USDA United States Department of Agriculture

Natural Resources Conservation Service

Climate Change – Implementing Building Blocks for Climate Smart Agriculture

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National Leader Climate Change

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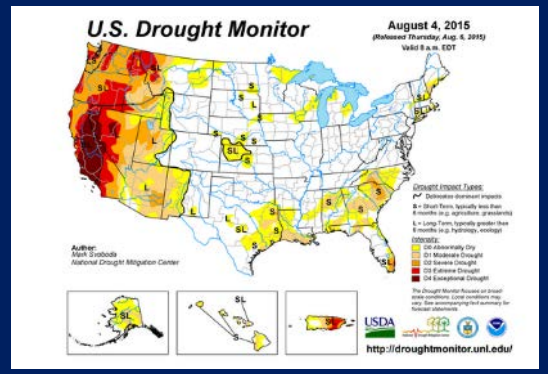
Deputy Chief, SSRA

NRCS National Leadership Team Meeting
October 18, 2016

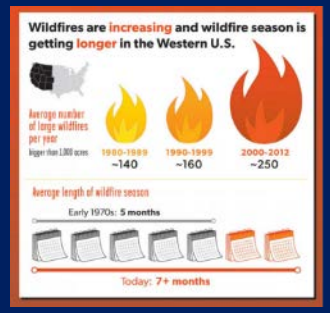
Climate Change Impacts are occurring



Increased drought

Extreme Rainfall

Reduction in water tables



Increasing wildfire seasons and intensity of wildfires

Increasing pests and diseases

Food and Agriculture Organization of the United Nations

Climate-smart agriculture (CSA)

Approach to guide actions needed to transform and reorient agricultural systems to effectively support development and **ensure food security in a changing climate.**

- sustainably increase agricultural productivity and incomes
- adapt and build resilience to climate change
- reduce greenhouse gas emissions where possible

CSA is an approach for developing agricultural strategies to secure sustainable food security under climate change

Mitigation – Sequestering C; Reducing emissions
Adaptation – Modifying production practices

- Two endmember concepts of actions
- Focus in NRCS Conservation Programs, Soil Health, USDA Climate Hubs, and Building Blocks

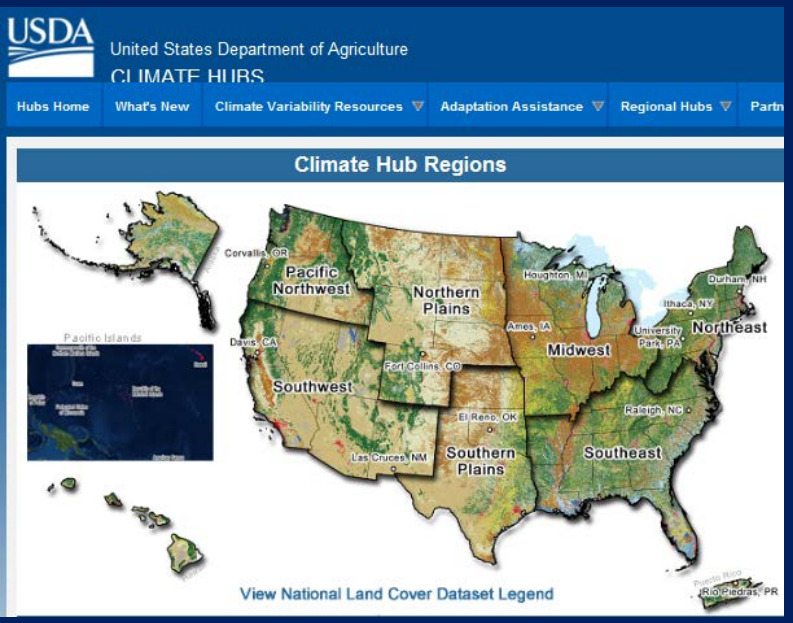
White House
National Security Council
Council on Environmental Quality
Office of Science and Technology

President's Climate Action Plan

June 2013

Key Objectives include:

- Cut carbon pollution in America
- Prepare the U.S. for impacts of climate change (EO 13653)
- Lead international efforts to combat global climate change and prepare for its impacts



