SESSION 3:


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• National Perspective
• Farm/Ranch Perspective
  – Conservation Toolbox
• Conservation Business Perspective
• Tracking Progress of the Portfolio and Pitfalls
Existing Data – Rely on it while committing to Improvement (Data and Progress)

U.S. Cropland Remaining Cropland Carbon Stock Change on Mineral Soils (MMT CO2e)

Examine the Literature then Set Goals

Figure 8.3: Global (A) and regional (B) estimates of technical mitigation potential by 2030. Note: Equivalent values for Smith et al. (2007a) are taken from Table 7 of Smith et al., 2007a.
Develop a Pathway to Success – Take Inventory and Perform Needs Assessment

U.S. Cropland Remaining Cropland Carbon Stock Change on Mineral Soils (MMT CO2e)

IPCC AR4
Develop a Pathway to Success – Take Inventory and Perform Needs Assessment

U.S. Cropland Remaining Cropland Carbon Stock Change on Mineral Soils (MMT CO2e)

- What Practices?
- Who Leads?
- How Much Cost?

Anticipate:
- Progress Measurement
- Course Correction
• National Perspective
• Farm/Ranch Perspective
  – Conservation Toolbox
• Conservation Business Perspective
• Tracking Progress of the Portfolio and Pitfalls
Cultivation, potatoes

Cult., potatoes stop
Grass planted

Some manure additions

Dorich et al. 2015/16, unpublished
SOC Stocks are not eternally depleted, they can be rebuilt over time.
<table>
<thead>
<tr>
<th>Climate Change Mitigation Building Block</th>
<th>Conservation Practice Standard</th>
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</thead>
<tbody>
<tr>
<td>Soil Health</td>
<td></td>
</tr>
<tr>
<td>327 Conservation Cover (ac)</td>
<td></td>
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<tr>
<td>328 Conservation Crop Rotation (ac)</td>
<td></td>
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<tr>
<td>329 Residue and Tillage Management, No Till (ac)</td>
<td></td>
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<tr>
<td>329A Strip Till (ac)</td>
<td></td>
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<tr>
<td>329B Mulch Till (ac)</td>
<td></td>
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<tr>
<td>330 Contour Farming (ac)</td>
<td></td>
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<tr>
<td>332 Contour Buffer Strips (ac)</td>
<td></td>
</tr>
<tr>
<td>340 Cover Crop (ac)</td>
<td></td>
</tr>
<tr>
<td>345 Residue and Tillage Management, Reduced Till (ac)</td>
<td></td>
</tr>
<tr>
<td>386 Field Border (ac)</td>
<td></td>
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<tr>
<td>393 Filter Strips (ac)</td>
<td></td>
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<tr>
<td>412 Grassed Waterways (ac)</td>
<td></td>
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<tr>
<td>585 Stripcropping (ac)</td>
<td></td>
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<tr>
<td>601 Vegetative Barriers (ft)</td>
<td></td>
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<tr>
<td>603 Herbaceous Wind Barriers (ft)</td>
<td></td>
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<tr>
<td>Nitrogen Management</td>
<td></td>
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<tr>
<td>590 Nutrient Management (ac)</td>
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<tr>
<td>Livestock Partnership</td>
<td></td>
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<tr>
<td>366 Anaerobic Digester</td>
<td></td>
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<tr>
<td>Grazing and Pasture</td>
<td></td>
</tr>
<tr>
<td>512 Forage and Biomass Planting (ac)</td>
<td></td>
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<tr>
<td>528 Prescribed Grazing</td>
<td></td>
</tr>
<tr>
<td>528A Prescribed Grazing</td>
<td></td>
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<tr>
<td>550 Range Planting</td>
<td></td>
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<tr>
<td>Agroforestry (not an official Building Block but benefits present)</td>
<td></td>
</tr>
<tr>
<td>380 Windbreaks and Shelterbelts (ft)</td>
<td></td>
</tr>
<tr>
<td>381 Silvopasture Establishment (ac)</td>
<td></td>
</tr>
<tr>
<td>390 Riparian Herbaceous Buffer (ac)</td>
<td></td>
</tr>
<tr>
<td>391 Riparian Forest Buffer (ac)</td>
<td></td>
</tr>
<tr>
<td>612 Tree and Shrub Establishment (ac)</td>
<td></td>
</tr>
<tr>
<td>645 Upland Wildlife Habitat (ac)</td>
<td></td>
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<tr>
<td>650 Windbreak Renovation (ft)</td>
<td></td>
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<tr>
<td>Rice (not an official Building Block but benefits present)</td>
<td></td>
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<tr>
<td>436 Irrigation Reservoir (ac-ft)</td>
<td></td>
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<tr>
<td>447 Irrigation Tailwater Recovery (no.)</td>
<td></td>
</tr>
</tbody>
</table>
NRCS Conservation Practices with Atmospheric Benefits and Numerous Co-benefits

