

Piecing Together the Puzzle of Soil Health

Soil health is constantly being talked about in the Conservation Corner, in agriculture magazines like Successful Farming, Progressive Farmer, and in crop/livestock specific magazines like Dairy Today or Hoard's Dairymen. While I wait for you to get over the shock of magazines for farmers, soil health is important and it's not a magic bullet for all that ails agriculture. It's hard work, trial and error, and still we're in it's infancy of understanding how all the parts of the puzzle work together.

What we do know is that more trials, more research and more science is needed to fully understand it. It's why Conservation Districts, Michigan Agriculture Environmental Assurance Program (MAEAP) technicians, MSU Extension educators, and Natural Resource Conservation Service (NRCS) are working with farmers to promote soil health, do research, and incentivize soil health practices.

It's also why Kalkaska Conservation District is putting on a Soil Health Day July 25 at Iott's Farm in Kalkaska. Jodi DeHate, MAEAP technician, has been helping with some of the field day. Iott's Farm is a seed potato farm that also raises wheat and rye. They are MAEAP verified and have received the 4R's Advocate Award. 4R's pertains to nutrients namely fertilizers. The 4Rs of fertilizers are: right nutrient source, right rate, right time, and right place. So this farm is doing things right, but they want to do more.

Parts of the Soil Health Puzzle

Soil health is the big picture term or the edges of the puzzle. It holds these pieces: organic matter, reduced tillage, soil carbon, topsoil, soil microbes, crop rotation, grazing, and probably a few others.

Let's define a few. I'm hoping by now you know that reduced tillage means strip tillage – tilling only strips where the crop like corn will grow; vertical tillage- tilling only the very surface of a field; or no-till.

Organic matter is this carbon holding, sponge like, microbe haven in the soil. It's basically fiber in the soil that microbes interact with decaying matter which results in carbon being held in the soil, and water being held in the soil. It's measured in percentages. Organic matter is lost through tillage and it builds really slowly.

Topsoil is the top 4-12 inches of soil where our food comes from. Tillage and erosion have reduced our topsoils over the last 100 years by 50%.

Crop rotation is the practice of rotating crops in a field. For instance, local dairy farmers raise 3 years of corn and then switch to 3-4 years of alfalfa and perhaps a year of small grain like wheat or oats.

Grazing is the act of livestock, mostly cattle, eating plant matter and walking in the pastures to do so.

Soil microbes- these are microscopic livestock. They help plant roots uptake nutrients in the soil and create organic matter. In a healthy soil up to 16,000 pounds of microbes/acre can exist. That's the weight of one elephant!

Potatoes & Soil Health

Iotts raise seed potatoes meaning they are raising potatoes that will be used by other potato farmers to produce potatoes for eating. As potatoes are a root crop the soil health isn't always the best. Just the digging of any root crop can reduce organic matter, let alone the tillage used to prepare the soil.

Iott's, like many farmers across the nation are aware that organic matter is really helpful to crops. So with the help of Dr. George Bird and Marisol Quintanilla Tornel, both MSU Educators and researchers the farm has planted different plots of cover crops to see which will give them the best results. The farm also used Dairy Doo from Morgan's Composting to add more microbes. Soil samples of the plots were taken in early June and sent off to Cornell University for extensive soil testing including some soil health metrics.

The goal of this program is to educate others but really to help the farm figure out what's best for them and how it can be replicated on similar soil types to increase soil health in a similar cropping system.

Figuring out how to best implement soil health practices isn't always easy.

Steps to get started

If you farm, how do you get started with soil health practices? The best advice, start small. Experiment. Talk to resources that can help you. Read farm magazines. Cover crops are probably the easiest way to start your journey into soil health. Pick an easy one like rye. It establishes easily with more flexibility than other cover crops. You will have to determine how to terminate it in the spring. Some like oats will terminate over winter and it's an easy starter. But don't think cover crops are all rainbows and unicorns, because they aren't. From talking to farmers that have started using cover crops, they have really seen the difference in water holding capacity on their farms and a lot less erosion.

Thinking about reducing tillage? Talk to other farmers that have reduced tillage. No till can be done here, but it's definitely different. It's a huge mindset change in terms of management. Strip till is probably a better bet.

One thing to consider- keep your soil on your fields. Your topsoil is worth \$20-\$50 a ton. Most farms here are losing 1-3 tons/acre according to the wind and water erosion equations used. So stop letting your money leave the farm!

Considerations for our area.

With dairy farms, corn is chopped in September and October, with this crazy year it's going to be later that is if we don't get an early frost. So how in the world are cover crops going to be planted? One word: Interseeding. Broadcasting into knee high corn might work but the seed to

soil contact isn't as good. Some folks have seed flown on via airplane. There are also some toolbars that can help you get the seed to the ground.

At a cover crop field day last year there was some joking about mixing rye seed with liquid manure. Apparently that's been done in other states but there's some equipment and more management when spreading manure with rye seed in it.

Termination of cover crops can be an issue especially in a wet spring like this year. And always check what herbicide you use so that it doesn't affect your actual crop. Or what residual could hurt your cover crop when that's planted.

Why even?

Soil health and all that it encompasses can really make a farm more sustainable. Using less fertilizers, less diesel, reduce runoff of not only soil, but fertilizer - especially phosphorus and-nitrogen, holds more water in place, and helping increase yields.

Again, all of this takes work, dedication, money, and innovation. Reach out to agency folks to help you get started and to other farmers that are doing something different. Get their thoughts. Go to cover crop field days (hint, hint).

To attend the cover crop field day please contact <https://kalkaskaconservation.org/events/shfd>

There is a \$10 fee for the day, but a delicious local meal is provided. Directions and agenda are found through the link above.

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Soil Health Day flyer – Credits to Kalkaska Conservation District



Photo Credit: Jodi DeHate
Cover crop of tillage radish, annual rye grass in a local field fall of 2018



Photo credit: Jodi DeHate

Baby tillage radish in local field fall of 2018