

## SOIL MANAGEMENT

### Quiz I

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- A Bedrock \_\_\_\_\_ A dense, hard, or compacted layer in soil that slows water percolation and movement of air and obstructs root growth. Pans may be caused by compaction, clay, or chemical cementation.
- B Horizon (soil) \_\_\_\_\_ A dense and brittle subsurface layer of soil that restricts root penetration and water movement.
- C Compaction \_\_\_\_\_ Also known as a plow pan. A subsurface layer of soil having a bulk density that is higher than the layer either above or below it. The compaction is caused by the forces exerted during tillage operations.
- D Fragipan \_\_\_\_\_ A dense, compacted layer of clay found in the subsoil that limits or slows the downward movement of water through the soil.
- E Hardpan \_\_\_\_\_ Portion of the soil or rock profile in which all pores are filled with water.
- F Claypan \_\_\_\_\_ Solid, or consolidated, rock lying under the soil.
- G Tillage pan \_\_\_\_\_ Increasing the soil bulk density, thereby decreasing the soil porosity, by the application of mechanical forces to the soil.
- H Saturated zone \_\_\_\_\_ A horizontal layer of soil, created by soil-forming processes, that differs in physical or chemical properties from adjacent layers.

### Quiz II

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- A Ped \_\_\_\_\_ Physical condition of the soil in terms of how easily it can be tilled, how good a seedbed can be made, how easily seedling shoots and roots can penetrate.
- B Platy \_\_\_\_\_ The ease by which a moist soil can be crumbled.
- C Alluvium \_\_\_\_\_ A mass of fine soil particles held together by clay, organic matter, or microbial gums.
- D Granular \_\_\_\_\_ A natural soil aggregate, such as a granule or prism.
- E Aggregate \_\_\_\_\_ Soil structure where the individual units are bounded by flat or slightly rounded vertical faces. Units are distinctly longer vertically, and the faces are typically casts or molds of adjoining units. Vertices are angular or sub-rounded.
- F Tilth \_\_\_\_\_ Soil structure classification in which aggregates are in the shape of blocks or polyhedrons.
- G Blocky \_\_\_\_\_ A general term for all eroded material deposited by running water including gravel, sand, silt, and clay.
- H Friable \_\_\_\_\_ Soil structure where the units are approximately spherical or polyhedral.
- I Prismatic (columnar) \_\_\_\_\_ A soil structure consisting of soil aggregates that are developed predominantly along the horizontal axis; laminated; flaky.

Quiz III

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- A Soil texture \_\_\_\_\_ A soil mapping unit with an erodibility index of 8 or more.
- B Soil survey \_\_\_\_\_ Basis for setting boundaries in a soil map. May include one or more soil series.
- C Soil structure \_\_\_\_\_ The mass of oven-dry soil per unit volume, usually expressed as grams per cubic centimeter.
- D Mapping unit \_\_\_\_\_ The examination, description, and mapping of soils of an area according to the soil classification system.
- E Bulk density \_\_\_\_\_ Using topography and/or slope characteristics to separate a field into different zones having similar soil characteristics and crop productivity.
- F Highly erodible land \_\_\_\_\_ The relative proportions of sand, silt, and clay.
- G Landscape \_\_\_\_\_ The combination or arrangement of primary soil particles into secondary soil particle

Quiz IV

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- A Acid soil \_\_\_\_\_ A soil whose traits are determined mainly by its mineral content; contains less than 20 percent organic matter.
- B Alkaline soil \_\_\_\_\_ Soil high in sodium and low in soluble salts.
- C Calcareous soil \_\_\_\_\_ A soil that has a pH value less than 7.0.
- D Mineral soil \_\_\_\_\_ A non-sodic soil containing sufficient soluble salt to adversely affect the growth of most crops.
- E Organic soil \_\_\_\_\_ A soil that has a pH value greater than 7.0.
- F Saline soil \_\_\_\_\_ A soil containing significant amounts of naturally occurring calcium carbonate, which fizzes when dilute acid is applied.
- G Sodic soil \_\_\_\_\_ Soil containing more than 20 or 30 percent organic matter in the US and Canada, respectively.