<table>
<thead>
<tr>
<th>Qualitative Ranking</th>
<th>Practice Code</th>
<th>Practice Standard and Associated Information Sheet</th>
<th>Beneficial Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=Neutral</td>
<td>327</td>
<td>Conservation Cover (Information Sheet)</td>
<td>Establishing perennial vegetation on land retired from agriculture production increases soil carbon and increases biomass carbon stocks.</td>
</tr>
<tr>
<td></td>
<td>379</td>
<td>Multi-Story Cropping</td>
<td>Establishing trees and shrubs that are managed as an overstory to crops increases net carbon storage in woody biomass and soils. Harvested biomass can serve as a renewable fuel and feedstock.</td>
</tr>
<tr>
<td></td>
<td>380</td>
<td>Windbreak/Shelterbelt Establishment (Information Sheet)</td>
<td>Establishing linear plantings of woody plants increases biomass carbon stocks and enhances soil carbon.</td>
</tr>
<tr>
<td></td>
<td>381</td>
<td>Silvopasture Establishment</td>
<td>Establishment of trees, shrubs, and compatible forages on the same acreage increases biomass carbon stocks and enhances soil carbon.</td>
</tr>
<tr>
<td></td>
<td>512</td>
<td>Forage and Biomass Planting (Information Sheet)</td>
<td>Deep-rooted perennial biomass sequesters carbon and may have slight soil carbon benefits. Harvested biomass can serve as a renewable fuel and feedstock.</td>
</tr>
<tr>
<td></td>
<td>612</td>
<td>Tree/Shrub Establishment (Information Sheet)</td>
<td>Establishing trees and shrubs on a site where trees/shrubs were not previously established increases biomass carbon and increases soil carbon. Mature biomass can serve as a renewable fuel and feedstock.</td>
</tr>
<tr>
<td></td>
<td>666</td>
<td>Forest Stand Improvement (Information Sheet)</td>
<td>Proper forest stand management (density, size class, understory species, etc.) improves forest health and increases carbon sequestration potential of the forest stand. Managed forests sequester carbon above and below ground. Harvested biomass can serve as a renewable fuel and feedstock.</td>
</tr>
</tbody>
</table>
• National Perspective
• Farm/Ranch Perspective
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• Conservation Business Perspective
• Tracking Progress of the Portfolio and Pitfalls
Observation: There is plenty of carbon storage potential in the U.S. Terrestrial Ecosystem

Working Lands Conservation Practices can be Implemented with Proper Signals

There are Quantification Tools to Help Track Progress

Strong Business Case that Values Carbon Storage in the Terrestrial Ecosystem (Terrestrial C Portfolio)
This is more than Random Acts of Conservation – it’s Business

Transaction Costs and Registry

Buyer

Seller
This is more than Random Acts of Conservation – it’s Business
**Figure 6: EQIP Revolving Loan Fund**

1. NRCS and investor provide funds
2. Loans to EQIP-eligible producers to implement conservation
3. Loan repayments, including interest, fund new loans
4. Investor receives payoff at some level over time
5. NRCS as first-loss investor may not recoup full payback; could lose funds if not further revolve

**Figure 7: Investors as Intermediaries in Securing Conservation Easements**

1. Investor buys agricultural land with unique conservation value for $100,000.
2. Investor identifies ACEP-eligible farmer who needs land and can afford $100,000 but needs additional funds to secure easement.
3. Investor sells land to ACEP-eligible farmer for $10,000, with two requirements: the farmer must secure the easement ($100,000) and give it back to the investor.

**Figure 8: Aggregation Model with Investment Capital**

1. NRCS
2. Impact Investor
3. Value generated by project (environmental credits, cost reduction, increases in income)
CIG Conservation Finance Partnership Fund—The Idea

$10 million from CIG

$10 million from philanthropic/investment partner

Conservation Finance Partnership Fund

Project Returns:
- Payment for ecosystem services
- Value-added products
- Increased profits or equity

Investable Conservation Project Portfolio
• National Perspective
• Farm/Ranch Perspective
  – Conservation Toolbox
• Conservation Business Perspective
• Tracking Progress of the Portfolio and Pitfalls
It has been argued (by some) that a project that stores carbon temporarily has no value.

But how about a portfolio of these projects. Would there be no value to the program as a whole, which is not temporary?

