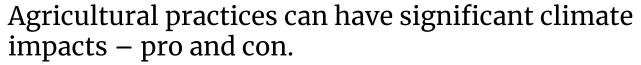
Climate-Smart Agriculture Research & Innovations

David J. Hayes September 12, 2023

Why "Climate-Smart" Agriculture?







Carbon dioxide, methane and nitrous oxide emissions or reductions.



Multiple benefits can flow from adopting "climate-smart" agricultural practices.

- Higher yields & reduced costs from precision agriculture.
- Resilience in the face of climate impacts.
- Incentive payments.

Statutory/Legal Framework to Incentivize Climate-Smart Ag Practices

funded

other

Inflation Reduction Act

\$19+B Funding

Allocated to existing USDA conservation programs based on Secretary of Agriculture's confirmation of climate benefits.

\$300M of the IRA funding is explicitly dedicated for the measurement, monitoring, verification, and reporting (MMRV) of carbon sequestration or methane and nitrous oxide emissions reductions.

USDA"Partnerships for Climate-Smart Commodities" Initiative

\$3+B Program

Tests proposition that farmers who produce commodities using "climatesmart" practices can sell products at higher prices.

Includes a significant focus on MMRV; presumes development of a credible MMRV-based certification process.

"Climate-Smart Agriculture & Forestry" Initiative via E.O. 14008.

Tasks USDA with evaluating incentives for the voluntary adoption of climate-smart ag and forestry practices.

2023 Omnibus Budget

Requires that USDA identify "widely accepted protocols" and "sampling methodologies" to ensure "programmatic integrity" of voluntary carbon markets.

New Farm Bill -- ???

Urgent need for better MMRV of climate smart practices in ag.

Measuring, monitoring, reporting & verification (MMRV) of agricultural GHG fluxes is difficult & expensive . . .

... due to the heterogeneity of ag soils and under-investment in ground-truthed MMRV technologies & methodologies.

But potential incentive payments are putting focus on climate and sustainability practices across supply chains . . .

... so major agricultural producers and farmer-suppliers need mechanisms to confirm/validate climate benefits.

Some voluntary carbon markets &/or ag producers are generating carbon offset/inset payments for "climate-smart" regenerative ag practices . . .

... but the absence of broadlyaccepted MMRV standards is limiting incentive payments.



Factors Holding Back Improved MMRV for Climate-Smart Practices



Investment: USDA traditionally has invested in broad-based models developed by land-grant universities. New technologies and methodologies are available to provide ground-truthing and scaling of area- and practice-specific climate-smart practices.



Soil-Focus: USDA traditionally has focused almost exclusively on carbon uptake in soils. Yet, the large majority of GHG benefits are associated with reduced methane and nitrous oxide emissions from livestock- and fertilizer-related practices.



Data: Proprietary data sampling & software modeling tools are proliferating in voluntary carbon markets, making public confirmation of climate benefits more difficult.

Addressing MMRV Deficiencies & Increasing Climate-Smart Payments



Stanford report: "Data Progress Needed for Climate-Smart Agriculture" (April 2023) https://law.stanford.edu/publications/dataprogress-needed-for-climate-smart-agriculture/

The USDA has a **historic opportunity** to address key MMRV deficiencies through coordinated implementation of:

- (1) new IRA funding, including its \$300M for MMRV and required Secretarial confirmation of climate benefits
- (2) MMRV innovations piloted under the Partnerships for Climate-Smart Commodities program; and
- (3) Omnibus budget-required protocol analysis.
- (4) Upcoming Farm Bill.

Addressing MMRV Deficiencies & Increasing Climate-Smart Payments



Endorse USDA's focus on **specific agricultural practices** regarding soil regeneration; precision fertilizer use; livestock feed & manure management.

Lack of consensus protocols on data collection and modeling, combined with limited public availability of GHG data on soil carbon, N20 and CH4, undermines MMRV efforts.

Underscore need and opportunity for USDA to develop a **comprehensive plan around climate data collection & analysis**. Cite previous USDA data efforts, National Academies and White House initiatives and Congressional direction and funding on this topic.

Addressing MMRV Deficiencies & Maximizing Adoption of Climate-Smart Agricultural Practices

Marshal outside experts to help USDA develop protocols for field-testing carbon in soils and methane and nitrous oxide emissions.

Support national soil monitoring network built around regional nodes to establish baseline conditions and enable trend-line analyses for both soil carbon and nitrous oxide emissions.

Develop separate methane testing and protocol development initiative.

Identify and deploy a data management platform/mechanism that collects and organizes agricultural GHG data in accessible formats.

Tie into broader White House initiative.

Encourage the development of new/revised GHG-focused agricultural models and conversion factors that are calibrated to MMRV data, with significant focus on methane.

Engage in extensive farmer outreach and technical assistance to encourage broadbased adoption of climate-smart practices.

Evaluate potential "climate-smart" certification standards and mechanisms that may be appropriate for agriculture.