Climate Smart Agricultural Recommendations From the Carbon Tracking and Monitoring Workshop, July 2022

Minnesota's Climate Action Framework presents an opportunity for Minnesota Agriculture. These recommendations for Minnesota Legislative Leaders result from discussions at an Agricultural Carbon Tracking and Monitoring workshop held in July 2022. With 60 stakeholders, we advanced ideas for a more systematic approach to tracking, monitoring, and goal setting that addressed the need for meaningful reductions in agricultural carbon emissions in the context of environmental co-benefits and social equity. The Workshop Report provides a full description of the discussions.

This synthesis includes Context, Recommendations, and a Workshop Summary.

The workshop and full reports were supported by a joint award for an Impact Goal Grant from the Agricultural Climate Solutions workshop, which was supported by the University of Minnesota's Institute on the Environment and the McKnight Foundation.

Provided by:

- George Boody, SoilCarbon LLC
- Jessica Gutknecht, Associate Professor, Dept. of Soil, Water, and Climate; University of Minnesota
-Green Lands Blue Waters

- With the assistance of the following reviewers:
Hannah Bernhardt, Farmer
Teresa Opheim, Climate Land Leaders
Theresa Keaveny, Climate Land Leaders
Suzanne Rhees, Board of Water and Soil Resources
Evelyn Reilly, Green Lands Blue Waters
Aaron Reser, Green Lands Blue Waters
Erin Meier, Green Lands Blue Waters
Anna Cates, University of Minnesota

Agricultural Carbon Tracking and Monitoring Workshop

Minnesota State Legislative Policy Recommendations

Draft 8.29.23

Context

Minnesota's Next Generation Energy Act set goals for greenhouse gas emission (GHG) reductions across all sectors of the economy. While Minnesota has accomplished significant reductions from the energy sector, emissions from livestock and cropping agriculture increased by 17% through 2020.[1]

The Minnesota Climate Action Framework calls on the state to "Identify opportunities for farmers and landowners to participate in ecosystem services markets (e.g., for carbon removal, flood protection, and water quality) that incentivize best management practices for climate mitigation and adaptation." Climate-smart agricultural conservation practices are not being adopted fast enough or providing large enough cuts in emissions to achieve the goals required to avoid dramatic consequences of climate change (see IPCC February 2022 Working Group II report).

Increasing continuous living cover (CLC) in the form of perennial production systems and managed rotational grazing builds soil health, boosts resilience to climate impacts, and sequesters carbon in the soil—providing potential climate solutions that also generate environmental and social co-benefits. No-till combined with cover crops, longer rotations with small grains, and other nutrient/manure management practices can also be climate-smart. These systems could reduce agricultural emissions and future production costs for farmers, as well as help meet Minnesota's goals for nitrogen reduction and habitat improvement.

Carbon markets, broader ecosystem service markets, and publicly funded incentives that pay farmers to implement carbon-sequestering practices could increase farmer adoption of these practices, but additional data on effectiveness would help prioritize where to invest time and money. The lack of research on GHG emission reductions attributable to climate smart practices has hampered efforts to promote the most effective practices. Goals and baselines are needed to inform what should be tracked to determine progress or the lack thereof.

If goals and metrics are clear, these initiatives offer high potential to advance agricultural systems in a way that holistically serves the environment and the people living and working on it. However, the agricultural sector has historically underserved Black, Indigenous, and People of Color (BIPOC), women, immigrants, and beginning farmers. Therefore, including the diverse perspectives of "emerging" farmers is essential as we consider sustainability goals and tracking methods to ensure equity and inclusion in climate change solutions.

Goals should be set for avoiding emissions so that agriculture might achieve net emission reductions of 30% in five to six years and deeper reductions over longer horizons. Related goals should be formulated to advance equitable participation by small- and medium-sized farming and agricultural enterprises, including those led by underserved and under-represented farmers. A framework of metrics and methods must be developed to track the achievement of goals.

