

# Glossary

## A

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**acid soil** - A low pH is caused by the percolation of mildly acidic water; exchangeable bases are replaced by hydrogen ions.

**acidic** - Soil containing more hydrogen ions (H<sup>+</sup>) than hydroxyl ions (OH<sup>-</sup>).

**acre-foot** - Equal to approximately 326,000 gallons, or enough water to cover an acre of land one foot deep.

**acre-inch** - Water measured over a given area of one acre.

**actinomycete** - Group of organisms with characteristics between bacteria and fungi (often called mold bacteria).

**adhesion** - The force of attraction between unlike molecules (water to soil particles).

**adobe** - A mixture of sand, clay, water and sometimes a fibrous or organic material, has been used for buildings for thousands of years.

**adsorption** - A surface function where plants take nutrients out of the soil solution and store the nutrients.

**aggregates** - Groups of soil particles that bind to each other more strongly than to adjacent particles.

**Agricultural Research Service (ARS)** - Works to ensure that Americans have reliable, adequate supplies of high-quality food and other agricultural products. ARS accomplishes its goals through scientific discoveries that help solve problems in crop and livestock production and protection, human nutrition, and the interaction of agriculture and the environment.

**agro-forestry** - A type of land management combining trees with agricultural crops and/or animals.

**alkaline** - Soil containing more hydroxyl ions (OH<sup>-</sup>) than hydrogen ions (H<sup>+</sup>).

**alkaline (soil)** - A high pH is caused by reaction of water and the bases: calcium, magnesium, sodium, to form hydroxyl ions.

**allelopathy** - A chemical substance released by one plant that can benefit or inhibit the growth of another plant.

**alluvial fan** - A fan-shaped sediment deposit usually found at the base of a mountain range or hill.

**alluvial soils** - Soils deposited by fresh running water, such as rivers, which form sediments.

**anion** - Negatively charged atoms or molecules.

**antitranspirants** - Coating leaves with a chemical material that reduces water loss through stomata and leaf surfaces by reducing the size and number of stomata.

**aquifer** - Underground layers of rock and sediment saturated with water; water exists in most places under the earth's surface

**arable land** - Land suitable for crop production.

**autotroph** - Organisms that produce their own food, i.e. plants.

## **B**

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**banding** - Narrow bands of fertilizer are applied in furrows two inches from seeds or seeding and two inches deep.

**base saturation** - Percentage of the cation exchange sites filled with exchangeable bases.

**Best Management Practices (BMP)** - A practice, or combination of practices, that is determined to be an effective and practicable (including technological, economic, and institutional considerations) means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals.

**biological weathering** - Occurs when plants and biological life contribute to the disintegration of rocks.

**bioremediation** - The use of living things to reduce pollution; seeding with soil bacteria to break down organic pollutants.

**biosolids** - Nutrient-rich organic materials resulting from the treatment of domestic sewage in a treatment facility.

**bioswales** - Swales, shallow ditches, removing water from yards designed with deep, organic, porous soils and planted into dense vegetation to slow down runoff, promoting infiltration and trapping sediment.

**broadcasting** - Fertilizer is spread uniformly over the field before planting; occurs by use of machinery or aircraft.

**brownfield** - Brownfield sites; real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant”

**buffering** - Occurs when the soil solution contains either a weak acid and its salt or a weak base and its salt, which is resistant to changes in pH.

**buffering capacity** - The capacity of a soil to resist change in pH.

**bulk density** - Refers to the weight of the oven-dry (moisture removed) soil with its natural structural arrangement.

**burned lime** - Or quicklime, is made by heating limestone; heat drives off carbon dioxide resulting in the lighter calcium oxide:

## C

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**calcareous soils** - Soils in a very high alkaline range that are 100% base-saturated and contain several percent or more of calcium carbonate.

**Calcium Carbonate Equivalent (CCE)** - Expression of the acid-neutralizing capacity of a carbonate rock relative to that of pure calcium carbonate.

**capillarity** - The tendency of a liquid in a capillary tube or absorbent material to rise or fall as a result of surface tension.

**carbon cycle** - Plants remove carbon dioxide from the atmosphere and oceans by fixing it into glucose; in turn, animals, plants and human activities produce carbon dioxide (CO<sub>2</sub>) by respiration, decomposition and burning which is used by photosynthesis.

