




**Field Day Held near
Selinsgrove
Promoting Soil
Health, Cover Crops**

**Soil Health
Toolbox** 
FIELD DAY

The Snyder County Conservation District (SCCD) held a Soil Health Toolbox Field Day event at the Middlecreek Valley Antique Association Grounds, along Old Colony Road, Selinsgrove on April 21, 2022. Twenty-eight (28) farmers, landowners, consultants, and conservationists attended this field day.

Farmers learned about:

- How their farm's "soil herd" can work for them.
- Improved soil health can minimize soil and nutrient losses.
- Increasing the amount of time plants grow on a field improves (i.e.: cover crops) soil health.
- How better soil health can improve soil water infiltration and resistance to erosion.



A rainfall simulator, supplied by the Chesapeake Bay Foundation (CBF), showed farmers how different soil conditions, tillage histories, and cover cropping/crop residue, effect soil runoff and soil infiltration during a very heavy 1 inch per 2 minute rain event.

The five scenarios (as shown in the left photo, from left to right) shown were:

- Rotational grazed, 5 year-old mixed grass pasture
- No-till planted triticale cover crop after sweet corn residue
- No-till corn residue with history of prior no-tilled crops
- December no-tilled rye cover crop after wheat/double cropped soybeans with a history of prior no-tilled crops
- Triticale cover crop seeded after tilled squash & other vegetables

Above Photo: Bill Chain, CBF PA Ag. Program Manager & Associate Director, describes the five scenarios before he runs the rainfall simulator.

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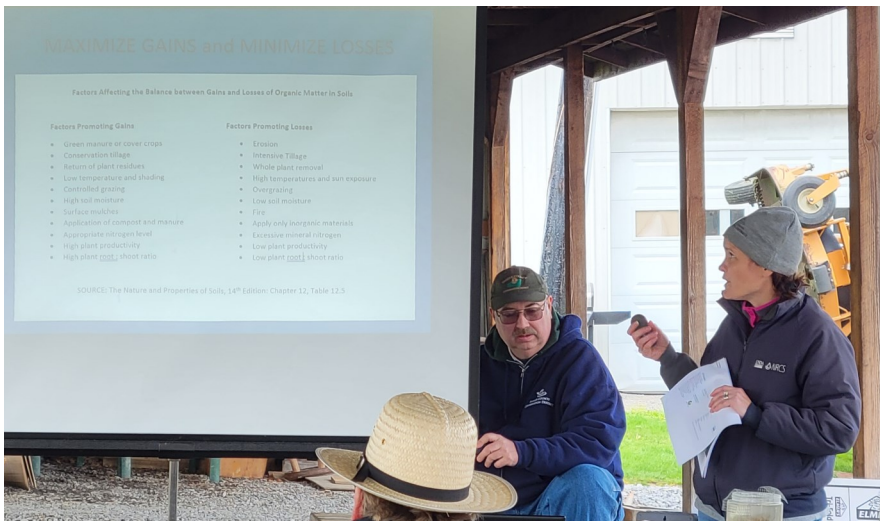
Top Left Photo:

Notice the two rows of water containers. The front row of containers (red arrow) collect rainwater that runs off the soil surface. In this specific demonstration, hardly any of the five soil examples yield stormwater runoff, which can hold sediment (and potentially phosphorus laden) water that ran off the fall tilled tray.

The back row of containers (yellow arrow) collect rainfall that infiltrates through the soil. Notice that these plants and residues allow less water to runoff, protect topsoil from erosion, more water to infiltrate, and enable the soil to hold water longer during many dry events.



All five soil scenarios were collected from actual farm fields and pastures the day before the field day in Snyder County.



Melissa Erdman, (left photo: far right) USDA-Natural Resources Conservation Service District Conservationist, Mifflintown Field Office, gave a presentation titled “How to Extend Energy Capture and Convert It to Soil Carbon.” The key for improving soil health is building soil carbon. She showed a graph that the U.S. Corn Belt has only 61% of soil carbon compared to 1907 measurements.

She explained how increasing the amount of time a growing plant is capturing sunlight energy and

converting it to carbon to build soil structure for improved water holding capacity. This also feeds the soil biology for better nutrient availability for plant growth and production. Farmers need three management techniques and mindsets achieve this according to Erdman. The three concepts to increase soil carbon are:

1. Cover the soil with crop residue and living plants and roots year-round.
2. Keeping the soil undisturbed (no tillage) at all times, or at least minimize tillage.
3. Increase plant diversity through more varied crop rotations and interseeding and/or plant multi-species cover crops.

Erdman also described valuable resources on cover crop species selections such as USDA-Agricultural Research Service’s Cover Crop Chart, Green Cover Seeds’ Smart Mix webtool, and Northeast Cover Crops Council’s webtool.

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Barry Spangler, SCCD Ag. Conservation Technician, gave a presentation (left photo, far right) on how to better manage farm soils and conducts a soil health demonstration comparing neighboring similar soils with different tillage & vegetation managements.

