Soil Health – The Framework

It is virtually impossible to pick up any agricultural publication and not find at least one article talking about soil health. But really what is soil health? One of the more recent definitions states; "Soil health is the capacity of soil to function as a living system, to sustain plant and animal productivity, maintain or enhance water and air quality, and promote plant and animal health." This is a very concise explanation, but we need tangible benefits, reasons and strategies that can be used on the farm to improve soil health. Leaders in the industry believe that moving towards a more focused and sustainable approach to soil health could make growers more resilient going forward.

So now let us consider what good soil health looks like and why a grower might implement practices that improve soil health. Good soil health will:

- **Improve water infiltration** due to improved soil structure, increased soil organic matter and reduced compaction of a soil.
- **Increase water holding capacity** meaning a soil can retain more water (like a sponge) for crop production especially during periods of low rainfall.
- **Create diverse communities of soil organisms** which have been shown to help alleviate plant disease, insect and weed pests as well as forming symbiotic associations with plant roots.
- **Store soil organic carbon** which is the main source of energy for micro-organism populations as well as removing that carbon from the atmosphere (greenhouse gases).

Now with an understanding of what soil health is and why a grower would consider improving their soil's health, how could they go about doing that.

1. **Minimize soil disturbance** –Less microbial disruption and more capacity for those microbes to promote crop development. Less disturbance also improves overall physical, chemical, and biological properties of a soil.
2. **Keep soils covered with plant residue (known as soil armor)** -This stabilizes soil temperature and reduces erosion creating favorable conditions for soil micro-organisms who in turn recycle nutrients, combat pests, and create pores for plant roots to develop.
3. **Maintain living roots year-round (even in cold climates)** -Roots provide food sources for beneficial bacteria and mycorrhizal fungi. Roots help overall soil structure and are a key ingredient for increasing soil organic matter.
4. **Increase plant diversity** -Studies show that soils are more productive when there are various plants/ roots leading to an assortment of microbes. This is accomplished through a diverse rotation and, or multi species cover crops.
5. **Incorporate livestock where possible** – This could be any type of off-season grazing, forage crops or even applying manure. These options improve nutrient cycling and stimulate nitrogen fixing bacteria activities.

Sounds interesting, right? But, will improving soil health make more money, save more money, gain access to more markets, reduce workload, improve quality etc. etc. The answer is **highly likely**! Improving soil health should capture some of these benefits in the long-term even though there may be short-term setbacks when learning a new management strategy. Change is difficult and can be risky thus requiring a thorough understanding of the soil health strategy with a strong commitment to the final goal. Studies have shown that as soil health improves, the soil's capacity to produce increases while potentially requiring the same or less inputs. More and more end users are putting emphasis on "how" was it produced instead of "how much" does it cost with sustainable and environmentally friendly practices leading the list. And finally, reduced tillage and potentially fewer pesticide applications mean less man and machine hours at the end of the season.

As stewards of the land, farmers want to leave things better than they found them. What better way to create a legacy than investing some time and focus on building soil health?

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