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Climate-Smart Agriculture Research & Innovations

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Why “Climate-Smart” Agriculture?



Agricultural practices can have significant climate impacts – pro and con.

- 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 "climate-smart" 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 broadly-accepted 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/data-progress-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, N₂O 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 broad-based adoption of climate-smart practices.

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