These recommendations result from discussions at an Agricultural Carbon Tracking and Monitoring workshop held in July 2022. With 60 stakeholders, we advanced ideas for a more systematic approach to tracking, monitoring, and goal setting that addressed the need for both social equity and meaningful reductions in agricultural emissions. The Workshop Report provides a full description of the discussions. *The workshop and full reports were supported by a joint award for an Impact Goal Grant from the Agricultural Climate Solutions workshop, which was supported by the University of Minnesota's Institute on the Environment and the McKnight Foundation.*

[1] MPCA https://public.tableau.com/app/profile/mpca.data.services/viz/GHGemissioninventory/GHGsummarystory

Recommendations

1. *Integrate co-benefits in carbon markets and state-funded programs for agricultural incentives.*
   - Define guardrails for carbon markets on contracting and tracking to assure veracity:
     - For example, set high, meaningful entry standards and then branch out to make sure more people are eligible; low bars like minimal tillage won't be impactful.
   - Build on and expand models such as Minnesota Agricultural Water Quality Certification Program (MDA) and the Working Lands RIM Easement Program (BWSR), which incentivize adoption of a suite of practices for soil health, not only single practices such as reduced tillage, and maintaining practices over time.
     - These programs could also: Incorporate additional diverse strategies such as agrovoltaics, prairie strips, and paying for data collection and monitoring *in addition to* payments for implementing practices and carbon/ecosystem services.
     - Concepts from the Working Lands Watershed Restoration study completed in 2018 (BWSR) could be incorporated into programs that seek to shift row crop fields to working lands perennials.
   - In addition to support for initiatives such as Forever Green crop research, expand funding for other marketable perennial crops such as hemp that may have both climate and ecosystem service benefits.

2. *Level the playing field for social equity and inclusion alongside carbon and ecosystem service markets.*
   - Model programs on community-level food systems, water quality planning, and climate adaptation planning approaches, e.g., Tribal nation's community food systems and food sovereignty plans:
     - For example, design policies to bring new people to the land with secure and affordable land access, rather than just changing costs/incentives for people who are already there.
   - Create incentive structures for commodities and specialty crops, especially for smaller operations, that offer higher payments for initial per-acre increments of practices and/or ecosystem services by, for example:
     - Putting caps on contract levels or the eligible number of acres.
     - Supporting farmers during a 3–5-year transition period to adopt CLC.
     - Not using additionality as a prerequisite to participate in carbon markets. Doing so penalizes farmers who have already adopted climate-smart practices.
   - Keep the monitoring and reporting burden on the program rather than on farmers.

3. *Scale rewards for practices that have the greatest and longest-term effects—e.g., forest and grassland maintenance and improvement–and be honest about the limitations of different land uses.*
   - Remove the most vulnerable lands from production, especially peat soils and former wetlands.
   - Incentivize farmers and landowners to:
     - Shift marginal fields to production systems with high levels of conservation, ecosystem services, and potential for GHG reductions.
     - Retain grasslands through managed rotational grazing and "working lands" easements for perennials.

4. *Develop integrated goals and systemic monitoring tracking frameworks for carbon, ecological services, and equity to know if we are achieving goals*.
   - Develop a True Cost Accounting Framework and methods applicable to tracking and monitoring GHG emissions, along with environmental and social impacts, as well as co-benefits:
     - Set clear goals for agricultural GHG net reduction related to agricultural practices and land-uses.
     - Ensure standardization and transparency in tracking and modeling.
     - Account for ecosystem service tradeoffs with GHG reductions and measure environmental co-benefits.

5. *Expand funding for research to better understand links between soil health and carbon storage in systems managed with living cover and the degree to which soil carbon storage in different systems responds to management and weather.*
   - Increase funding to the Minnesota Office of Soil Health to do this comprehensively.
     - For example, support and refine monitoring strategies for maximum accuracy and ease of use.
   - Support research and outreach station experiments (diverse in geography and cropping rotations) in process-based modeling of whole-farm systems to inform soil carbon credits and better understand "dynamic persistence" with respect to soil carbon storage in diverse CLC systems.
     - For example, prioritize research funding for identifying and tracking benefits of stacking practices, including the soil health/carbon storage impacts from CLC and managed rotational grazing systems.

