UVM Center for Sustainable Agriculture Grass Farming Research:

What does increased soil organic matter mean for water on the farm?

About the research

This project is taking place on a 400-acre Champlain Valley diversified beef farm with long previous use as a dairy operation. Its recent history includes heavy tillage and synthetic inputs, and the increased frequency of extreme weather events, which both have contributed to soil erosion and disaggregation and resulted in degraded fields. The Center's research team is helping the current farmers recover the soils by monitoring and researching soil health and pasture forage ecosystems as they relate to the production of high-quality, grass-fed, grass-finished beef.

We see pasture-based farming as an inseparable triad of well-functioning soils, abundant and high quality forages, and healthy livestock animals in a constant and balanced rotation. Preliminary research results are indicating what many grass-based livestock farmers have been finding and saying for years: that the practices that support biodiversity, carbon sequestration, water quality and animal welfare are also good for a farmer's financial bottom line.

Background and Methodology

The research location is a 400-acre Champlain Valley diversified beef farm with long previous use as a dairy operation. Past practices that include heavy tillage and synthetic inputs, and the increased frequency of extreme weather events have contributed to soil erosion and disaggregation and resulted in depleted fields. By applying key princples of grazing for soil health, the project has resulted in an increase of 1.7% soil organic matter since 2015. Among the ecological benefits of improved soil health is increased water holding capacity, which has benefits for the farm itself, the land around it, and the health of nearby bodies of water.

The preliminary findings detailed on the other side of this sheet show that by applying the four basic principles of soil health*, farmers can increase the ability of their land to hold water, keep nutrients in the soil where they belong instead of running off into unwanted places, and, potentially, realize profits through payments for ecosystem services.

* 1. Well-covered soils 2. Biodiversity above and below ground, 3. Animals graze all fields at least once per year. 4. Let roots flourish by not tilling.

Questions?
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2 years of applying
4 key principles of soil health *
= 1.7% increase in Soil Organic Matter (SOM)

*1. well-covered soils
2. biodiversity above and below ground
3. animals graze all fields at least 1x/yr.
4. let roots flourish by not tilling

A 1.7% increase in SOM can hold 46,168 gallons of water in the top 6-8" of topsoil

over 188 acres, that means

6.9 million gallons of water can infiltrate into the soil

instead of running off the land

This farm
can now absorb an additional
1.36" of water compared to when this work began.

With heavier rain under climate change, this is significant for the farm's neighbors and nearby bodies of water.

If water credits* were offered to farmers for increasing SOM, this could mean a payment of nearly $1,000 to the farm.

* not yet available to Vermont farms

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