

soil



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CornsTalk

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Where the
food chain
begins.

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The food chain begins with soil.

Nebraska farmers have known for decades that soil quality is the very foundation of sustainable crop production. We simply cannot produce the food we need on the scale we need without soil.

Soil is the growing medium for much of the world's food. Protecting, preserving and nurturing soils is critical to our ability to produce a reliable, sustainable food supply.

In this issue of *CornsTALK*, you'll discover how Nebraska corn farmers are continually improving their management of this precious resource.

What makes a

Soil health is defined as the continued capacity of a soil to function as a vital living ecosystem that sustains plants, animals and humans. According to Dr. Nick Goeser, executive director of the Soil Health Partnership, there are three major components that determine the quality or "health" of a soil:



Physical: The ability of the soil to hold water; the overall stability of the aggregate; the physical nature of the soil in terms of its texture, structure and compaction.

Biological: The presence of beneficial bacteria and fungi; organic matter such as roots and decaying vegetation; living organisms such as worms and insects.

Chemical: Levels of fertility including nitrogen, phosphorus, potassium and micronutrients; soil pH; and the soil's cation exchange capacity, a measure of the "electrical" environment within soil that determines its ability to retain water and nutrients.

About 45% of a healthy soil is actually porous space made up of air or water. That's the space where plant root systems can grow and where beneficial microbes can thrive.

"The key to soil health is to strike the right balance between all of these components," Goeser said. "There is no one solution that works for all fields since soil types and characteristics vary greatly—even within the same field. But helping farmers better understand what impacts soil health and how they can better manage their soils is a huge step in terms of sustainability of this precious resource."

"The key to soil health is to strike the

soil “healthy?”

Standing in a soil pit near Shelby, Neb., Dr. Nick Goeser of the Soil Health Partnership speaks to a group of farmers about ways to improve soil quality.



right balance between all of these components.”

Dr. Nick Goeser | executive director of the Soil Health Partnership

A unique partnership focused on improving soil health.

The Soil Health Partnership is a farmer-led initiative focused on identifying, testing and measuring management practices to improve soil health and enhance sustainable agricultural production.

Many farmers across the country are implementing innovative management practices that result in economic and environmental benefits. The Soil Health Partnership builds upon the work of these farmers to provide connections between on-farm practices and improving soil health.

The following organizations provide funding and/or technical support for the partnership:

- Monsanto
- U.S. Department of Agriculture (Natural Resources Conservation Service)
- Midwest Row Crops Collaborative
- Walton Family Foundation
- The Nature Conservancy
- Environmental Defense Fund



“We have assembled a diverse group of excellent partners in this program,” said Dr. Nick Goeser, executive director of the Soil Health Partnership. “They each bring a unique perspective to the program that challenges us to think about working with farmers and agronomists in new ways. Their input and engagement continues to be invaluable in our efforts to tackle difficult issues and develop effective solutions and strategies.”

Discover more at: soilhealthpartnership.org

What's the difference between soil and dirt?

