

Building the Future on a Foundation of Soil Health

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What if I told you that the answers to the troubling problems of our times were within our grasp? That they are just beneath our feet? That the solution to world hunger, clean air and water, the cure for cancer, global warming, economic stability, and maybe even world peace lie in how we treat our soil?

Still true are the words of Franklin D. Roosevelt that, “A nation that destroys its soil destroys itself.” And, so timely is the designation of 2015, as the International Year of Soils. This year, the WORLD joins together to raise awareness of the importance of healthy soils for a healthy life, and to advocate for sustainable management of our soils. This year, let us all begin building the future on a foundation of soil health.



2015
International
Year of Soils

Soil health is not something new. Conservation activities that build soil health have been around forever. Ancient cultures recognized the importance of caretaking the earth. To consider, however, conservation in terms of soil health is a really exciting and different way of managing resources. It's considering ways to cultivate a healthy ecosystem for soil organism that allow us to harness their power for keeping plants strong and healthy.

Soil is a living system, and healthy soil, is full of life. Beneath our feet, millions of species and billions of organisms make up a complex and diverse mix of microscopic and macroscopic life. These bacteria, algae, microscopic insects, earthworms, beetles, ants, mites and fungi make up the greatest concentration of biomass anywhere on the planet. Estimates vary, but if you could weigh all the organisms in the top six inches of soil on an acre of land, you'd find they would weigh between 2,500 pounds to more than 5,000 pounds, depending on how healthy the soil is. That is a LOT of life!

What these creatures lack in size, they make up for in what they do. These microbes work to process soil into rich, dark, stable humus. As a group, they cycle nutrients, build the soil and give it structure. Healthy soils help to regulate water, sustain plant and animal life, filter and buffer potential pollutants, cycle nutrients, and provide physical stability and support for plants and structures. Through these actions they prevent disease and pest problems, make available nutrients and minerals necessary for plant growth, build biodiversity, store carbon, and purify water. They are less susceptible to erosion, generate less dust and runoff, and have better nutrient availability. Fortunately, improvement in soil health resulting from increases in soil organic matter can happen as quickly as three years.

For the less altruistic, soil health still makes sense. Healthy soil produces more, and will increase your profits not just by higher yields, but also through lower inputs of labor, fuel, fertilizer and pesticides.

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SECRETS
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SOIL

A FARMER'S FAVORITE COCKTAIL
MAY NOT BE WHAT YOU THINK.

INNOVATIVE FARMERS ARE BREATHING NEW LIFE INTO THEIR SOIL BY SEEDING A "COCKTAIL MIX" OF 6-12 PLANTS TO GET DIVERSITY ABOVE-GROUND, WHICH CREATES MUCH-NEEDED DIVERSITY BELOW THE GROUND. THROUGH THAT DIVERSITY, FARMERS ARE MIMICKING THE SOIL-BUILDING AND MICROBIAL-FRIENDLY CONDITIONS OF THE DIVERSE NATIVE PRAIRIES.

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While the path to better soil health is different for each farm and farmer, the principles of building healthy soils are the same everywhere.

Do not disturb. Disturbing the soil exposes fragile organisms to air and sunlight, and destroys organic matter, soil structure, and the habitat that soil organisms need. Tillage, the agricultural preparation of soil by mechanical agitation of soil through digging, stirring and inverting the soil, has been used traditionally to prepare fields for planting. Traditional thought was that tillage would open up the soil and allow water and plant roots to penetrate, however, we are now finding that tillage weakens soil by destroying the glues that soil biota create that give soil structure.

Residue and tillage management, managing the amount of crop and other plant residue on the soil surface by limiting soil disturbing activities, helps protect soil organisms. Residue and tillage management reduces erosion, increases soil organic matter content, reduces energy use, and increases plant available moisture. Changes as small as reducing the number of soil disturbing passes through a field can make a positive impact on soil health. Other techniques to reduce tillage and increase residues include using lower disturbance equipment to till, delaying and consolidating tillage operations, cutting or crimping a crop to terminate it instead of tilling it in, and strip till or no till farming.

Provide food and shelter necessary for the survival of living organisms. Keeping the soil covered, and growing a living root year-round are key for the survival of soil biota. Cover crops, grasses, legumes and forbs that are planted to provide seasonal cover, are an excellent tool for providing food and shelter for soil organisms. These plantings help reduce erosion, increase soil organic matter, capture and recycle or redistribute nutrients in the soil profile, promote biological nitrogen, reduce energy use, increase biodiversity, suppress weeds, manage

soil moisture, and reduce soil compaction. Cover crops provide living roots during times when a crop is not present, they help increase organic matter, and improve water infiltration.

Use plant diversity to increase diversity of life in the soil. Crop rotation is growing crops from different plant families in a planned sequence on the same field. This is an easy way to increase plant diversity. Planting different kinds of crops help balance plant available nutrients and manage plant pests (weeds, insects and diseases). A cover crop planted in a rotation is an excellent way to insert a different plant family into a crop sequence. Using cover crops that are a “cocktail mix” of 6-12 plants will attract a more diverse community of organisms and create a more complex food web. In addition, a mixed species cover crop can provide multiple benefits when they include ones that fix nitrogen, scavenge leftover nitrogen, control weeds, attract beneficial insects, and suppress plant pests.

Soil health isn't important just for farmers. Improperly managed grazing can disturb the soil. Forest systems that lack diversity also lack stability and function. Find out more about how you can help build the future on a foundation of soil health. Visit www.pia.nrcs.usda.gov, or contact your local NRCS Field Office.



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