Quiz V

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- A Salinity \_\_\_\_\_ Spots of different colors in a soil reflecting whether iron in the soil is reduced (greenish-grey colors when poorly drained) or oxidized (reddish-brown colors when well drained). Usually indicates cycling between poor and good aeration.
- B Solubility \_\_\_\_\_ An organic soil in which the organic matter is mostly decomposed.
- C Buffering \_\_\_\_\_ Unconsolidated soil material consisting of undecayed or slightly decayed organic matter that has accumulated underwater where low oxygen inhibits decay.
- D Colloid \_\_\_\_\_ An index of concentration of dissolved salts in the soil.
- E Heavy metals \_\_\_\_\_ An ion with a negative charge.
- F Mottling \_\_\_\_\_ The ability of a solution, like the soil solution or irrigation water, to resist changes in pH when acid or alkaline substances are added. Often used when speaking of soil to describe its resistance to pH changes when limed or acidified.
- G Muck \_\_\_\_\_ The amount of exchangeable cations that a soil can adsorb at a specific pH, expressed as centimoles of charge per kilogram (cmolc/kg) of soil or milliequivalents per 100 g of
- H Peat \_\_\_\_\_ A very tiny particle capable of being suspended in water without settling out. In soil, have a charged surface that attracts ions.
- I pH \_\_\_\_\_ Refers to lead, copper, zinc, mercury, arsenic, cadmium, nickel, and selenium. Some states may list additional metals.
- J Anion \_\_\_\_\_ Numerical measure of hydrogen ion concentration, with a scale of 0 to 14. Neutral is pH 7, values below 7 are acidic, and values above 7 are alkaline.
- K Cation exchange capacity (CEC) \_\_\_\_\_ Amount of a substance that will dissolve in a given amount of another substance, typically water.

Quiz VI

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- A Nitrification \_\_\_\_\_ The loss of a compound in gaseous form.
- B Immobilization \_\_\_\_\_ The transformation of nitrate to gaseous forms of nitrogen, occurring under anaerobic
- C Denitrification \_\_\_\_\_ The conversion of an element by soil organisms from an organic form to an inorganic form.
- D Volatilization \_\_\_\_\_ Use of an element by microorganisms, removing it from the plant available component
- E Mineralization \_\_\_\_\_ Conversion of nitrogen gas to ammonium by microorganisms or industrial process
- F Nitrogen fixation \_\_\_\_\_ Conversion of ammonium to nitrate by specific soil bacteria

Quiz VII

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- A Percolation \_\_\_\_\_ Entry of water from precipitation, irrigation, or runoff into the soil profile.
- B Preferential flow \_\_\_\_\_ Movement of water horizontally below the soil surface, usually along an impervious layer.
- C Lateral flow \_\_\_\_\_ The movement of material in solution by the drainage of water through the soil.
- D Mass flow \_\_\_\_\_ The movement of solutes associated with net movement of water.
- E Capillary action \_\_\_\_\_ Downward movement of water through soil or rock.
- F Infiltration \_\_\_\_\_ Capacity of soil, sediment, or porous rock to transmit water and gases.
- G Permeability \_\_\_\_\_ Rapid movement of water and constituents through soil via large and continuous pores.
- H Recharge \_\_\_\_\_ Downward movement of water through soil to groundwater.
- I Leaching \_\_\_\_\_ Movement of water in the soil through small soil pores.