**carbon-nitrogen ratio or (C:N Ratio)** - A ratio of the mass of carbon to the mass of nitrogen in a substance.

**cation** - A positively charged atom or molecule.

**cation exchange capacity (CEC)** - Total number of exchangeable cations a soil can adsorb.

**chemical weathering** - Occurs when changes in the chemical makeup of rock is altered causing it to soften and/or break down. This type of weathering occurs mostly in hot and humid environments.

**cohesion** - The force of attraction between like molecules (water molecules to other water molecules).

**colluvium** - Material that slides/rolls down slopes and accumulates at the bottom (land slide).

**complete fertilizer**- A fertilizer that contains the three primary nutrients: Nitrogen (N), Phosphorus (P) and Potassium (K).

**composite sample** - A sample comprising two or more increments selected to represent the material being analyzed.

**compost** - When organic material is stored in a pile on the ground under conditions that increase decay.

**concrete** - A material made of crushed stone, rock, sand and cement. Cement is a fine powder made of limestone, silicon, aluminum, iron and clay and mixed with water. When water is added, cement hardens.

**Conservation Reserve Program (CRP)** - A land conservation program administered by the Farm Service Agency (FSA).

**conservation tillage** - A method that leaves the previous year's crop residue on a field from before and after planting a crop to reduce soil erosion and runoff.

**consumptive use** - The total water used to produce a crop – including evaporation, transpiration and water that become part of the plant.

**continuous cropping** - The production of a single crop in a field.

**conventional tillage** - A process of cultivating the soil to prepare a seedbed and for weed control. A sequence of events is used such as ploughing and harrowing and removal of plant residue from previous crops.

**core aeration** - Mechanically removing plugs of soil and thatch from a lawn.

**cover crop** - Planting used mainly to slow erosion and improve soil fertility.

**crop rotation** - The growing of selected crops in a regular order on any field.

**cropping system** - A total of all crops and the sequences and/or management practices used to grow those crops; proper soil management necessary to maintain or increase productivity of the crops.

**cultivation on the contour** - The practice of planting and cultivating of crops following the contours of the land.

## D

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**deltas** - The alluvial deposit at the mouth of a river, i.e. Mississippi Delta.

**denitrification** - The loss or removal of nitrogen or nitrogen compounds; specifically: reduction of nitrates or nitrites commonly by bacteria (as in soil) that usually results in the escape of nitrogen into the air

**detritus** - Active soil organic matter.

**double cropping** - or sequential cropping; planting a second crop immediately following the harvest of the first crop (also considered multiple cropping).

**drainage** - The natural or artificial removal of surface and sub-surface water from a given area.

**dryland farming** - The profitable production of crops without irrigation or very limited, variable or unstable rainfall.

## E

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**emitters** - Device with pin-hole size openings located at intervals along lateral plastic tubes laid on soil surface.

**Environmental Quality Incentives Program (EQIP)** - Provides financial and technical assistance to agricultural producers to address natural resource concerns and deliver environmental benefits such as improved water and air quality, conserved ground and surface water, reduced soil erosion and sedimentation or improved or created wildlife habitat.

**eolian deposits** - Wind-transported parent material.

**eutrophication** - An increase of algae growth in water bodies. In many ecosystems; this is a slow, long term, but natural process.

**exchangeable bases** - Some cations not held very strongly and can be easily exchanged.

## F

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**fallow** - Plowed land left without a crop growing for a season.

**family** - Families are established within a subgroup based on properties important to plant growth and soil uses such as texture, temperature, mineralogy and soil depth. Name composed of descriptive words placed before subgroup name.

**Farm Service Agency (FSA)** - Administers farm commodity, crop insurance, credit, environmental, conservation, and emergency assistance programs for farmers and ranchers.

**fertigation** - Fertilizer is added to irrigation water and applied to crops at intervals during the growing season.

**fertilizer** - Any material applied to a soil or plant to supply essential elements.

**fertilizer grade** - An expression referring to the legal guarantee of the available plant nutrients expressed as a percentage by weight in a fertilizer, e.g. a 12-32-16 grade of NPK complex.

