

Working Group Topic: Sequestration in agricultural soils

Commission Members: Marie Audet, Paul Costello, Robert Turner

State Agency Staff: Alex DePillis, Karen Bates, Marli Rupe, Ken Jones

Public Members:

Existing Condition and trajectory:

Conservation practices that increase soil health, reduce pollution and soil loss, and store carbon are already being adopted by progressive farmers. Current practices include no-till/low-till, cover cropping, and nutrient management plans. On the GHG side, these practices both increase carbon stored in the soil and decrease carbon emissions. They provide additional benefits to farmers by reducing fossil fuel use, enhancing productivity, and reducing fertilizer costs. Other co-benefits include reductions in nitrogen and phosphorous emissions and better soil resilience under drought. Many farms have adopted these practices voluntarily. Some experts believe conservation practices in agriculture have the potential for capturing all our annual CO₂ emissions, both locally and globally. There are current initiatives in the legislature that promote regenerative agricultural practices. Markets and payments for soil-based carbon offsets are nascent, but clearly gaining momentum across North America.

Goal:

The goals stated in the CEP include reducing GHGs within the state and from outside the state's boundaries caused energy use within the state by 50% by 2028 and 75% by 2050. Sequestration is an important and somewhat overlooked strategy to reduce atmospheric carbon dioxide. The CEP mentions carbon sequestration mainly in the context of forests. Agriculture plays a small role in the CEP, focused mainly on the potential for energy generation (and emission reductions) from anaerobic digestion. This subcommittee will examine the potential for substantial additional sequestration in agricultural soils. We will articulate goals for the reduction of GHG emissions and the sequestration of carbon resulting from improved management of agricultural soils. Our investigations will allow the Commission to identify key leverage points and policy actions needed to systematically advance this goal.

Other Entities Exploring Topic:

Within Vermont, NRCS, UVM extension, VT Dept of Agriculture, the VT Legislature, and others are working on aspects of improving agricultural soil management. These organizations bring a wealth of data and experience working with framers. This committee's efforts will leverage the work of these groups, with what we feel is an opportunity to elevate the importance of this work—but with an important shift in emphasis: good soils management doesn't just benefit our farmers and waters, it benefits our climate. Our final recommendations will incorporate information on the science of carbon sequestration in ag soils; the history of soil carbon additions and the potential for additional sequestration; and the relevance of this to the State's GHG goals. Vermont is not alone in these efforts. Other states, Canadian provinces, agricultural non-profit organizations, and the UN Framework Convention on Climate Change COP21¹ are among the organizations promoting similar goals.

Proposed Commission Focus:

1. Soil Science and agronomy

Ample information exists about the rates of sequestration and emission reductions under various soil practices. We have begun to compile relevant reports and data sources containing estimates of the potential per-acre benefits and can extrapolate this to an estimate of additional sequestration for

¹ <http://newsroom.unfccc.int/lpaa/agriculture/join-the-41000-initiative-soils-for-food-security-and-climate/>

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Vermont. The subcommittee will organize and interpret this information in the context of the goal stated above.

2. Financial information

Information on the financial costs and returns available to farmers that influence carbon-friendly practices appears less readily available. We need to understand whether research has been done supporting a range of costs and cost reductions associated with the adoption of these practices. Having this information will be important to identifying key interventions.

3. Motivating behavior

We've begun to collect information on what motivates a farmer to change practices. Clearly, financial incentives through practice-enabling grants are strong motivators, but we also need to explore whether new businesses that may offer contract planting or cropping may play a role, especially as a wider swath of farmers begin to consider this option. We know that different forms of incentive have been applied in states in the northeast. We expect to investigate the range of other programs that may offer tactics for Vermont.

4. Positioning our farmers for selling offsets

Sales of carbon offsets are being examined as a market mechanism to encourage adoption of these practices. Even if a program mechanism existed, current prices are too low to warrant the effort involved in offset sales. However, markets change and the trajectory of interest in these mechanisms is increasing. We propose to investigate any existing programs and protocols to examine how Vermont farmers might position themselves for the sale of offset credits.

Metrics:

We will have engaged multiple experts across different sectors in the gathering and organizing of information. Maintaining this engagement across partners will add to the strength of the final recommendations.

We will have met our objective if we can articulate the following:

- a. The amount of carbon sequestered over the last ten (or fewer) years since farmers started employing conservation tillage practices
- b. The best opportunities for the greatest additional sequestration. This may include certain soils (more C potential) or regions where farmers are more receptive.
- c. Tons of carbon that can reasonably be sequestered in a ten-year time frame.
- d. Specific programs and incentives that are likely to be effective motivators.
- e. The estimated cost of these programs, and the likely impact they will have on rates of sequestration.
- f. The kinds of information systems or technologies needed to measure and report on the status of acres under conservation cropping.

Information Needs:

Most of the information we need exists. We need to gather it together, assess its adequacy, and identify gaps.

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Potential Expertise:

Josh Falkner (UVM)

Jeff Carter (UVM Extension)

[Daniella Malin Climate Smart](#)

[Carbon farming \(Toensmeier\)](#)

[Alex DePillis \(Vermont Agency of Agriculture\)](#)

[Jenifer Wightman \(Cornell University\)](#)

Full Commission Discussion Items:

[What else does the full commission need to consider?]

DRAFT