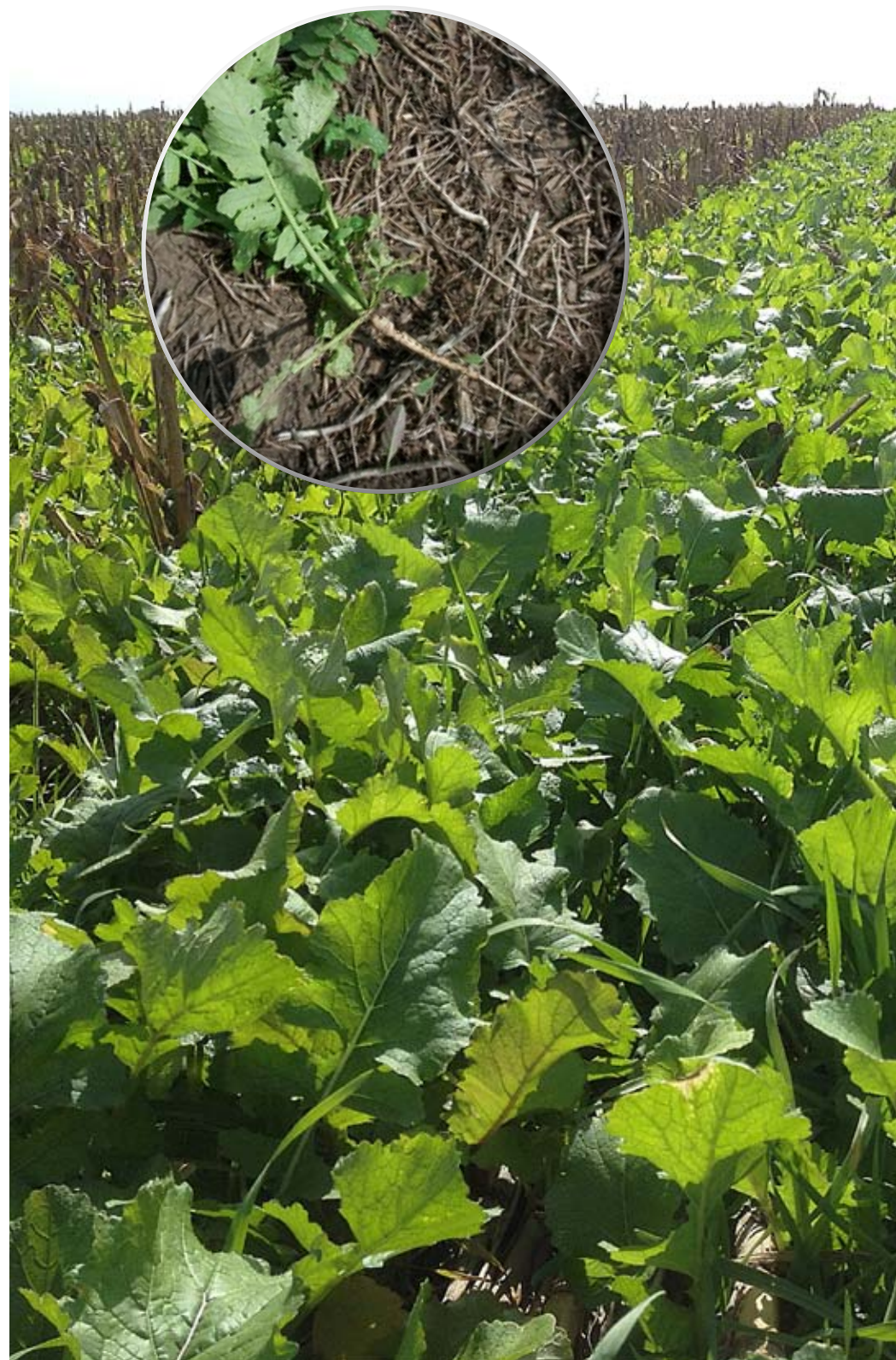
First of all, there is a difference. And according to Neil Dominy, Nebraska State Soil Scientist, the answer is pretty simple.

"Soil is in place. Dirt isn't," Dominy said. "Soil has integrity and has structure, living organisms, and has been in place over time."

Dirt, on the other hand, is mobile. "Dirt is what's on the road, the bottom of your shoes or in the air. It's out of place."



How radishes impr



love soil quality.



On his farm near Shelby, Neb., Greg Whitmore grows corn, soybeans —and radishes.

Greg Whitmore of Shelby is enrolled in the Soil Health Partnership, a national data-driven initiative that encourages farmers to incorporate strategies to improve soil health on their land. These strategies include growing cover crops, practicing conservation tillage and advanced nutrient management. Cover crops such as radishes, turnips, rye and other species are not only helping Whitmore improve the overall quality of soil on his land. Cover crops are also helping him keep the soil he has.

“I got tired of seeing that soil blow away in the spring or wash away down the hill during a hard rain,” he said. “Cover crops have helped stabilize the soil and improve its overall quality. We’re already seeing significant return in terms of productivity and reduced input costs.”

“The cover crops also suppress weed growth, so I’m saving money on herbicide and reducing impact on the environment by reducing chemical use,” Whitmore added.

Typically, Whitmore plants the cover crops immediately after harvesting his primary cash crop. The cover crops grow in the months after harvest, keeping the soil “active” long after the primary crop is taken out of the field. When the cover crops eventually die off in the winter or are killed prior to spring planting, they add organic matter to the soil as they decay.

Importantly, the cover crops also help the soil retain moisture and withstand erosion during winter winds and early spring rains. As the roots burrow into the soil, they create “channels” for better water infiltration, nutrient dispersion and soil stability.