**fertilizer ratio** - Indicates a comparative proportion of nitrogen to phosphate to potash. For example, a 15-10-5 fertilizer has a ratio of 3-2-1, and an 8-12-4 fertilizer has a ratio of 2-3-1.

**Field capacity (FC)** - The amount of soil moisture or water content held in the soil after excess water has drained away and the rate of downward movement has decreased.

**fillers** - May be sand, clay granules, ground limestone or ground corncobs and are used to bring a load of bulk fertilizer to a weight of 1 ton.

**floodplains** - An area of low-lying ground adjacent to a river, formed mainly of river sediments and subject to flooding.

**fluid fertilizer** - Concentrated fertilizers that must be diluted with water; available in liquid form, powder, or pellets.

**foliar feeding** - Nutrients are applied to the plant itself by using diluted fertilizer solutions that are sprayed on crop leaves.

**frost wedging** - Occurs in cold climates when water freezes and expands in rocks. The action of expanding and contracting causes the rock to crack peeling outer layers away (exfoliation).

**fungi** - More complex, non-photosynthetic, multi-celled organisms (except yeast, which is single celled).

**furrow-diking** - Special equipment creates basins to hold water by making furrows with dikes (small ridges).

**furrow method** - Water flows in furrows along contours or straight furrows; used in row crops. This method is efficient in water utilization.

## G

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**Geographic Information System (GIS)** - Computerized data management system designed to capture, store, analyze, manage and display spatial and geographical information such as maps and reports.

**glacial drifts** - Material, as gravel, sand, or clay, transported and deposited by a glacier or by glacial meltwater.

**Global Positioning Systems (GPS)** - Allows instant identification of location with precise satellite coordinates; replaces need to estimate location using printed maps and identifiable landmarks.

**granules** - Treated, evenly sized grains, spread evenly and easily, coated to reduce moisture absorption during storage.

**gravitational potential** - When soil water is above water table level and carries potential energy by gravity.

**gravitational water** - Moves into, through or out of the soil under the influence of gravity; found in the macropores; moves rapidly out of well-drained soil (two to three days); can cause flooding in other areas; occupies air space in the pore spaces, can deprive oxygen to roots, causing plants to wilt and even die.

**great group** - Each suborder is divided into great groups based on similar layers present in horizons with emphasis on presence or absence of specific diagnostic features, base status, soil temperature and soil moisture regimes. Named by adding prefix to suborder name.

**green manure** - Crops grown for a specific period and plowed under before maturing to improve soil fertility and quality.

**groundwater** - Water than has seeped into the ground through rocks, cracks and soil.

**guaranteed analysis** - The minimum amount of N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O, etc. in the fertilizer material.

## H

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**heterotroph** - Break down complex organic compounds into simpler compounds, release energy by oxidizing carbon and hydrogen atoms, producing carbon dioxide and water.

**horizons** - Designated according to their soil profile position and the varying physical and chemical processes that created them.

**humification** - Compounds formed from chemical reaction with soil nitrogen that is large, rich in nitrogen, highly complex and resistant to attack.

**humus** - Stable organic matter left in soil when plants or animals die.

**hydrologic (water) cycle** - Continually moves water from the soil to the plants then to the atmosphere and back to the soil.

**hydrophilic gel polymers** - Increase water-holding capacity of soil; absorb and hold water many times their weight, not releasing it until soil has dried.

**hydrophobic** - Repels water instead of absorbing it.

**hydroseeding** - A planting process that uses a slurry of seed and mulch. It is often used as an erosion control technique on construction sites, as an alternative to the traditional process of broadcasting or sowing dry seed.

**hygroscopic water** - Water absorbed from the atmosphere and held very tightly by the soil particles, so that it is unavailable to plants in amounts sufficient for them to survive.

**hypoxia** - Severe, extreme low-oxygen conditions.

## I-J-K

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**immobilization** - The conversion of inorganic compounds to organic compounds by micro-organisms or plants, by which it is prevented from being accessible to plants.

**infiltration** - The movement of water into soil.

**inoculation** - Beneficially infecting soil with useful organisms.

**intercropping** - or relay cropping; growing two or more generally dissimilar crops simultaneously on the same piece of land; grown in distinct rows.