Source: Marland 2015, presentation National Ag. Air Quality Task Force, Knoxville, TN
Carbon and Markets Opportunity

Cost = $3-5 billion/year

Currently available protocols:

• Avoided Conversion of Grasslands & Shrublands
• Compost Additions to Grazed Grasslands
• Soil Carbon Quantification
• Adoption of Sustainable Agricultural Land Mgmt

• Numerous unvalued co-benefits
A Few Potential Pitfalls to Consider

- Perfection vs. Portfolio of Good Projects
- Time Delays Associated with Implementation of Practices – Practice Maturity
- Payment Alignment with Practices
  - (price & time)
  - Conservation Legacy Effect – practice “stickiness factor”
  - Compliment C Markets
U.S. Cropland Remaining Cropland Carbon Stock Change on Mineral Soils (MMT CO2e)

SESSION 3: State of the knowledge on policies and incentives and socio-economic constraints on terrestrial C sequestration activities

What policy options are suited for land use and management for C sequestration and GHG emission mitigation? Voluntary conservation measures that provide enough economic incentive and ample implementation flexibility to have application in a broad spectrum of circumstance. The voluntary and compliance carbon markets work for some participants but currently exclude participants, a ‘portfolio approach’ is more farmer/rancher friendly.

What are the likely costs? Need an economic analysis but $2-4 billion per year but private capital is looking for investible projects. This should be a diverse funding stream – public, private, philanthropic, equity, bond, etc.

Do existing land use and agriculture programs policies enhance or deter adoption of CDR implementation? They enhance adoption on a small amount of acreage, need to attract finance while simultaneously deploying capital. Technical assistance is also critically important!

What are barriers? How do we overcome them? Too little money touching a small fraction of the land area. Limited to no value placed on terrestrial carbon sequestration. We need a business case for farmers, ranchers and investors.

What information is needed to assess the commercial viability of practices or land use change for C sequestration? Comprehensive cost/benefit analysis by practice, true valuation of practices and benefits over time.

What do we know about the co-benefits and negative impacts of the C sequestration terrestrial management practices and their economic value? (i.e., ecosystem services, soil health, water quality, etc.)? How important are induced or secondary macro-economic effects? We do not know enough and are unable to quantify many of the co-benefits, quantification can lead to valuation but we should not delay progress while we work on quantification tools for the co-benefits.
Planning today... for a better tomorrow.
How difficult would it be to entirely offset the carbon footprint of US Agriculture?

Entire U.S. Ag. Carbon Footprint = 516
(Enteric, rice, manure mgmt., field burning)

Cropland Fertilizer and Fossil Fuel Emissions = 218

Sum = 587
Figure 8.5: Total technical mitigation potentials (all practices, all GHGs: MtCO2-eq/yr) for each region by 2030, showing mean estimates.

Note: based on the B2 scenario though the pattern is similar for all SRES scenarios.
Source: Drawn from data in Smith et al., 2007a.

Source: IPCC Fourth Assessment Report: Climate Change 2007, WGIII, Mitigation
Conservation Planning and Conservation Effects

Example: Temporal Scales

- Planning
- Demonstration
- Education
- Effects

Baseline
Potential Further Degradation
Potential Contract End Dates
“Conservation Legacy Effect” Example
Forage and Biomass Planting (CPS512)
COMET-Planner Benefit = 0.37 TCO2e/ac/yr

Environmental Benefit by year (in gray):

<table>
<thead>
<tr>
<th>Year</th>
<th>Benefit Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY1997</td>
<td>0.37 TCO2e</td>
</tr>
<tr>
<td>FY1998</td>
<td>2 x 0.37</td>
</tr>
<tr>
<td>FY1999</td>
<td>3 x 0.37</td>
</tr>
<tr>
<td>FY2000</td>
<td>2 x 0.37 + any conservation legacy ((0.5 \text{ or } 0.75 \text{ or } 1.0)) \times 0.37</td>
</tr>
<tr>
<td>FY2001</td>
<td>1 x 0.37 + any conservation legacy ((0.5 \text{ or } 0.75 \text{ or } 1.0)) \times 0.37</td>
</tr>
<tr>
<td>FY2002 ONLY</td>
<td>conservation legacy ((0.5 \text{ or } 0.75 \text{ or } 1.0)) \times 0.37</td>
</tr>
</tbody>
</table>

Contract Expired, this acre is no longer in ProTracts Conservation Legacy Explored
**Environmental Impact Bond:** PFS to tx risk to willing investors to improve soil carbon

**Service Provider (Fund manager):**
- Crop/cattle yields $ +
  - CO2
  - H20
  - N20
  - Etc.

**Investors:** Upfront $ for soil carbon BMP intervention. Shares in upside/downside performance of outcomes.

**Credit revenues used to help repay bond purchasers**

**Payor:** Repays investors based on outcomes

**Upfront $:** Practice change, TA & initial yield hit +

**Pay For Success:** Payment for delivery of verified credits

**EPAF:** Put option contract platform

**Soil Carbon Club**

**Portfolio Registry**

**Land Stewardship Program** (BMP, protocols, data, modeling, M&V)

**3rd Party Verified Ecosystem Credits**

**Voluntary market**

**Compliance market**

**Mars $1B commitment**

**INVEST WITH PURPOSE**

**THE CLIMATE TRUST**