Radishes and turnips have deep tap roots which capture nutrients that may lie beyond the reach of the primary crop such as corn or soybeans. By absorbing those nutrients, the cover crop brings those nutrients closer to the surface, where they become available once the cover crops die off.

“I see the use of cover crops as a key sustainability strategy for my farm,” Whitmore said. “I reduce erosion, reduce weed pressure, improve the soil’s nutrient value and enhance soil moisture. It’s a systems approach to soil health that isn’t just about cover crops, but requires holistic management of fertility, water, nutrients, tillage and other practices.”

“I see cover crops as a key sustainability strategy for my farm. Cover crops have helped stabilize the soil and improve its overall quality.”

— Greg Whitmore

Soil as a carbon sink.

Carbon sinks are natural systems that absorb carbon dioxide from the atmosphere, thereby reducing the concentration of greenhouse gases into the atmosphere which have been identified as a factor in global warming. Carbon sinks tend to absorb—or “sequester”—a substantial volume of carbon dioxide while releasing a minimal amount.

Soil, along with oceans and forests, are the three largest carbon sinks on the planet. As a result, initiatives focused on continual improvement of soil quality are being viewed as an important strategy in addressing climate challenges.

“It’s becoming more clear that agriculture is about much more than simply growing an abundant supply of food,” said David Merrell, a St. Edward farmer and chairman of the Nebraska Corn Board. “Our initiatives to continually improve soil health are also important to the health of our planet.”

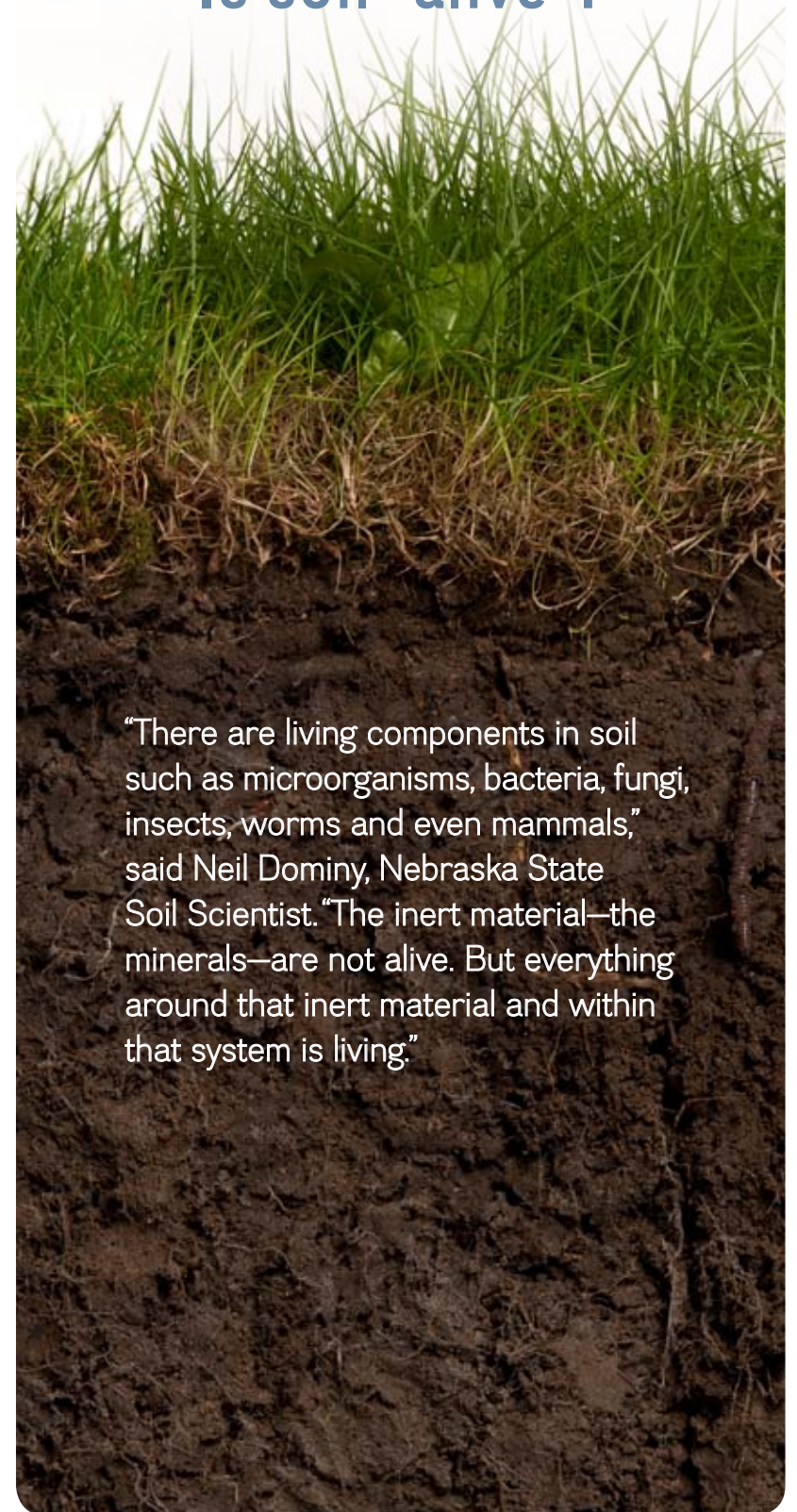
Carbon is the main component of soil organic matter and helps give soil its water-retention capacity, its structure, and its fertility. Through photosynthesis, a plant draws carbon out of the air to form carbon compounds. What the plant doesn’t need for growth is exuded through the roots to feed soil organisms, whereby the carbon is “fixed” or stabilized.