**irrigation** - The artificial application of water to soil to supplement water available from rainfall and snow to help with crop production.

## L

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**land capability classification** - A system of grouping soils on the basis of their “capability” to produce common cultivated crops and pasture plants without deteriorating over a long period of time.

**landscaping** - The care and maintenance of a landscape or ornamental plantings.

**leaching** - Dissolved substances can pass through soil by rainwater or irrigation, which causes the loss of water-soluble plant nutrients.

**legumes** - Nitrogen fixing plants grown for seed value such as alfalfa and peanuts.

**levees** - Ridges of sediment deposited naturally alongside a river. These can be through flooding or manmade to regulate water flow.

**lignin** - Makes up most of soil humus; large, highly complex molecules, 10-30% of plant tissue; makes plants rigid and decay resistant

**liming** - Materials contain calcium and/or magnesium in forms, which when dissolved, will neutralize soil acidity.

**load-bearing capacity** - The capacity of soil to support the loads applied to the ground.

**logarithmic scale** - The pH scale is logarithmic and as a result, each whole pH value below 7 is ten times more acidic than the next higher value.

## **M**

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**macrofauna** - Animals that are one centimeter or more long but smaller than an earthworm.

**macronutrients** - Chemical elements required in large amounts for plant growth and development.

**map units** - A collection of areas defined and named the same in terms of their soil components and/or miscellaneous areas.

**matric potential** - Results from the attraction of water molecules to soil particles; determines movement of soil water and water availability to plants.

**mesofauna** - Typically live within soil pores, have limited burrowing ability (mostly inhabit surface litter) and feed on organic materials, microflora, microfauna and other invertebrates.

**micelle** - A particle of silicate clay.

**microfauna** - The smallest of soil organisms and have to be viewed with a microscope.

**microflora** - Bacteria and microscopic algae and fungi, especially those living in a particular site or habitat.

**micro-irrigation** - The frequent application of small quantities of water directly above and below the soil surface

**micronutrients** - Minute amounts of these seven essential elements are found in plants and soils, but their roles are critical for plant nutrition.

**mineral cycle** - Processes that regulates the flow, distribution, and migration of mineral nutrients across the Earth's surface. Minerals are naturally occurring chemical compounds that are made up of elements.

**mineralization** - The decomposition or oxidation of the chemical compounds in organic matter releasing the nutrients contained in those compounds into soluble inorganic forms that may be plant-accessible.

**mixed fertilizer** - A fertilizer that contains two or more nutrients; may be created by mixing two different "straight" fertilizers together.

**monocropping** - or monoculture – production of a single crop in a field.

**mottled** - Spotted or blotched

**muck** - Organic material that is rotten, highly decomposed; often slimy and black in color.

**mulch till** - A process where crop residue is spread uniformly over a field to aid in planting the next crop; accomplished by minimum tillage such as chiseling and disk harrowing to partially incorporate surface organic matter.

**multiple cropping** - Growing two or more crops consecutively or at the same time on the same field in the same year; crops needed that mature quickly to allow two harvests in one year.

**mycorrhizae** - Fungi that form a symbiotic (mutually beneficial) relationship with plant roots and help with plant growth.

## **N**

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**National Association of Conservation Districts (NACD)** - A nonprofit organization that represents America's 3,000 conservation districts and the individuals who serve on their governing boards. Conservation districts are local units of government established under state law to carry out natural resource management programs at the local level.

**National Institute of Food and Agriculture (NIFA)** - An agency within the U.S. Department of Agriculture (USDA), part of the executive branch of the Federal Government. Congress created NIFA through the Food, Conservation, and Energy Act of 2008. NIFA replaced the former Cooperative State Research, Education, and Extension Service (CSREES), which had been in existence since 1994.

**Natural Resources Conservation Service (NRCS)** - Formerly known as the Soil Conservation Service is an agency of the United States Department of Agriculture that provides technical assistance to farmers and other private landowners and managers.

**Near-infrared Spectroscopy (NIRS)** - A method that uses the near infrared region of the electromagnetic spectrum (from about 800 nm to 2500 nm). This method, typically used in the medical field, is now being used in soil analysis.

