

Support the Healthy Soils Bill (SD.1438/HD.3065)

Current levels of atmospheric carbon are so dangerously high that we can not choose between reducing emissions and sequestering carbon. We must do both. Agriculture is the only sector that has the ability to transform from a net emitter of CO₂ (producing almost 10% of U.S. emissions¹) to a net reducer of CO₂.

If the world's agricultural land were managed so that it were to gain soil carbon rather than lose it, an increase of only 0.4% soil organic carbon would effectively offset 20–35% of global anthropogenic greenhouse gas emissions.² Farms employing Healthy Soils Practices are seeing soil carbon levels increase from a baseline of 1-2% up to 5-8% over ten or more years, which add up to 25 to 60 tons of carbon per acre.³

Healthy Soils Practices present truly *shovel-ready* strategies for reduction of atmospheric carbon. Numerous farming practices have been demonstrated to increase soil health and soil carbon, yet these are still not widely implemented. With state incentives and support, farmers can adopt these practices, helping to slow climate change, improve water quality and quantity, become more resilient to extreme weather – and become more profitable.



Healthy Soil Practices include:

- No-till or reduced till
- Cover crops and diversified crop rotations
- Planned grazing
- Integrated crop-livestock systems
- Efficient fertilizer use
- Applying compost and manure
- Using more perennial crops & silvopasture systems
- Soil remineralization, microbial inoculation & biochar
- Agroforestry

Healthy soil is soil that hosts a robust soil ecosystem.

Healthy soils have more organic (carbon-based) material and therefore more carbon.

Healthy soil retains many times its weight in water, making it more resilient to droughts and floods.

Healthy Soil Practices describe farming and grazing practices that, among other benefits, reverse climate change by rebuilding soil organic matter and restoring degraded soil biodiversity – resulting in both carbon drawdown and improving the water cycle.

Benefits of Healthy Soils Practices include:

- ✓ Carbon-Negative agriculture: 25 to 60 tons of carbon (tC) stored per acre⁴
- ✓ Planned grazing has resulted in annual soil carbon gains of up to 3 tC/acre/year⁵
- ✓ Increased water retention: 20-30% more water retention capacity⁶
- ✓ Enhanced drought, flood and heat resilience
- ✓ Reduced nutrient pollution: 10-30% less nutrient pollution of surface and ground waters since soils better retain applied fertilizers⁷
- ✓ Reduced soil erosion: Greater than 33% less soil erosion⁸
- ✓ Reduced need for applications of chemically-based, inorganic fertilizers
- ✓ Reduced leaching and increased decomposition of pesticides⁹
- ✓ Increased farm profitability¹⁰

Soil Health in Massachusetts

-  Agricultural soils (globally) have likely lost one-half to two-thirds of their Carbon stocks.¹¹
-  As of 2007 we were losing 34-39 million tons of soil per year from water erosion of agricultural land in the Northeast.¹²
-  Because of the 2016 drought, 80% of Massachusetts farmers surveyed experienced significant crop losses on 29,077 acres¹³, costing more than \$14 Million in crop damage.¹⁴

The MA Department of Agriculture **does not** currently have a soil health specialist.

What does the Healthy Soils Bill do?



This bill creates a Healthy Soils Program within the Commission for Conservation of Soil, Water and Related Resources, which shall, subject to the availability of funds, seek to optimize climate benefits while supporting the economic viability of agriculture in the commonwealth by providing incentives, including loans, grants, research, technical assistance, educational material on Healthy Soils Practices.

Improve Massachusetts's food security and food system efficiency by including an expert in Healthy Soils Practices on the Mass. Food Policy Council.

At a time when the federal action on climate change is faltering, states must lead and Massachusetts should build on its long history of climate leadership and join with the six other states which have passed Healthy Soils and Soil Carbon Sequestration legislation. By promoting shovel-ready agricultural practices, the State will help Massachusetts farms better adapt to the shocks of worsening climate change as well as help mitigate further impacts, while improving crop quality and quantity and farmer bottom lines.

This fact sheet was last updated on 1/22/19

Suggested Resources and References Cited

NOFA/Mass Carbon Resources: <http://nofamass.org/carbon>

USDA/NRCS. Soil Health Awareness - Unlock the Secrets in the Soil. <http://bit.ly/UnlockSoil>

Environmental Law Institute. Legal Pathways to Carbon-Neutral Agriculture (2017). bit.ly/ELI_Carbon

1. U.S. EPA. "Inventory of U.S. Greenhouse Gas Emissions and Sinks" http://bit.ly/EPA_GHG2017

2. Minasny, B. et al. Soil carbon 4 per mille. *Geoderma*. 292, 59-86 (2017). <http://bit.ly/Minasny>

3., 4. Hawken, Paul (ed.). *Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming*. New York: Penguin Books (2017).

5. Machmuler, M. et al. Emerging land use practices rapidly increase soil organic matter. *Nature Comm.*, 6:6995 (2015).

<https://go.nature.com/2G087FM>

6., 7., 8. The Nature Conservancy. "rethink Soil: A Roadmap for U.S. Soil Health." (2016). <http://bit.ly/rethinksoil>

9. Lewandowsky, Ann. University of Minnesota Extension. "Soil management and health" (2002). <http://bit.ly/UMNextension>

10. A 2017 study by the National Assoc. of Conservation Districts found that using cover crops and no-till can result in an economic return of

over \$100 per acre. National Assoc. of Conservation Districts, Soil Health Research, <http://www.nacdnet.org/soil-health-research>

11. Machmuler, M. et al. Emerging land use practices rapidly increase soil organic matter. *Nature Comm.*, 6:6995 (2015).

<https://go.nature.com/2G087FM>

12. USDA/NRCS. "Water Erosion on Cropland, by Region and Year." http://bit.ly/USDA_erosion

13. USDA Climate Hubs (Archived). "29,000 Acres of Farmland Affected by Drought in Massachusetts" (2016). <http://bit.ly/29000acres>

14. "Mass. crop damage estimated at \$14 Mil, aid available in four counties." WWLP, Sept. 6, 2016. <http://bit.ly/2016drought>

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Endorsing Organizations