Healthier soils with more organic matter and improved integrity have greater carbon sequestration capability. That’s why many scientists and environmentalists see soil management as a critical strategy in reducing greenhouse gases.





Is soil “alive”?



“There are living components in soil such as microorganisms, bacteria, fungi, insects, worms and even mammals,” said Neil Dominy, Nebraska State Soil Scientist. “The inert material—the minerals—are not alive. But everything around that inert material and within that system is living.”

Why most farmers don't plow their fields.



Ever wonder why more and more farmers are leaving “trash” in their fields after harvest? Those corn stalks, corn cobs and leaves are called “residue”—and they are helping farmers improve soil quality and manage their crops and fields in the face of extreme weather events.

Plowing the soil has been compared to a tornado ripping through a city. While that may be an extreme analogy, plowing does disrupt the living organisms in the soil and exposes more of the soil to the air, which accelerates evaporation and loss of essential soil moisture and nutrients.

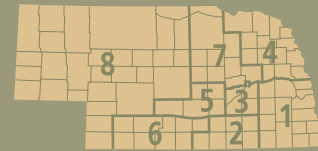
As a result, many farmers have adopted no-till or minimum tillage practices which leave residue in the field—and that leads to a wide range of benefits:

- Residue **captures snow** during the winter which improves the moisture profile in the field
- Residue provides soil stability to help **reduce erosion** from wind and rain
- During spring planting, the residue helps **retain moisture** to help the new seeds germinate and the young plants thrive
- Decaying residue **adds nutrients** and organic matter to the soil, which improves overall soil health and reduces the need for additional fertilizer
- Reduced tillage means **fewer trips** across the field which reduces soil compaction and energy consumption

Some farmers put cattle on their cornfields in the fall and winter to graze on the stalks and residue. The manure from those animals adds nutrients and organic matter to the soil as well.

No-till and minimum tillage practices are also helping farmers cope with the advent of extreme weather events such as torrential rains and extreme drought by preserving the integrity of the soil, reducing erosion and retaining as much moisture in the soil as possible.

“Clean, groomed fields at planting time used to be a matter of pride for farmers in my grandfather’s time,” said Brandon Hunnicutt of Giltner, a farmer-director on the Nebraska Corn Board. “But farmers are always adopting new practices, technologies and ideas to help ensure sustainability and preserve our resources for generations to come. No-till fields may not look as pretty as the pristine, tilled fields of the past, but the benefits clearly outweigh the aesthetics.”



District 1
Dave Bruntz
Friend, NE



District 6
Dennis Gengenbach
Smithfield, NE



District 2
John Greer
Edgar, NE



District 7
David Merrell
St. Edward, NE



District 3
Brandon Hunnicutt
Giltner, NE



District 8
Jon Holzfaster
Paxton, NE



District 4
Debbie Borg
Allen, NE



At-large
Alan Tiemann
Seward, NE



District 5
Tim Scheer
St. Paul, NE



Nebraska Corn Board members represent the eight districts indicated on the map and are appointed by the Governor. One at-large member is elected by the other Board members.

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