**necrotic** - The death of most or all the cells or tissue due to disease.

**nematode** - The most numerous multicellular animals on earth. A handful of soil will contain thousands of the microscopic worms, many of them parasites of insects, plants or animals.

**neutral** - When a soil contains equal concentrations of hydrogen and hydroxyl ions.

**nitrification** - The biological oxidation of ammonia or ammonium to nitrite followed by the oxidation of the nitrite to nitrate. Nitrification is an important step in the nitrogen cycle in soil.

**nitrogen cycle** - This is the movement and exchange of organic and inorganic matter back into the production of living matter.

**nitrogen fixation** - Part of the nitrogen cycle. Before nitrogen can be used by plants, it must first be removed from the atmosphere – either naturally through nitrogen fixation, which occurs in green plants called legumes or commercially through fertilizer plants. Nitrogen fixation is the process whereby elemental nitrogen is removed from the atmosphere by soil bacteria called rhizobia.

**nonpoint source pollution** - Usually comes from land runoff, precipitation, drainage, and seepage.

**no-till** - A way of growing crops or pasture from year to year without disturbing the soil through tillage; considered a type of conservation tillage; more many advantages than disadvantages.

## O

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**olericulture** - A branch of horticulture that deals with the production, storage, processing, and marketing of vegetables.

**order** - Based on presence or absence of key layers in the diagnostic horizon. The differences relate to dominant soil forming processes and degree of soil formation. Each order is identified by a word ending in 'sol.'

**organic farming** - A farming method that involves growing and nurturing crops without the use of synthetic based fertilizers and pesticides.

**organic matter** - Plant and animal material, both dead and living.

**organic standards** - Indicates the food or other agricultural product has been produced through approved methods. Specific requirements are verified by USDA-accredited certifying agents before labeled as USDA organic.

**osmotic potential** - Refers to the attraction of salts and dissolved organic compounds (solutes) to water.

## **P-Q**

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**parent material** - The underlying geological material (generally bedrock or a superficial or drift deposit) in which soil horizons form.

**peat** - A brown, soil-like material characteristic of boggy, acid ground, consisting of partly decomposed vegetable matter. It is widely cut and dried for use in gardening and as fuel.

**pedology** - The study of the formation and classification of soil.

**pedon** - A unit of soil, typically one meter by one meter in width and 1.5 meters deep (extending to the root depth).

**pelletized lime** - Finely ground limestone, pelletized with the aid of clay or other type of synthetic binder.

**penetrometer** - An instrument for determining the consistency or hardness of a substance by measuring the depth or rate of penetration of a rod or needle driven into it by a known force.

**percolation** - The downward movement of water within the soil.

**perlite** - Large granules of light-weight expanded volcanic glass.

**Permanent Wilting Point (PWP)** - The point where no more water is available to the plant.

**permeability** - The quality of soil allowing both kinds of water movement.

**pH** - A figure expressing the acidity or alkalinity of a solution on a logarithmic scale on which 7 is neutral, lower values are more acid, and higher values more alkaline.

**phosphorus index** - Quantifies potential phosphorus hazards on lands, to identify sites with a higher risk of phosphorus movement and to help devise corrective plans.

**plant tissue test** - Plants themselves can be tested for nutrient content in order to determine fertilizer needs.

**point source pollution** - The Clean Water Act, is any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged.

**polyculture** - Growing multiple crops in the same space; includes multiple cropping, intercropping, companion planting, beneficial weeds and alley cropping; can imitate the diversity of natural ecosystems.

**pomology** - The study and cultivation of fruits and nuts.

**pop-up fertilizer** - Also called seed placement, where a small amount of fertilizer is placed with the seeds during planting.

**pore space** - A part of the volume of soil measured for bulk density.

**precipitation** - Water released from clouds in the form of rain, freezing rain, sleet, snow or hail.

**precision farming** - An approach to farm management that uses information technology (IT) to ensure that the crops and soil receive exactly what they need for optimum health and productivity.

**preferential flow** - The flow of free water through large pores, bypassing the general soil matrix.

**pressurized liquid fertilizer** - Fertilizers held in pressurized tanks until they can be injected into the soil.

**prills** - Free of dust, smooth, round, easy to use and spread, coated to protect during storage.

**primary consumer** - They eat the primary producers.

**primary producer** - Organisms (for example: plants) that produce their own food. They are the base of the food chain.

**primary tillage** - Initially breaks up the soil after a harvest to a depth of approximately 10-12 inches and buries residue from a previous crop.

