



IOWA CHAPTER

5 principles of soil health

The United States Department of Agriculture (USDA) estimates that Iowa loses 5.2 tons of topsoil per acre of cultivated cropland every year due to sheet and rill erosion, in essence water erosion.¹ USDA also estimates that Iowa loses 0.5 ton of topsoil per acre of cultivated cropland due to wind erosion.² On their own, soils form at an average rate of 0.24 tons per acre, with a range of 0.01 to 0.08 tons per acre, per year.³ Over half of Iowa's topsoil has been lost since the land was first cultivated, and over half of the organic material in the soil has been lost.⁴

What this means for Iowa is that cultivated farmland is losing soil at a significant rate every year and that methods need to be introduced to restore the topsoil and to preserve it on the land. Failing to do so will result in a significant reduction in soil fertility, exhausted soil and compacted soil. All of this means that the yield of crops will be significantly reduced. The livelihoods of farmers, the vitality of rural communities, and the production of food for generations to come are all at risk.

When it comes to soil health, there are five principles⁵

1. **Soil cover at all times (soil armor)** – Soil cover prevents wind and water erosion. It reduces soil evaporation rates which means that more water is available for plants. Soil cover helps reduce weeds.
2. **Minimize physical, chemical, and biological disturbance of the soil** – Tillage removes the pore spaces between soil particles, which reduces the infiltration of water, destroys the soil structure, and leads to compaction. Chemicals – herbicides, pesticides, fungicides - can destroy the beneficial web of microbes in the soil. Biological disturbance, such as overgrazing, can reduce soil cover, can cause compaction, and can reduce soil nutrients.
3. **Living roots in the soil at all times** – Living plants hold carbon in the soil and reduce erosion.
4. **Plant diversity** – Crop rotations, including small grains and hay, improve the soil microbes, increase the soil fertility, and reduce pests.
5. **Integrate animals** – Managed livestock help reduce weeds and provide natural fertilizer to the land.

Farmers win when these five principles are integrated into the farming operation. Enriching carbon in soils increases water retention, reduces carbon in the air, and increases soil fertility and crop yields. Another benefit is storing carbon, thus keeping it out of the atmosphere, helps to mitigate climate change.



Photo by USDA NRCS

When you look around Iowa, most of the land we see has not implemented any of these principles. And we wonder why we have problems with soil erosion and water quality!

¹ U.S. Department of Agriculture, “Summary Report: 2010 National Resources Inventory”, Natural Resources Conservation Service, Washington, DC, and Center for Survey Statistics and Methodology, Iowa State University, Ames, Iowa, page 88

² U.S. Department of Agriculture, “Summary Report: 2010 National Resources Inventory”, Natural Resources Conservation Service, Washington, DC, and Center for Survey Statistics and Methodology, Iowa State University, Ames, Iowa, page 101

³ Rick Cruse, “Soil Erosion – What will the future bring?”, Power Point, Iowa State University

⁴ Francis Thicke, *A New Vision for Iowa Food and Agriculture*, Mulberry Knoll Books, 2010, page 8

⁵ United States Department of Agriculture, Natural Resources Conservation Service, North Dakota, www.nrcs.usda.gov/wps/portal/nrcs/detailfull/nd/soils/health/?cid=nrcseprd1300631