classification system, and the name or phase of a soil series is the most common reference term used in soil map unit names.

**Soil taxonomy** – An elaborate soil classification system based largely on soil forming processes as indicated by the presence or absence of major diagnostic horizons.

**Soil texture** – A term commonly used to describe the proportionate distribution of the different sizes of mineral particles in a soil, principally sand, silt, and clay.

**Soil type** – A basic unit for classifying and mapping soils, where soil profiles vary within defined, narrow limits. A soil type develops from a common parent material.

**Soil water** – Water held in the capillary pore spaces of soils.

**Sorting** – The process by which sedimentary particles of particular size, shape, or specific gravity are naturally selected and separated from associated but dissimilar particles by agents of transportation, especially running water.

**Subsoil** – The layer or stratum of earth material that lies immediately below the surface soil (topsoil).

**Tillage** – The agricultural preparation (cultivation) of the soil by mechanical agitation prior to planting.

**Topsoil** – A generic term referring to the uppermost horizons of a soil profile that generally contain high levels of organic material and the root systems of surface vegetation.

**Transpiration** – The process by which water absorbed by plants, usually through the roots, is evaporated into the atmosphere from the plant surface, usually the leaves.