

### **Empowering Vermont Farmers to Address Climate Change While Protecting and Enhancing Ecosystems**

The agricultural sector accounts for 15.8 percent of Vermont's greenhouse gas (GHG) emissions. Today, Vermont farmers are already succeeding in reducing on-farm GHG emissions through water-quality farming practices, and Vermont farmers have a realistic potential to sequester 1 million tons of CO<sub>2</sub> annually – 100% of Vermont agriculture's 2050 climate goal – by increasing the organic matter content of Vermont's agricultural soils. Agriculture is an industry – along with forestry – that is most vulnerable to climate change. The Agriculture & Ecosystems 5C Subtask group recommends incentivizing farming systems that help all farmers both mitigate climate change and build resilience to its impacts.

Agriculture – and its associated natural and working lands – is a nexus for building a resilient future for Vermont in the face of climate change that centers priorities of:

1. Improving soils, water, and resilience of the working landscape to combat climate change;
2. Increasing sustainable economic development and creating good jobs in Vermont's food and farm sector; and
3. Improving access to healthy local foods for all Vermonters.

The importance and focus on Vermont's agricultural soils to address climate change is paramount to catalyze a paradigm shift in how farmers are acknowledged and empowered to perform their essential roles of environmental stewardship while providing food and fiber. Where historic federal food policy and current international markets have driven agriculture to particular farming systems and methods that have historically externalized costs of production to water, land, and air – a focus on Vermont's soils and investment in **six key pathways** can help catalyze enterprise-level changes, remove the barriers to transition, and leverage the impressive engagement and work farmers have recently undertaken to address Vermont's water quality challenges and expand and capacitate all Vermont farmers to address climate change.

These **six pathways** are:

1. Quantify and account for both agricultural emissions and sinks,
2. Expand, enhance, adapt, and invest in existing State of Vermont programs that support agricultural GHG emission reduction & ag soil carbon sequestration.
3. Implement a Payment for Ecosystem Services program for healthy soils and soil carbon sequestration,
4. Invest in farmland conservation that protects natural and working lands from development,
5. Invest in Climate Smart Agriculture education, outreach, research, and technical assistance programs, and
6. Foster partnerships at all levels, which is essential to recognize, leverage, and build strategies for farmers to address climate change.

These recommended pathways and strategies require a public process for discussion, research, teaching and consensus building. This takes time and it is important to acknowledge that these pathways and strategies are not final – it will take a robust public process to articulate and define final pathways and strategies that will be successful in supporting the broad goal of empowering farmers to address climate change while protecting and enhancing ecosystems.

## **Charge**

Subtask Group 5C was charged with investigating and drafting recommendations for consideration by the full Agriculture & Ecosystems Subcommittee. The charge of Task 5C is provided below:

***Task 5C: Identify and develop initiatives, programs and strategies that reduce gross and net annual greenhouse gas emissions from Vermont's agricultural land and agricultural operations. This includes strategies to maintain or increase carbon sequestration and storage in Vermont's agricultural lands, and the prevention of maladaptive practices that release carbon, including conversion to other land uses.***

## **Membership**

Subtask Group 5C was comprised of the following members:

VCC Ag & Eco Subcommittee Members:

- Abbie Corse, The Corse Farm Dairy – Ag & Eco Co-Chair
- David Mears, Audubon
- Ryan Patch, AAFM
- John Roberts, CVFC
- Alissa White, UVM

Staff Support:

- Marli Rupe, DEC
- Alex DePillis, AAFM
- Judson Peck, AAFM

## **Meetings**

Subtask group 5C has met 11 times between April 22, 2021 and June 24, 2021.

## **Subtask group 5C: Process**

Subtask Group 5C proposed a seven-part process to tackle the charge of Task 5C. The Subtask Group has not fully completed all seven steps at the time of the submission of this interim update and preliminary recommendations. The seven-part process is outlined below:

1. Define terms
  - a. Gross GHG emission
  - b. Net GHG emission
  - c. Agricultural Land
  - d. Agricultural Operations
  - e. Carbon sequestration and storage
  - f. Maladaptive practices
2. Review existing ag emissions inventory to identify sources of emissions
  - a.

