**What is Soil Health? Why Should I Care?**

**David Lamm -| Nov 2**

**Soil health is the capacity of a soil to function.**  **Healthy soil gives us clean air and water, bountiful crops and forests, productive grazing land, diverse wildlife, and beautiful landscapes.**

**Soil does all of this by performing five essential functions**

1. Nutrient Cycling - Soil stores, moderates the release of, and cycles nutrients and other elements. During these biogeochemical processes, analogous to the water cycle, nutrients can be transformed into plant available forms, held in the soil, or even lost to air or water.
2. Water Relations - Soil can regulate the drainage, flow and storage of water and solutes, which includes nitrogen, phosphorus, pesticides, and other nutrients and compounds dissolved in the water. With proper functioning, soil partitions water for groundwater recharge and for use by plants and soil animals.
3. Biodiversity and Habitat - Soil supports the growth of a variety of plants, animals, and soil microorganisms, usually by providing a diverse physical, chemical, and biological habitat.
4. Filtering and Buffering - Soil acts as a filter to protect the quality of water, air, and other resources. Toxic compounds or excess nutrients can be degraded or otherwise made unavailable to plants and animals.
5. Physical Stability and Support - Soil has the ability to maintain its porous structure to allow passage of air and water, withstand erosive forces, and provide a medium for plant roots. Soils also provide anchoring support for human structures and protect archeological treasures.

Soil is a living system of macroscopic and microscopic organisms that need food to eat and places to live. There are more individual organisms in a teaspoon of soil than there are people on earth; thus, the soil is controlled by these organisms. Managing for soil health (improved soil function) is mostly a matter of maintaining suitable habitat for the myriad of creatures that comprise the soil food web. Managing for soil health can be accomplished by disturbing the soil as little as possible, growing as many different species of plants as practical, keeping living plants growing in the soil as often as possible, and keeping the soil covered all the time.

Consider these four principles for building soil health:

1. **Manage More by Disturbing Soil Less - Physical soil disturbance, such as tillage with a plow, disk, or chisel plow, that results in bare or compacted soil is destructive and disruptive to soil microbes and creates a hostile, instead of hospitable, place for them to live and work. The soil may also be disturbed chemically or biologically through the misuse of inputs, such as fertilizers and pesticides. This disrupts the symbiotic relationship between fungi, microorganisms and crop roots.**
2. **Diversify with crop diversity - The key to improving soil health is assuring that the food and energy chains and webs includes as many different plants or animals as practical.**
3. **Grow living roots throughout the year - There are many sources of food in the soil that feed the soil food web, but there is no better food than the sugars exuded by living roots.**
4. **Keep the soil covered as much as possible - Soil should always be covered by growing plants and/or their residues, and soil should rarely be visible from above. This is true regardless of land use (cropland, hay land, pasture, or range).**

 Soil health is improved by disturbing the soil less, growing the greatest diversity of crops (in rotation and as diverse mixtures of cover crops), maintaining living roots in the soil as much as possible (with crops and cover crops), and keeping the soil covered with residue at all times. Drills, planters, seed, fertilizer, pesticides, livestock, fences, water, farm implements, etc. are all tools that can be used to manage soil habitat for the benefit of living members of the soil food web. Many soils have a water infiltration problem that causes a water runoff problem. If soil health is improved, the structure of the soil results in greater water infiltration, less runoff, less or no erosion, and reduced incidence of flooding and sedimentation. These circumstances protect against drought.

 Join the [Soil Health Community](https://connections.usda.gov/communities/service/html/communityview?communityUuid=54ff94be-4a42-4e69-9ba3-a3099f85768d) to continue the discussion.

**David Lamm  
National Soil Health and Sustainability Team Leader  
USDA Natural Resources Conservation Service**