Quiz VIII

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- A Free water \_\_\_\_\_ Portion of water in soil that can be readily absorbed by plant roots.
- B Field capacity \_\_\_\_\_ The amount of water a soil holds after free water has drained because of gravity.
- C Available water \_\_\_\_\_ Water that moves through the soil under the influence of gravity; gravitational water.
- D Water holding capacity \_\_\_\_\_ Soil water content at which most plants cannot obtain sufficient water to prevent permanent tissue damage.
- E Hygroscopic water \_\_\_\_\_ Similar to field capacity; the amount of water a soil holds after free water has drained because of gravity.
- F Permanent wilting point \_\_\_\_\_ Water held tightly by adhesion to soil particles. Cannot be used by plants and remains in soil after air-drying.

Quiz IX

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- A Aquifer \_\_\_\_\_ All land and water that drains runoff to a stream or other surface water body.
- B Discharge \_\_\_\_\_ Land near a stream commonly flooded when the water levels are high. Soil is built from sediments deposited during flooding.
- C Flood plain \_\_\_\_\_ Water in the saturated zone below the soil surface.
- D Watershed \_\_\_\_\_ Land area over which surface water infiltrates into soil and percolates downward to replenish an aquifer.
- E Water table \_\_\_\_\_ Layers of underground porous rock, gravel, or sand through which groundwater flows and can supply water at a reasonable rate. May be perched, confined, or unconfined.
- F Recharge area \_\_\_\_\_ Upper surface of the ground water or layer of soil saturated with water.
- G Groundwater \_\_\_\_\_ Flow of surface water in a stream or the flow of ground water from a pipe, spring, ditch, or flowing artesian well.

Quiz X

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A Carbon-nitrogen (C:N ratio)	_____	The amount of oxygen required by aerobic microorganisms to decompose the organic matter in a sample of water and used as a measure of the degree of water pollution.
B Carbon sequestration	_____	Plant and plant-derived material, including manure. Includes forestry products, wood and food processing wastes, energy crops such as switchgrass, and crop residues.
C Organic matter	_____	Any organic material, such as livestock manure, compost, sewage sludge, or yard wastes applied to the soil to add nutrients or for soil improvement.
D Biological oxygen demand (BOD)	_____	Process through which carbon dioxide from the atmosphere is absorbed by trees, plants, and crops through photosynthesis, and stored as carbon in biomass and soils.
E Humus	_____	Natural or artificial layer of plant residue or other material covering the surface which conserves soil moisture, holds soil, and minimizes temperature fluctuations.
F Biomass	_____	Highly decomposed organic matter that is dark-colored and highly colloidal.
G Mulch	_____	The organic fraction of the soil exclusive of undecayed plant and animal residues.
H Biosolid	_____	Ratio of the mass of carbon to the mass of nitrogen in soil, organic material, or plants.

Quiz XI

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A Point source contamination	_____	Community of animals and plants and the physical environment in which they live.
B Non-point source contamination	_____	Enrichment of aquatic systems by nutrients, primarily N and P, causing excessive vegetative growth. Decomposition results in O <sub>2</sub> depletion and death of aquatic life.
C Wetlands	_____	Water contamination from specific sources such as leaking underground storage tanks, landfills, industrial waste discharge points, or chemical mixing sites.
D Riparian zone	_____	Water contamination derived from diffuse sources such as construction sites, agricultural fields, and urban runoff.
E Buffer strip	_____	Amount of a substance entering the environment (soil, water, or air).
F Environmentally sensitive area	_____	Land adjacent to a body of water that is at least periodically influenced by flooding.
G Ecosystem	_____	An area characterized by periods of inundation, hydric soils, and hydrophytic vegetation.
H Loading	_____	Areas or strips of land maintained in vegetation and strategically located on the landscape to help control runoff, erosion, and entrap contaminants.
I Eutrophication	_____	Places on the landscape that can be readily impacted by human or natural activity so as to degrade the condition of the site.

