

Title: How Healthy is Your Soil?

Soil health is incredibly important to all of us.

Soil is not just important to farmers. Soil health is important to anyone who eats.

FYI, this is not going to be soil science. I do not understand the topic well enough for that. I simply hope to give you some information and tell you where to get more.

Good farmers have known for centuries, actually millennia, that livestock combined with crop rotation can maintain soil health and productivity indefinitely.

Fifty years ago, virtually all Midwest farmers raised livestock and practiced crop rotation. From a soil health standpoint, that was good.

Now, very few do.

Back then, we were taught to think of the soil as a mixture of chemicals. I believe most farmers and fertilizer dealers still think of soil that way.

We believed that organic material mattered but mostly for soil tilth and moisture holding.

The biological life of the soil, such as bacteria, fungi, nematodes and worms was not really a consideration.

In the early 1970s, Earl Butz was Nixon's Secretary of Agriculture. Earl told us that there would never again be a grain surplus. He said that we should plow up the fence rows and plant all the acres we could.

He left office in 1976. A few years later grain prices and the farm economy in general collapsed into a 20 year slump.

I listened to Earl. I plowed all the Sherburne County sand I could buy or rent.

In the 1970s, I got 200 bushel corn yields. It required irrigation and lots of fertilizer. The new weed killers, Atrazine and Roundup were of great help too.

We understood soil as containing so many pounds of nitrogen, phosphorus, potassium etc per acre.

If a crop farmer hoped to harvest a grain crop that needed "X" pounds of nitrogen, he added what the soil lacked. Plus a bunch more to account for natural losses.

I farmed that way.

I knifed in anhydrous ammonia. At first, I was delighted that the ammonia killed the pocket gophers.

Later I realized that it was killing everything that lived in the soil. Not just gophers, bull snakes and mice.

The ammonia killed everything. Earthworms, bacteria, good bugs, bad bugs, all gone.

After the third year, the sand became so coarse and loose it would blow in any wind.

To remedy that, I pioneered no-till planting in this county. That stopped the sand from blowing.

Somehow, the organic content of the soil kept falling anyway.

I was not worried. I told people that all I needed the sand to do was hold the plants upright.

After about five years, yields starting falling off. The plants were running short on trace elements.

I added magnesium and a few other elements to my fertilizer. It became a treadmill. Every year something else turned up missing.

After almost 20 years of chemical farming my soil was not just dead, it was coarse and sterile. The soil PH was in the low 5s. It was hard to grow sandburs.

I admit that this sand should never have been plowed in the first place.

I also realize that the great prairie loam soils of southwestern Minnesota, Iowa and the eastern Dakotas are different from my sand. Those soils are better able to endure tillage and continuous cropping.

Nevertheless, history, not just our history but world history tells us that no soil can be abused indefinitely.

That is the bad news.

It takes centuries to build topsoil. But building topsoil is not exactly the same as restoring soil vitality and natural fertility.

The good news, and the reason I am writing this article is that great farmers in a number of locations are proving that soils can be revitalized in only a few years.

The secret is not a secret at all. It is the old recipe of crop rotation and organic material buildup combined with the clear realization that plant biology is crucial.

There are billions of microbes in a cubic foot of healthy soil. Those microbes (microorganisms) are bacteria, fungi, protozoa, microscopic creatures both plants and animals.

Those creatures are essential for making absorbable nutrients available to plants.

They work, as any symbiotic biosystem works, to keep things in balance. The natural habitat for these microbes is organic material. Organic material that is primarily last year's roots.

It is in the microbes' interest to produce nutrients that plants need. Healthy plants mean more roots. More old roots mean more microbe habitat.

Under the right soil conditions of organic material, temperature and moisture, that is what they do.

It turns out that the old, actually ancient system, of animals and crop rotation had it right.

The mental breakthrough for me is to understand soil as a biological rather than a chemical system.

With that perspective and some new information, the process and the pieces all fit together.

I have been working for over 20 years to restore my land to pasture. Most of it is doing well. I have nice restored native prairie pastures, good legume mix pastures and blended pastures. Even so, there are trouble spots. There are areas that could be much better. I think this new perspective will help me improve all my soil. I only wish I had learned what I am now learning 20 years ago. The restoration process might have gone much quicker and much smoother.

Most of you reading this are bison raisers. That means you have manure and grazing lands in your farming mix. You are probably doing a good job of managing your soils now. Nevertheless, it is likely you can benefit from these new insights.

There are plenty of opportunities to learn more.

This information has gone mainstream.

The USDA website and your NRCS reps can provide tons of information.

The most recent issue of the Minnesota Volunteer from the DNR has a good overview article. You can locate that article with a simple internet search in a few clicks.

If you have time for seminars as I do in the winter, there are many opportunities.

Charlie Johnson, SD Farmer of the Year for 2013 spoke this winter at a conference in St Cloud.

Perhaps the best known farmer-advocates of soil restoration are from Burleigh County ND. Gabe Brown and others are speaking at conferences and seminars all over the Midwest.

If you prefer to read about these new/old methods you can find all the information you want on the internet.

This stuff is good news. It is exciting. It makes sense. It works.

Best regards.

Tom Barthel, Secretary and Director at Large.