TERRESTRIAL CARBON SEQUESTRATION

NAS Workshop on Terrestrial Carbon
Colorado State University
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Debbie Reed, C-AGG
Topics

- C-AGG: Focus, Experience, Relevance
- Describe Market-Based Approaches
  - Spectrum of Market-Based Programs
  - Successes of Carbon Offset Markets
  - Challenges: Key Lessons Learned
- High Level Recommendations
- Policy, Economic, and Sociocultural Recommendations
C-AGG

• C-AGG founded in 2009 to help develop carbon (C) offset market programs, policies, tools, methodologies for agricultural sector engagement in climate change mitigation

• Multi-stakeholder forum; 3+ meetings annually

• Theory of Change: Power of Markets = Power to Drive Change
  o Price signals, e.g. price on C = market ‘pull’
  o Signals from buyers = market ‘push’

C-AGG’s focus has been on voluntary, incentive-based market opportunities to help scale agricultural GHG emissions reductions and increased sequestration.
Focus has evolved from solely C offset markets to include ecosystem service markets: co-benefits

Public-private partnership with USDA NRCS: catalyzed progress, knowledge development regarding market-based approaches, tools, metrics, programmatic investments and infrastructure

Adam Chambers, USDA NRCS, will also speak to the issue of markets – and how market approaches can bring private finance to bear

My comments today reflect what C-AGG has learned based in nearly a decade of market-based experiences – mostly in carbon offset markets.
Market-Based Approaches:

Can engage the agricultural sector

C-AGG has characterized and described a Spectrum of Ecosystem Service Market Programs that can be tapped to achieve agricultural GHG mitigation:

- Conservation Programs (federal, state)
- Certification Programs & Sustainable Supply Chain Programs
- Payment for Ecosystem Service Markets
- Voluntary Carbon Offset Markets
- Compliance Carbon Offset Markets
Market-Based Approaches:
Can engage the agricultural sector

Economic incentives, data & verification requirements, program rigor and certainty of outcomes increases from left to right. Current program availability & opportunity to engage the agricultural sector at scale is highly variable.

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Market-Based Approaches:
A Public-Private Partnership

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Market-Based Approaches:

Successes in Carbon Offset Markets

- C offset market metrics, protocols and market infrastructure for agricultural engagement have been successfully established.
- Over 3 M tons of C credits have been generated from ag offsets through ACR, CAR and VCS – the 3 Carbon Offset Market Registries that operate in the US.
- 3 M tons of C over 10 years is proof of concept, not ‘scale.’
- Economics of ag C offsets continues to be a challenge:
  - low demand
  - low price point
  - high project implementation costs
  - high MRV costs

Successes to Date: market infrastructure, agricultural offset protocols, metrics for carbon markets have been successfully established.

However: scale has not been achieved. Recommendations will speak to the policy, economic, and sociocultural challenges.
C Market Challenges: Key Lessons Learned

• **GHG / sequestration**: A national policy that creates a carbon price signal is the single greatest need.

• In the absence of a national policy, carbon offset markets have not provided the opportunity to scale GHG emissions or sequestration from the agricultural sector.
C Market Challenges: Key Lessons Learned

• Level of rigor associated with C offset market project implementation and MRV costs exceeds current financial return to project developers and landowners
  – ~ $3-10/ton x ~ .2 tons to 2 tons / acre
• carbon offset market rules w/r/t additionality and permanence, for instance, hamper agricultural sector engagement:
  – 100-year permanence difficult given land ownership, tenure, agricultural management, biological systems
  – exclusion of early adopters creates cognitive dissonance: risk takers, ag community leaders
High Level Recommendations

Increased Soil Carbon Sequestration:
• An imperative to help draw down atmospheric C
• Historical soil C losses create a replacement opportunity
• ‘No regrets’ strategy: only potential downside is opportunity costs
• Significant on-farm, societal co-benefits
  – Enhanced water holding capacity, fertility, tilth, productivity, resilience
  – reduced erosion, nutrient leaching

Photo by NASA / Public domain
High Level Recommendations

- Net CO2e reductions approach is critical (C, N2O, CH4)
- Systems based approaches are important for agricultural sector
- Effective strategies will enable and encourage innovation, flexibility (across sectors, systems, regions), and recognize the nature of biological ecosystems
- Trade-offs, including environmental, may be necessary
- Monitor impacts for unintended consequences
Policy Recommendations