Quiz XII

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- A Strip-till \_\_\_\_\_ May be referred to as conventional tillage. Tillage where all plant residues are covered. Low surface residue levels provide little protection from wind and/or water erosion.
- B Clean till \_\_\_\_\_ A general term for tillage practices that leave crop residues on the soil surface to reduce erosion.
- C Minimum tillage \_\_\_\_\_ Tillage following the slope, rather than up and down a slope. Helps prevent erosion and runoff.
- D Mulch tillage \_\_\_\_\_ Tillage deeper than that needed to produce loose soil for a seedbed, usually used to loosen a compacted subsoil.
- E Fallow \_\_\_\_\_ Fields left idle on which vegetative growth is controlled by tillage or chemicals to accumulate water and/or mineral nutrients.
- F Deep tillage \_\_\_\_\_ Tillage methods that involve fewer tillage operations than clean tillage does.
- G Conservation tillage \_\_\_\_\_ A full-width tillage and planting combination that leaves some plant residues or other material on the soil surface.
- H No till/Direct seeding \_\_\_\_\_ Method of growing crops that involves no seedbed preparation prior to planting.
- I Contour tillage \_\_\_\_\_ A tillage and planting system that disturbs a relatively narrow area of the soil (normally 8 to 10 in wide), into which the crop is planted and some or all of the fertilizer is applied.

Quiz XIII

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- A Broadcast \_\_\_\_\_ Fertilizer applied below and beside the seed with the planter.
- B Topdress \_\_\_\_\_ Fertilizer broadcast over a growing crop and not incorporated.
- C Sidedress \_\_\_\_\_ Fertilizer applied in irrigation water.
- D Incorporate \_\_\_\_\_ Fertilizer applied at variable rates based on GIS and grid soil sampling.
- E Split \_\_\_\_\_ Fertilizer applied at variable rates based on light reflectance/absorbance of crop canopy.
- F Band \_\_\_\_\_ Fertilizer spread uniformly over the soil surface.
- G Sensor based VRT \_\_\_\_\_ Fertilizer applied to growing row crop; usually incorporated during cultivation process.
- H Fertigation \_\_\_\_\_ Fertilizer mixed into the soil.

Quiz XIV

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A	Sediment	_____	A large channel in the soil, caused by erosion that is deep and wide enough that it cannot be crossed by tillage equipment.
B	Suspension	_____	A channel in the soil caused by runoff water erosion that is small enough to be erased by tillage.
C	Rill	_____	A water erosion process caused by raindrop impact on the soil surface and a thin layer of water (sheet) moving over the soil surface.
D	Gully	_____	Eroded soil and rock material, and plant debris, transported and deposited by wind or water.
E	Saltation	_____	Movement of sand-sized particles/aggregates by wind, in which the particles roll; along the soil surface. May account for 7 to 25 percent of total transport by wind.
F	Surface creep	_____	Movement of fine (<0.1 mm) soil particles by wind. The particles are dislodged from the soil surface, are small enough to remain in the air mass for an extended period. From 20 to more than 60 percent of an eroding soil may be carried this way.
G	Soil loss tolerance (T value)	_____	Movement of individual soil particles/small aggregates by wind, in which the particles are lifted as much as 12 inches, then travel a short distance before dropping back to the soil surface. From 50 to 80 percent of total soil transport by wind.
H	Sheet and rill erosion	_____	(i) Maximum average annual soil loss that will allow continuous cropping and maintain soil productivity without requiring additional management inputs. (ii) The maximum soil erosion loss that is offset by the theoretical maximum rate of soil development.

Quiz XV

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A	RUSLE II	_____	Wind Erosion Prediction System, a process-based daily time-step model that simulates weather (wind speed and direction, precipitation, and evapotranspiration) and field conditions (crop growth, surface roughness, crop residue, and windbreaks or barriers) to predict soil erosion by wind.
B	WEPS	_____	An equation for predicting the average annual soil loss in mass per unit area per year
C	A=RKLSCP	_____	Revised Universal Soil Loss Equation
D	R	_____	Conservation practice factor
E	K	_____	Cropping system and management factor
F	L	_____	Erodibility factor
G	S	_____	Percent slope
H	C	_____	Rainfall factor
I	P	_____	Slope length
J	A	_____	The average annual soil loss in mass per unit area per year