**pulverized fertilizer** - Finely crushed powder, difficult to spread evenly, may cake during storage.

## R

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**rain-fed farming** - The natural application of water to the soil through direct rainfall. This occurs in areas where there is enough precipitation to grow crops without irrigation. It is also common in poor, developing countries, where irrigation is not available.

**rangeland** - Those lands on which native vegetation is mostly grasses, grass-like plants, forbs (herbaceous flowering plant that is not a grass), or shrubs suitable for grazing or browsing; also includes woodlands and most deserts, shrublands, tundra, alpine communities, marshes and meadows.

**recharge basins** - Landscape depression in which ponded water percolates through the soil to recharge an underlying aquifer.

**relay intercropping** - Growing two or more crops simultaneously during part of each crop's life cycle; second crop planted after first crop has reached reproductive stage of growth but before it is ready for harvest.

**residual soil** - weather in place, weathering occurs slowly, are shallow and usually found on bedrock.

**resistance block** - A meter is used to read the electrical resistance of moisture blocks installed in the ground; the blocks incorporate two electrodes imbedded in a gypsum material and covered with a porous material; porous material allows water to move in equilibrium with the soil moisture indicating changes in amount of water in soil.

**retention ponds** - Manmade depressions installed to collect runoff water.

**ridge-till** - Maintaining ridges is essential; old residue removed into furrows in preparation for new crop; operating depth is shallow, disturbing only the ridge tops; some control of weeds and incorporation of herbicide possible.

**root wedging** - Occurs when roots grow into a crack in a rock and the pressure of this pries apart the stone.

**rosetting** - Circular arrangement of leaves.

**rotation cropping** - A cropping sequence that includes more than one crop over several years.

**runoff** - Excess water that flows over the ground.

## S

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**saline** - Salty

**saline soils** - Contain soluble salts and impairs productivity of plants but does not contain an excess of exchangeable sodium.

**saline-sodic soil** - Typically characterized by sodium (Na) saturation greater than 15% of the CEC and a pH of 8.4 or less.

**salinization** - The process by which water-soluble salts accumulate in the soil.

**salt wedging** - Occurs when salt is left behind after water evaporates and over time the salt creates pressure causing rocks to split and weaken.

**saprophytes** - Decomposers, feed on dead organic matter.

**saturated flow** - (gravitational) water flows downward by gravity; occurs mainly in large soil pores.

**Scientific Irrigation Scheduling (SIS)** - Refers to a method of irrigating that measures the actual soil moisture and crop evapotranspiration and delivers water to the crops based on those scientific measurements.

**secondary consumers** - Consume the primary consumers.

**secondary tillage** - Not as deep as primary tillage and creates a smoother finish to make a good seedbed.

**series** - Often named for a nearby town or landscape where first discovered. Consists of soils within a family that have similar color, texture, structure, reaction, mineral and chemical composition, and soil profile arrangement.

**shrink-swell potential** - Extent that a clay (smallest class of soil particles) soil will expand or contract when wet or dry.

**side-dressing** - Fertilizer is applied to the soil six to eight inches from the plants along the rows.

**site-specific management** - Individualized to small areas or "sites" to be tested and managed.

**slag** - Byproduct of steel manufacturing and valued as fertilizer in gardens and farms in some areas of the country because of the slowly-released phosphate content in phosphorus-containing slag, and its liming effect.

**slow-release fertilizer** - Designed to slowly release nutrients into the soil over many weeks or even months.

**sod crops** - Cover the ground surface and fill the surface soil with fibrous roots tend to hold the soil in place and reduce erosion.

**sodic** - or alkali soils contain excessive amounts of sodium (Na) on the soil CEC sites.

**sodic soils** - Exchangeable sodium percentage (or sodium saturation) is 15 or more, and pH is in the range 8.5 to 10.0. If soluble salts are not present, but exchangeable sodium is, the soil can be called "sodic". Sodic soils contain sufficient exchangeable sodium to interfere with the growth of most plants.