Other market-based mechanisms can be adopted to help to scale agricultural engagement until C policies / signals adopted

Ecosystem service markets are in early stages of development, but offer possibility of monetizing multiple environmental attributes that can be realized from the agricultural sector to help meet not only GHG mitigation needs, but also natural resource conservation, restoration, resilience
Policy Recommendations

• Actively protect existing soil C sinks, e.g. high biodiversity C rich grasslands in prairie pothole regions at risk of conversion

• Avoided conversion of agricultural lands to development is a strategy (California)

• Practice-based vs outcomes based policies: important distinction, but there are trade-offs
  – Costs and benefits, certainty of impacts
Policy Recommendations

• High priority is appropriate measurement, reporting and verification (MRV) system for all agricultural GHG and co-benefits, and common accounting systems
  – Programmatic investment at national level
  – Link project level v national or inventory level accounting
  – Harmonization and standardization of metrics, accounting, MRV: minimize risk of duplication of effort, double-counting, and variable reporting of actual outcomes
  – Process models more scalable, cost-effective at scale, but are data rich systems: historic data, research data sets by crop, region/climate, soil type, system, practice, etc. are needed to calibrate, validate
Policy Recommendations

- Role of technology for MRV systems as well as to help achieve increased soil carbon sequestration / reduced net GHG emissions can be a game-changer
  - Reduce burden on farmers / ranchers whenever possible
  - Data collection at farmers / rancher level must be met through user-friendly data collection interfaces
  - Use of remote sensing applications, satellite imagery (OPTIS) and precision agriculture technologies to meet data collection needs
Economic Recommendations

- Policies to cover risks to farmers/ranchers needed
  - Operational and practice changes often incur risks during 3-5 year transition periods, e.g. potential yield impacts
  - Insurance products or other risk coverage needed to overcome barriers to practice change - & can reinforce benefits later!
**Economic Recommendations**

- Proper valuation of ecosystem services – including soil carbon sequestration – can scale market approaches
  - Society demanding more from agriculture: costs and benefits of these demands to producers largely unknown
  - Quantification and monetization of ecosystem services to reflect true benefits to society will drive investments, demand
- Level of rigor required for MRV needs to match the financial return to the producer
  - Rigor increases project / program costs, but if outcome not appropriately valued, not cost-effective, not scalable
Sociocultural Recommendations

• High barriers to practice change are an ongoing challenge for producer engagement
• Tap and reward innovators and early actors to replicate change
  – Program and system design requires direct engagement of producers: innovators and early actors are risk-takers
  – Innovators and early actors viewed as community leaders within agricultural communities
  – Farmers learn from farmers, trusted partners (e.g. CCA)
• Decision support systems, materials needed: market signals not enough
  – Business case scenarios, cost-benefit analyses, comparative ROI based on systems, practices and desired outcomes
  – WE need to provide the tools / reduce burden to scale outcomes
QUESTIONS?

Debbie@c-agg.org
www.c-agg.org
MARKET-BASED PPP: AG OFFSET PROTOCOLS

2011 - USDA 1st GHG Conservation Innovation Grant (CIG) projects ($7.4M)
- C market methodologies and C credits
- C-AGG financial support to convene 8 projects at our meetings, focus on success
- Significant knowledge gained & shared
- Feedback loop to USDA
- New NRCS CIG convening model

2015 – USDA 2nd cohort GHG CIG projects ($10.1M)
- GHG CIGs ($3.9M) (9 projects)
- Environmental Markets ($2.1M) (6 projects)
- Innovative Conservation Finance ($4.1M) (8 projects)
- Microsoft purchase of rice carbon credits
Current US C Offset Market Landscape for Agriculture

MARKETS
- Compliance Market
- Voluntary Market*

PROTOCOLS
- Livestock Manure Management
- Rice Management
- Compost Additions
- Organic Waste Diversion
- Nutrient Management
- Avoided Conversion of Grasslands

REGISTRIES
- California Environmental Protection Agency
- American Carbon Registry
- Climate Action Reserve
- VCS
- Verified Carbon Standard

* A complete list of all of the currently approved agricultural methodologies/protocols can be found at www.c-agg.org