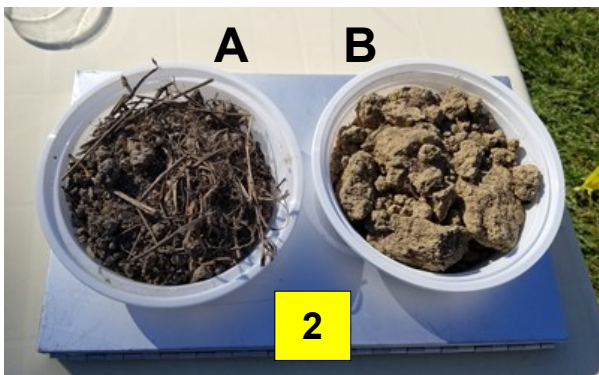
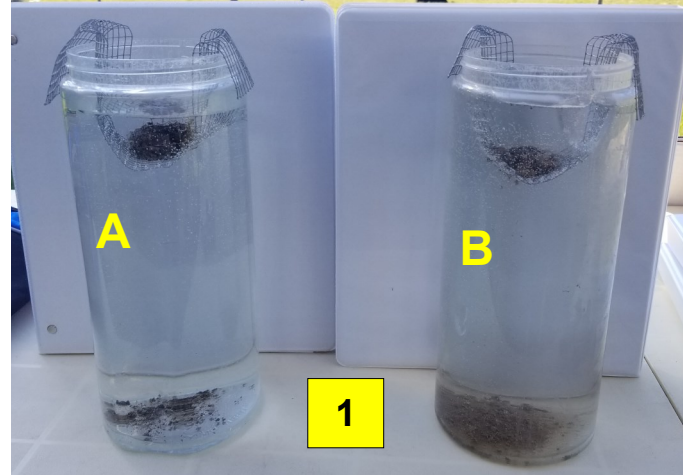


Photo “1” shows results from a soil health slake test demonstration conducted 1.5 hours before these photos were taken. It compares no-tilled soil (“A,” not tilled for at least 20 years and currently in permanent grass hay for at least 5 years) and continuously conventionally tilled soil (“B,” currently with no overwintering cover crop after annual small grain). Both neighboring soils were identified as the same soil type as per “Custom Soil Resource Report” created by USDA’s Web Soil Survey.

In Photo “1,” notice that “A’s” soil clump on the wire mesh on top is still holding together due to the soil organic matter allowed to accumulate over time. In “B,” the soil clump has almost disintegrated at the wire mesh on top due to lower organic matter content. The jar at left with the “A” soil shows that it is more resistant to degradation by water.

Notice on Photo “2” the corresponding dry soils on how each are structured different due to management (not due to different soil types) and the difference in color between the two. “A” is much darker due to a higher organic matter compared to “B.”

Tillage allows the oxygen to burn the organic matter, The lost carbon is released into the air instead of binding the soil and becoming a source of plant nutrients and other soil organisms’ feedstuff. Tillage also hinders the creation of stable organic matter that help keep the soil more intact and allow more water to be infiltrated into the soil instead of runoff off potentially causing soil erosion and stream sedimentation.

Recent research is showing that by eliminating tillage, this allows certain fungal species to cooperate with plants to reach and collect plant nutrients more efficiently. Also, farmers are noticing that cover crops can extend the period where green plants can convert sunlight into energy that feeds beneficial soil organisms and help supply nutrients for future crops.

Thanks goes out to USDA-NRCS Field Team #3 staff (covering Juniata, Mifflin, Snyder & Union Counties) for allowing the Conservation District to borrow its soil health demonstration equipment. Note: Photos “1” and “2” taken from November 2021 SCCD’s Soil Health Field Day Event.

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Lisa Blazure (*standing right, top photo*), Soil Health Coordinator, Stroud Water Research Center, and Coordinator, PA Soil Health Coalition, gave a presentation about, until recently, the mostly unrecognized soil biology (or “soil herd” i.e.: fungi, bacteria, protozoa, earthworms) that works cooperatively with plants to extract soil nutrients and soil mater more effectively. In essence, our soils and its biology can be compared to the “bugs” inside a cow’s rumen.



Lisa also indicated that research is showing that by:

- Eliminating tillage,
- Increasing the timeframes a living plant grows on a crop field (i.e.: cover crops sowed after a harvested crop, permanent pastures), and
- Adding additional plants into a crop rotation to diversify the soil “herd” (i.e.: expanding more than corn and beans, adding additional species to a cover crop),

This will enable the soil to work more with the farmer instead of against the farmer with increased soil organic matter and increased soil water holding capacity.

Participants also visited a soil test pit dug at the Association Grounds. Sjoerd Duiker, PhD, Professor of Soil Management & Applied Physics, Penn State Department of Plant Science, led the discussion on soil formation and visual clues that the fields can show us such as compaction issues, organic matter, earthworm burrows.



Dr. Duiker (*standing in front right, bottom photo*) then led the group to a no-till transplanter brought by Alan Ard, of Ard’s Market, Lewisburg. Before the field day started, this piece of equipment was pulled by a tractor. While no young plants were used, participants were able to see a thin slit where plants could be transplanted without prior tillage. While used on a permanent grass sod, the transplanter would work much better in a recently killed cover crop field (either by herbicide or crimping). By using the no-till transplanter, a farmer would be able to plant live seedlings, (such as tomatoes, gourds, watermelon, pepper, cucumber) without tilling the ground and needing plastic mulch. The killed cover crop would act as a mulch. Several farmers, including Ard, use this method to plant many of their horticultural crops.

Information about soil health can be gathered from your local conservation district, NRCS Field Office, or through websites through the PA Soil Health Coalition. For more information about his event, contact Barry Spangler, SCCD, at 570-837-3000, x5 or agtech@snydercd.org.

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May 2, 2022