**sodium adsorption ratio (SAR)** - Compares the concentration of sodium ions with the concentration of calcium and magnesium.

**soil** - The soft material that covers the surface of the earth and provides a place for the growth of plant roots.

**soil aggregates** - Groups of soil particles that bind to each other more strongly than to adjacent particles.

**Soil and Water Conservation Districts (SWCD)** - Districts work in both urban and rural settings, with landowners and with other units of government, to carry out a program for the conservation, use, and development of soil, water, and related resources.

**soil classification** - The process of arranging soil into categories based on common properties and according to usage.

**soil colloids** - Tiny clay and humus particles carrying a slight electrical charge which attracts nutrient ions. Silicate clays, oxide clays and humus are three types of soil colloids.

**soil erosion** - The movement of soil particles from one place to another under the influence of water or wind

**soil horizons** - Designated according to their soil profile position and the varying physical and chemical processes that created them.

**soil injection** - Used to place liquid or gaseous fertilizer below the soil near the plants roots.

**soil pitting** - Creating tiny pits to capture water.

**soil profile** - A vertical section of soil from the ground surface downwards through all of its horizons to where the soil meets underlying rock.

**soil sampling** - A sample of the soil to be tested is collected and sent to a testing center.

**soil survey** - The systematic examination, description, classification and mapping of soils in an area.

**soil taxonomy** - A system of classifying soils based on observable and quantifiable properties that can be viewed and sampled. Soils are grouped according to physical, chemical and mineralogical properties present in their soil horizons.

**soil test** - Performed in a lab generally analyze pH, nitrogen, phosphorus, potassium, calcium, magnesium, sodium, sulfur and salinity. More detailed tests are available which measure micronutrients such as zinc, iron, copper, manganese and boron.

**soil texture** - Refers to the amount of sand, silt and clay in the soil.

**soil texture triangle** - Used to determine textural name of a soil by measuring percentage of sand, silt and clay present in soil.

**soluble** - Able to be dissolved, especially in water.

**split application** - Divide up the year's fertilizer needs into two or more parts and apply at each interval.

**starter fertilizer** - A small quantity of fertilizer nutrients applied near the seed at planting which enhances the development of emerging seedlings by supplying essential nutrients in accessible locations near the roots.

**straight fertilizer** - A fertilizer that contains only one nutrient.

**strip cropping** - Growing soil-conserving and soil-depleting crops in alternate strips running perpendicular to the slope of the land

**strip-till** - The method of making narrow rows of 8 to 10 inches wide where seeds will be planted, leaving the soil in between the rows untilled; is considered a form of no-till; requires special equipment.

**structure** - Refers to the arrangement of soil particles. A well-developed structure usually indicates the presence of clay.

**subgroup** - Determined based on how the properties fit the typical concept of its great group. Describes characteristics such as wetness, sand, etc. New name is added before the great group name.

**suborder** - Each soil order is divided into a suborder based on how they differ in wetness, climate, major parent material, vegetation and other factors.

**subsoil** - The layer of soil just under the topsoil.

**surface water** - Water that collects on the surface of the ground.

**sustainable agriculture** - A philosophy and collection of practices that seeks to protect resources while ensuring adequate productivity. It strives to minimize off-farm inputs like fertilizers and pesticides and to maximize on-farm resources like nitrogen fixation by legumes. Top yields are less a goal than optimum and profitable yields based on reduced input costs.

**symbiont** - Organisms that live with another organism in a partnership that is beneficial to both.

## T

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**talus** - Sand and rocks that collect at the foot of a slope.

**Temporary Wilting Point (TWP)** - When plants lose water faster than it can be absorbed; plants can recover when conditions improve.

**tensiometer** – A sealed, airtight, water-filled tube with a porous tip on one end and a vacuum gauge on the other end which measures soil water suction expressed as tension; also called potentiometer.

**tension** - A measure of how much suction the soil pore exerts on water.

**terracing** - The practice of constructing embankments or ridges across sloping soils.

**tillage** - preparation of the soil for a good seedbed growing environment.

**tilth** - The condition of tilled soil, especially in respect to suitability for sowing seeds.

**topdressing** - A type of surface broadcasting where fertilizer is spread over a growing crop and not mixed into the soil.

