USDA

United States Department of Agriculture

Natural Resources Conservation Service

Your Soil Health Journey

What to look for along the way!

Let's Talk Soil!

Everyone wants a quick fix—just add cover crops and switch to no-till and BOOM--better soil health, right? That would be great, but the truth is work and perseverance are required!

Soil health improvement is a long-term journey. You can make progress following the soil health principles (see graphic below)

The ramp-up of improved soil health starts by feeding and protecting SOIL BIOLOGY. Soil organisms are the driving force behind dynamic and vital soil processes.

They start a positive feedback loop that accelerates the transformations occurring deep within the soil and that leads to more improvements in soil functions.

Some tangible benefits from improved soil health may take 5-10 years to become visible or measurable, but others may appear within a single year.

This factsheet highlights improvements you can expect to see after adjusting your management system to incorporate soil health principles.

The First Year...

Initially, most benefits you will see are a result of keeping the soil covered with plant residues (living and decaying) and increasing the amount of living roots present in the soil year-round.

Soil cover helps keep soil in place and protects the soil surface from impact by raindrops. This impact can dislodge individual soil particles when falling on bare soil, causing EROSION.

Keeping the soil covered reduces soil crusting that causes germination and emergence issues at planting.

Years 1-5...

In the next few years, most benefits seen are related to increased biological activity as more diverse food sources become regularly available to soil organisms throughout more of the year (all fall and winter!) instead of only during the cash crop growing season.

Root exudates released by all those living roots are an important food source for soil microbes. More diversity in the types of plants grown (cover crops) increases the diversity of living organisms within the soil.

These organisms begin to thrive as soil habitat becomes more optimized for growth. Improved conditions include temperature and moisture, soil aggregation, pore space, infiltration and aeration. Soil biology—from earthworms to microbes—are now better able to break down and use plant residues without the need for tillage.

Stimulation of soil biology leads to improvements you can actually SEE. Increased biological activity along with less soil disturbance (tillage) allows more stable soil aggregates to form. Soil aggregates are made up of individual mineral particles (sand, silt, and clay) all held together with microbial glues, plant roots, and fungal hyphae.

Soils with good aggregation have pore spaces between the separate aggregates, which allows for better exchange of air and water from the soil surface and deep into the profile below. The other benefits of improved soil structure are better water infiltration, resistance to compaction, and reduced risk of erosion.

Better Soil Aggregation =

- **Better trafficability: early field ops & access after rainfall**
- **Reduced surface ponding**
- **Less runoff and/or clearer runoff H2O; less sediment lost**
- **Soil feels spongy to walk on; more solid & supportive when wet—better soil structure!**

5 + Years...

Applying soil health principles for five years or more has compounding and cascading results, making your soils even more habitable for friendly microorganisms.

At this point you should start to notice consistent increases in organic matter levels in topsoil layers and maybe even deeper down! This process will seem fairly slow if you rely on cover crops and no-till as your only tools to increase carbon. If you successfully integrate livestock and/or fertilize with manure, this process and benefits will SPEED UP even more.

At this time farmers may consider modifying their nutrient management plan. Why? Because soil biological activity has been RAMPED UP NATURALLY. You may now be able to rely on nitrogen fixation from a legume cover crop or you can add the remaining nutrients needed using livestock manure during grazing from live N sources.

More phosphorus, potassium, and micronutrients are available for cash crop uptake as soil microbial activity liberates more plant-available nutrients directly to crops during the growing season.

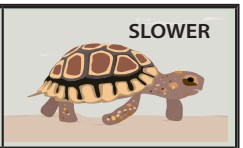
Your new, diverse microbial community also provides support to crops under attack by pathogens and diseases. Some soils under soil health management systems have been shown to suppress pathogenic populations as newly established diverse microbial communities provide competition. They can actually help keep pathogen populations in check.

Ready To Make Some Changes On Your Farm?

It can be challenging to change your farm operation and do things differently, but the benefits of resiliency and sustainability you can harvest on your family farm are valuable and profitable. Start small and as you figure things out, add more fields and higher levels of management to your operation.

NRCS Conservation Planners can help you develop a soil health action plan based on **your** goals and objectives. To start this "conservation conversation," call your local NRCS team and schedule an appointment today!

Visit www.il.nrcs.gov to learn more!

What Impacts the Rate of Change?	 FASTER	 SLOWER
Soil Texture	Heavy soils, high clay content	Coarse, sandy soils
Natural Soil Characteristics	Lower organic matter soils, forest soils (Alfisols)	High organic matter soils, prairie soils (Mollisols)
Previous Management	Eroded or degraded soils	Already using some soil health principles
Current Management	Higher level, bundled soil health principles—over- winter cover crop mix, high biomass, no-till, reduced chemical use.	Just meeting soil health principles—winter-killed, single species cover crop, reduced tillage

The timeframe to see soil health improvements is based on average Midwest conditions. Certain situations, like those described in this table, may cause changes that appear more rapidly or changes that require more time.

~Helpful Resources~

Midwest Cover Crops Council - *midwestcovercrops.org* - **Pocket Field Guide & Species Selector Tool**

NRCS Unlock Secrets of the Soil *https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/soils/health/*

Sustainable Ag Research & Education (SARE) *www.sare.org/Learning-Center*

USDA- NRCS Field Office Technical Guide *www.nrcs.usda.gov/technical/efotg*

NRCS CONTACT INFORMATION

Use this map to find your local District Conservationist & Field Office Team: *http://www.nrcs.usda.gov/wps/portal/nrcs/main/il/contact/*

Your local NRCS contact is:

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