Agriculture Sector Breakdown (2017)	MMTCO <sub>2</sub> e (2017)	Percent Contribution
Enteric Fermentation	0.64	47%
Manure Management	0.35	25%
Agricultural Soils	0.33	24%
Liming and Urea Fertilization	0.05	3%
<b>Total</b>	<b>1.37</b>	<b>100%</b>

- b. Review strategies and leverage points for each source of emissions in the inventory
  1. Enteric fermentation
  2. Manure management
  3. Agricultural soils
  4. Liming and Urea fertilization
3. Review existing LULUCF for Vermont
4. Review existing programs in Vermont and plans / strategies from regional states
5. Identify practice, programs, and strategies that impact GHG emissions from VT agricultural Lands
  - a. Current adoption
  - b. Gaps - not present in Vermont
6. Research cost of implementation as well as current scale of adoption
7. Review practices / strategies for the following criteria to develop a review to prioritization informed by scientific and technical expertise:
  - a. Cost-effectiveness,
  - b. Technologically feasibility
  - c. Equitability considerations

### **Subtask Group 5C: Documents Produced**

In executing the seven-part work plan, the Subtask Group has conducted research and analysis of local, national, and international resources to inform the Group's recommendation process. Two documents were produced by staff supporting the Subtask Group and are available for download from the following links. The title of the document, and a summary of information available within each workbook is provided below:

1. Inventory of Existing Agricultural Programming (excel workbook)
  - a. List of state, federal, non-profit programs that impact climate change
  - b. Practice Emission Reduction Coefficient (ERC) Data from COMET-Planner
  - c. Summary of Ag Digester Information
  - d. List of Ag Education and Outreach Providers in Vermont
  - e. Acronym List
2. Task 5C Agriculture Strategy Matrix (excel workbook)
  - a. 5C Strategy Matrix by emissions category
  - b. 'Bucket', CMS, Practice Matrix
    1. Ranking by: GHG Impact & Co-benefits, Feasibility & Impacts, Sustainability / Equity, NRCS Conservation Practices Physical Effects (CPPE)
  - c. Practices Implemented & Funding Appropriated (2 Sheets)
    1. State Implementation Since SFY2016
    2. Federal Implementation Since 2016
  - d. FFY21 VT EQIP Cost List (1,463 Scenarios)
  - e. NRCS Practice Descriptions by Conservation Practice Standard (CPS)
  - f. Practice Matrix Organized by 'Buckets'
  - g. NRCS CPPE Extracts (3 Sheets)

h. EPA Land Use Category Definitions

**Preliminary Pathway & Strategy Recommendations**

In providing preliminary recommendations, Subtask Group 5C has decided to structure recommendations in the following, stepwise format: 1. Pathway, 2. Strategy, 3. Strategy Details. This structure corresponds with the Cross-Sector Mitigation recommendation structure and translates the Subtask Group's "Bucket" framing into the same categories as the recommendation matrix. In providing these recommendations, the Group has drafted two documents:

1. This recommendation summary document (word document)
2. Ag & Ecosystems 5C Strategy Template (excel spreadsheet)

The preliminary recommendations for both Pathways and Strategy can be found below. For further detail regarding 'Strategy Details' please see the 'Ag & Ecosystems 5C Strategy Template' excel document.

**Pathway Recommendations**

1. Update Vermont Ag Emissions Inventory methods to quantify and account for both agricultural emissions and sinks,
2. Expand, enhance, adapt, and invest in existing State of Vermont programs that support agricultural GHG emission reduction & ag soil carbon sequestration.
3. Develop a Payment for Ecosystem Services (PES) Program for healthy soils and soil carbon sequestration
4. Farmland conservation and viability – protect natural and working lands from development
5. Enhance education, outreach, research, and technical assistance programming to encourage farmer participation and adoption of Climate Smart Agricultural strategies and practices.
6. Leverage, enhance, and capacitate existing and new state, federal, local, private, and nonprofit partnerships that will be needed to support Vermont farmer climate mitigation, adaptation and resilience work.

**Pathway Strategies**

1. Ag Emissions Inventory
  - a. Update State of Vermont Emissions Inventory to include net emissions to account for sequestration of carbon in agricultural soils.
2. Existing State Programs
  - a. Fund agronomic and grazing practices on farms such as no-till, cover crop, and rotational grazing
  - b. Partner on methane capture and energy generation on farms.
  - c. Development of a climate feed management program.
  - d. Voluntary adoption of natural resource restoration practices that support climate mitigation and resilience, including river corridor easements, wetland restoration, and afforestation practices.
3. Develop PES Program

- a. Develop and implement a State of Vermont PES Program that supports the development of healthy soils and carbon sequestration in soils.
4. Farmland Conservation
    - a. Farm conservation
    - b. Farm viability
  5. Education, Outreach, Research, & Technical Assistance
    - a. Enhance education, outreach, and technical assistance programming to support farmer learning and adoption of climate smart agricultural practices.
    - b. Fund and learn from local university and applied research.
  6. Partnerships
    - a. Maintain Ag & Ecosystems Subcommittee through development and implementation of GWSA and CAP to cultivate, build and reinforce state, federal, nonprofit, and private sector collaborations

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