**topsoil** - The surface or very top layer of soil.

**transpiration** - Evaporative process where water turns to vapor and is released from plants through the stomata (tiny pores) in their leaves.

## U-V

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**United States Department of Agriculture (USDA)** - Providing leadership on food, agriculture, natural resources, rural development, nutrition, and related issues based on public policy, the best available science, and effective management.

**unsaturated flow** - Water flows primarily by capillary action (multi-directional) from moist to dry soil; or from areas of high potential to areas of low potential called capillary rise.

**vermiculite** - A yellow or brown mineral found as an alteration product of mica and other minerals, and used for insulation or as a moisture-retentive medium for growing plants.

**vertical mulching** - A technique that can be used to partially alleviate soil compaction within the critical root zones of trees. Soil compaction is harmful as it reduces the amount of pore space in the soil normally filled by oxygen (micro-pores) and water (macro-pores).

## **W-X-Y-Z**

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**water erosion** - Caused by raindrops, surface flow and gully flow. A selective process in which organic matter and finer soil particles are removed first which rapidly destroys productivity of cultivated land.

**water holding capacity** - The total amount of water soil can hold at field capacity. Sandy soils tend to have low water storage capacity.

**water penetration** - The depth to which irrigation water or rain penetrates the soil before the rate of downward movement becomes negligible.

**water-use efficiency** - Can be measured by the amount of water needed to produce a unit of dry plant matter.

**weathering** - The process by which rock is broken down into smaller pieces.

**Web Soil Survey (WSS)** - Provides soil data and information produced by the National Cooperative Soil Survey. It is operated by the USDA Natural Resources Conservation Service (NRCS) and provides access to the largest natural resource information system in the world.

**wind erosion** - Common in dry areas where soils are often bare of vegetation and high wind velocities are common.

**xeriscaping** - A type of landscaping that reduces or eliminates the use of water.

# Soil Science Activities to Enhance Learning

Here is a list of free Internet activity resources that can be used in combination with this book:

Title	URL
Soils 4 Teachers – Lesson and Activities	<a href="http://www.soils4teachers.org/lessons-and-activities">http://www.soils4teachers.org/lessons-and-activities</a>
Soils 4 Kids – Experiments and Hands-on Projects	<a href="http://www.soils4kids.org/experiments">http://www.soils4kids.org/experiments</a>
Nutrients for Life – Science of Soil	<a href="http://www.thescienceofsoil.com/teacher-resources">http://www.thescienceofsoil.com/teacher-resources</a>
Teaching Soil and Earth Science on Pinterest	<a href="https://www.pinterest.com/globeprogram/teaching-stem-the-scoop-on-soil-and-earth-science/">https://www.pinterest.com/globeprogram/teaching-stem-the-scoop-on-soil-and-earth-science/</a>
Dr. Dirt K-12 Resources	<a href="http://www.doctordirt.org/">http://www.doctordirt.org/</a>
Soil Net – Various Activities and Information	<a href="http://www.soil-net.com/">http://www.soil-net.com/</a>
Dirt – Secrets of the Soil -Activity Booklet	<a href="http://utah.agclassroom.org/files/uploads/estore/unit_dirt.pdf">http://utah.agclassroom.org/files/uploads/estore/unit_dirt.pdf</a>
How Stuff Works – Soil Experiments	<a href="https://lifestyle.howstuffworks.com/crafts/other-arts-crafts/science-projects-for-kids-soil-experiments.htm">https://lifestyle.howstuffworks.com/crafts/other-arts-crafts/science-projects-for-kids-soil-experiments.htm</a>
Soil Lab Modules – University of British Columbia	<a href="http://labmodules.soilweb.ca/">http://labmodules.soilweb.ca/</a>
Soils 4 Youth Activities – Canada	<a href="http://soil4youth.soilweb.ca/activities/">http://soil4youth.soilweb.ca/activities/</a>
Demonstrations in Soil Science – Purdue University	<a href="https://www.agry.purdue.edu/courses/agry255/brochure/brochure.PDF">https://www.agry.purdue.edu/courses/agry255/brochure/brochure.PDF</a>
Virtual Labs – A Variety of Labs including pH	<a href="http://virtuallabs.nmsu.edu/">http://virtuallabs.nmsu.edu/</a>