Agricultural Tracking and Monitoring Workshop Summary: Who Generated **These Ideas?**

The Ag Carbon Tracking and Monitoring Workshop was an effective convening of diverse stakeholders who contributed thoughtful, well-informed background, promising models, and gaps in policy and programs, as well as recommendations for agricultural carbon sequestration in the context of ecological services, and equity and inclusion. An important shared understanding from participants was that ecological and social systems are at a breaking point, and we must work at a systems level with as much mandated change as possible to reduce emissions and increase sequestration potential. The consequences of inaction are dire. It is important to collectively assert that ag climate solutions hold great potential and actions are available and imperative at many scales and via many farm types. These include cropping and livestock systems. A diversity of solutions should be implemented now and into the future.

Participants outlined barriers to immediate action. Feasibility of farmer adoption is one of the most significant, including economic, cultural, technical knowledge, and infrastructure barriers to adoption of climate-smart practices. Pathways to adoption should be prioritized in strategy and measurement protocol development. Small-scale, BIPOC and emerging farmers experience additional adoption challenges given the structural inequities of agriculture that present many barriers, including limited land access. The ongoing trend towards consolidation disadvantages smaller farmers. These challenges also limit the ability of small-scale farmers to participate in and benefit from carbon markets, which are typically designed for large row crop operations. Since new farmers, BIPOC farmers, and small farmers tend to be more likely to implement diversified production systems, perennial crops and other regenerative practices, excluding them by omission or design is contradictory to maximizing climate change mitigation in agriculture.

There is often tension between large-scale incremental change and small-scale transformative change but ultimately, we need both. Equity and land access must be addressed in any cost-share, incentivization, or payment programs to avoid compounding these existing inequalities. One way to help do this is to include farmers of all types in program design, communicate appropriately, acknowledge and respond to their needs and limitations, and build programs that address adoption barriers. Other challenges lie in the science of carbon itself. Soil carbon measurement is still somewhat inexact, and carbon dynamics are characterized by high spatial and temporal variability that makes accurate modeling difficult. The situation is complicated by the importance of nitrous oxide and methane in agriculture's total GHG impact, especially because nitrous oxide is even more difficult to measure and model than carbon. While we must avoid overestimating the impact of given practices, we also must find ways to proceed in the face of uncertainty, since time is critical.

Participants noted the opportunity for adoption of climate-smart practices to improve soil health and provide broader ecological services. Soil health improvement can help avoid some GHG emissions and potentially sequester carbon while providing other ecological services that benefit both farmers and society, such as improved water quality and greater wildlife and pollinator habitat. Climate benefits could also stack with social benefits through practices such as perennial cropping systems and local value chain investments. Challenges include the complexity of measuring multiple environmental and social co-benefits and the difficulty of designing programs to support social benefits.

Finally, workshop participants addressed the limitations of carbon markets. Ag carbon sequestration does not negate the need for major reductions in carbon dioxide, methane, or nitrous oxide emissions. Many attendees referenced private sector corporate insetting[1] and other initiatives leading the way on ag and climate. Yet many remain skeptical of the influence of corporations involved in carbon markets, asking who benefits, how, and why. Carbon markets run the risk of solidifying support for dominant cropping systems that can have significant environmental impacts, especially when built by and for players with significant existing power in agricultural systems and policy. Instead, workshop participants offer recommendations to build markets and policy to better foster adoption of more diverse farmers and agricultural systems. Workshop participants provided many concrete recommendations, a critical piece in the development of these new markets. Program design should be dynamic, helping to ensure that the focus remains on intended impacts and beneficiaries, and that programs are both effective and inclusive. Combined with assessment throughout the adoption and implementation phases, it also ensures that they can be adjusted to avoid unintended negative consequences. State and federal regulation currently lags but should be supported along with current initiatives already moving through the private sector. Government standardization and regulation will ultimately be essential for verifiability and transparency to ensure that farmers have clear options and that companies deliver the promised climate benefits.