

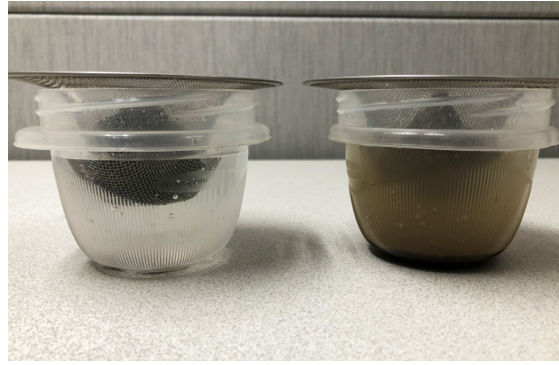
## Soil Health at Home

- » Use a spade or potato fork (potato fork works better when you are digging in a good root mass)
  - a. Look at the soil structure
  - b. Look for critters (especially earthworms)
  - c. Compare field sample to sample from an old fence row.

The samples below were taken in adjacent fields, less than 100 feet apart. The sample on the left is from a no-till and cover crop field, while the sample on the right is from a tilled field. The sample from the tilled field looks like a solid chunk while the no-till and cover crop sample has more structure to it. The no-till and cover crop system will continue to improve aggregation/structure over time.



- » Sink Strainer and Small Tupperware Container
  - a. Set a sink strainer in a small Tupperware container.
  - b. Place a chunk of soil in the sink strainer.
  - c. Using a water bottle with small holes drilled in the lid, simulate rainfall on the soil.
  - d. Continue until the soil is submerged in water.
  - e. Notice how the soil reacts to the water.
  - f. After about 5 minutes, flip the soil over onto a small plastic plate and observe what happens to the soil.



The sample on the left is from a no-till and cover crop field. The sample on the right is from a tilled field just across the fence. The no-till field has good aggregate stability which leads to cleaner water, reduced soil loss, better infiltration, more water holding capacity, better trafficability, and more! Tillage destroys the soil structure leaving it susceptible to damaging affects from rainfall, which can be seen in both of these pictures.



**For more information,  
contact your local NRCS office or visit:**  
[nrcs.usda.gov/wps/portal/nrcs/ia/soils/health/](http://nrcs.usda.gov/wps/portal/nrcs/ia/soils/health/)



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U.S. DEPARTMENT OF AGRICULTURE

## Soil Health: A Guide to Unlocking the Secrets in Your Soil



### Why Does Soil Health Matter?

- » Healthy soils are high-performing, productive soils.
- » Healthy soils reduce production costs—and improve profits.
- » Healthy soils protect natural resources on and off the farm.
- » Franklin Roosevelt's statement, "The nation that destroys its soil destroys itself," is as true today as it was 75 years ago.
- » Healthy soils can reduce nutrient loading and sediment runoff, increase efficiencies, and sustain wildlife habitat.



### What are the benefits of healthy soil?

- » Healthy soil holds more water and loses less water to runoff and evaporation (1% OM increase equals 20,000 to 27,000 gallons per acre more water in the top 6" of soil).
- » Organic matter builds as tillage decreases and plants and residue cover the soil. Organic matter holds 18-20 times its weight in water and recycles nutrients for plant use.



## The 5 Soil Health Principles

1. **Minimize Disturbance (Protect the soil)**
  - » Physical (tillage), chemical (overuse of fertilizers and pesticides), biological (overgrazing or fallow systems)
  - » Tillage destroys soil structure and habitat for soil organisms
2. **Maximize Cover (Protect the soil)**
  - » Reduces erosion, runoff, and evaporation
  - » Increases infiltration, habitat for soil organisms, and food for soil organisms
  - » Minimizes large swings in soil temperature
  - » Helps mitigate compaction from machines and livestock
3. **Maximize Biodiversity (Feed the soil)**
  - » Stimulates below-ground diversity
  - » Improves nutrient cycling
  - » Can help break pest and disease cycles
  - » Increase predator & pollinator populations
4. **Continuous Living Roots (Feed the soil)**
  - » Provides habitat and food for soil organisms
  - » Helps build soil structure
  - » Increases organic matter
5. **Integrate Livestock (Feed the soil)**
  - » Increases soil biology
  - » Helps with nutrient cycling

**No-till farming** helps protect the soil by leaving an armor of residue on the surface. The residue absorbs the impact of raindrops to prevent soil from being dislodged as well as reducing the impacts of water running across the surface. The residue also helps reduce temperature swings in the soil which provides a more stable environment for young seedlings. This also is helpful during the hot summer months as the residue protects the soil from the hot sun which can kill soil biology and evaporate precious moisture during dry periods.



**Adding a cover crop** to a no-till system provides even more benefits. Cover crop roots give off sugars that feed soil biology. The soil biology then secretes glomalin, a glue like substance that helps bind soil particles together to form aggregates. Building soil aggregates leads to increased infiltration, increased water holding capacity, increased organic matter, and increased nutrient cycling and availability within the soil.



## Getting Started

- » Plan ahead
- » Discuss ideas with an agronomist, NRCS, or a producer that is already doing soil health activities
- » Start small — Try a field or two to start
- » Start with cereal rye or wheat ahead of beans the first year
- » Oats or wheat ahead of corn the second year as oats winterkill and wheat isn't as aggressive as rye
- » Understand that your management will change
- » Patience—soil health doesn't happen overnight
- » Continue to learn and adapt

## Seeding Methods

- » Drill—Best coverage and good stand, but slow
- » Planter—Good coverage and stand, faster than drilling, may require specialized seed plates
- » Vertical Till (VT) or harrow with attached or broadcast seeder—Fast but does negate some soil health benefits
- » Hagie/Highboy—Allows to get covers in earlier, better seed establishment than airplane
- » Airplane—Fast, can get covers on earlier, establishment success greatly weather dependent
- » Drone – Can get covers on earlier, get places a plane can't get to, can only hold limited quantities of seed

## Termination

- » Winterkill—Non-winter hardy species only
- » Chemical—Most common termination method
- » Roller Crimper—Normally only used by advanced cover croppers, must wait until flag leaf stage of the cover crop, does not work on all cover crops