THE WHITE HOUSE
WASHINGTON

President's Climate Action Plan

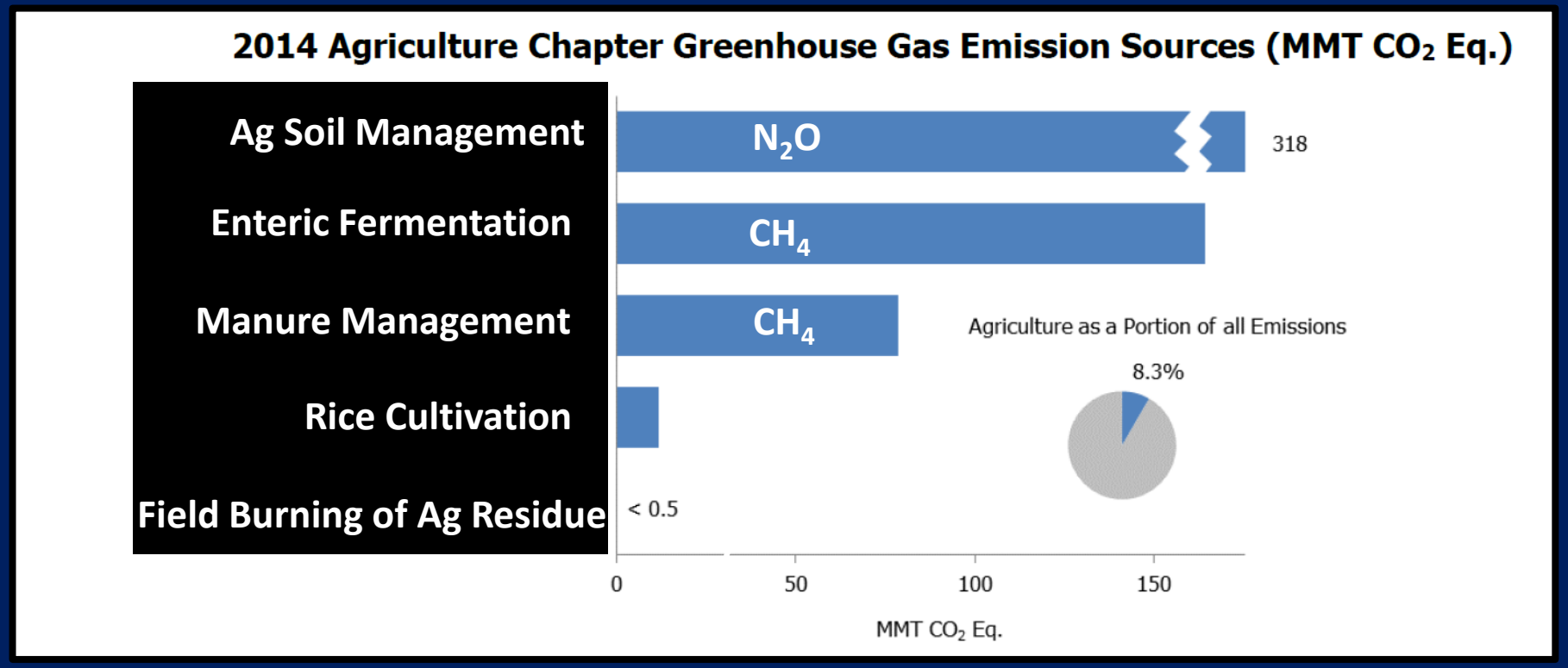
Regional USDA Climate Hubs
National Drought Resilient Partnership
Climate Data Initiative
Climate Resilience Toolkit

Foundation for USDA Building Blocks

Nov 12, 2014:

President Obama announced that by 2025 the U.S. intends to reduce GHG emissions by 26 to 28 percent below 2005 levels

GREENHOUSE GAS EMISSIONS FROM AGRICULTURE



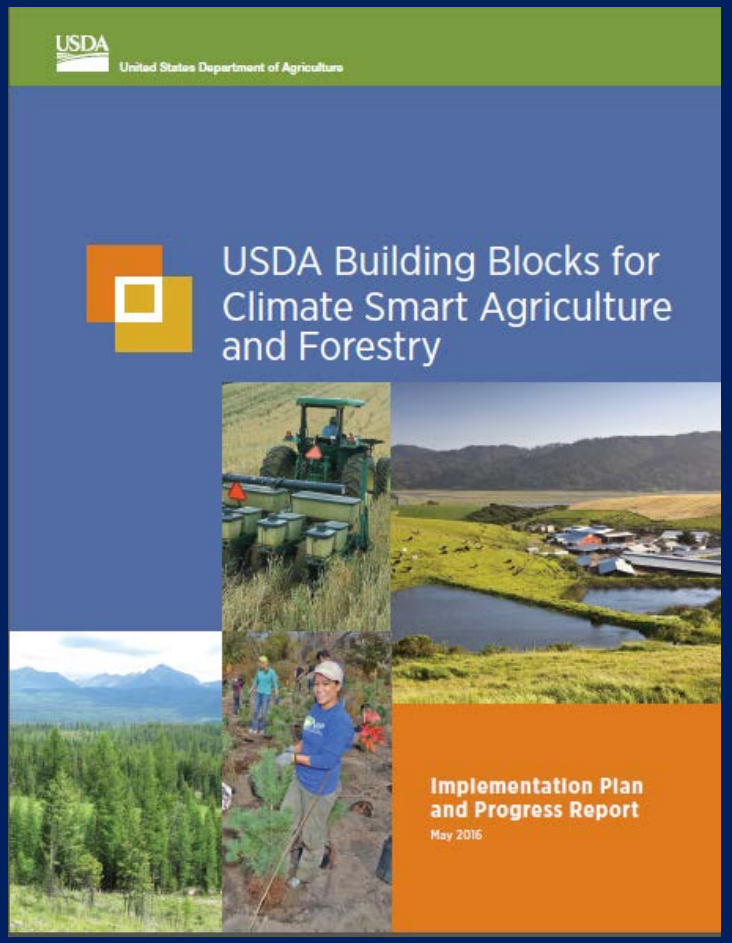
Total 2014 US emissions = 6,870.5 MMT CO_2 Eq

2014 Ag emissions = 573.6 MMT CO_2 Eq

2014: Agriculture contributes 8.3 percent of total U.S. greenhouse gas emissions.

Background for USDA Action

- **USDA is well-positioned to contribute since:**
  - Farmers and ranchers can:
    - Reduce GHG emissions
    - Store carbon
  - On-going conservation efforts of agencies, for example
    - Soil Health Initiative
    - Forest Restoration
    - Climate Change Adaptation

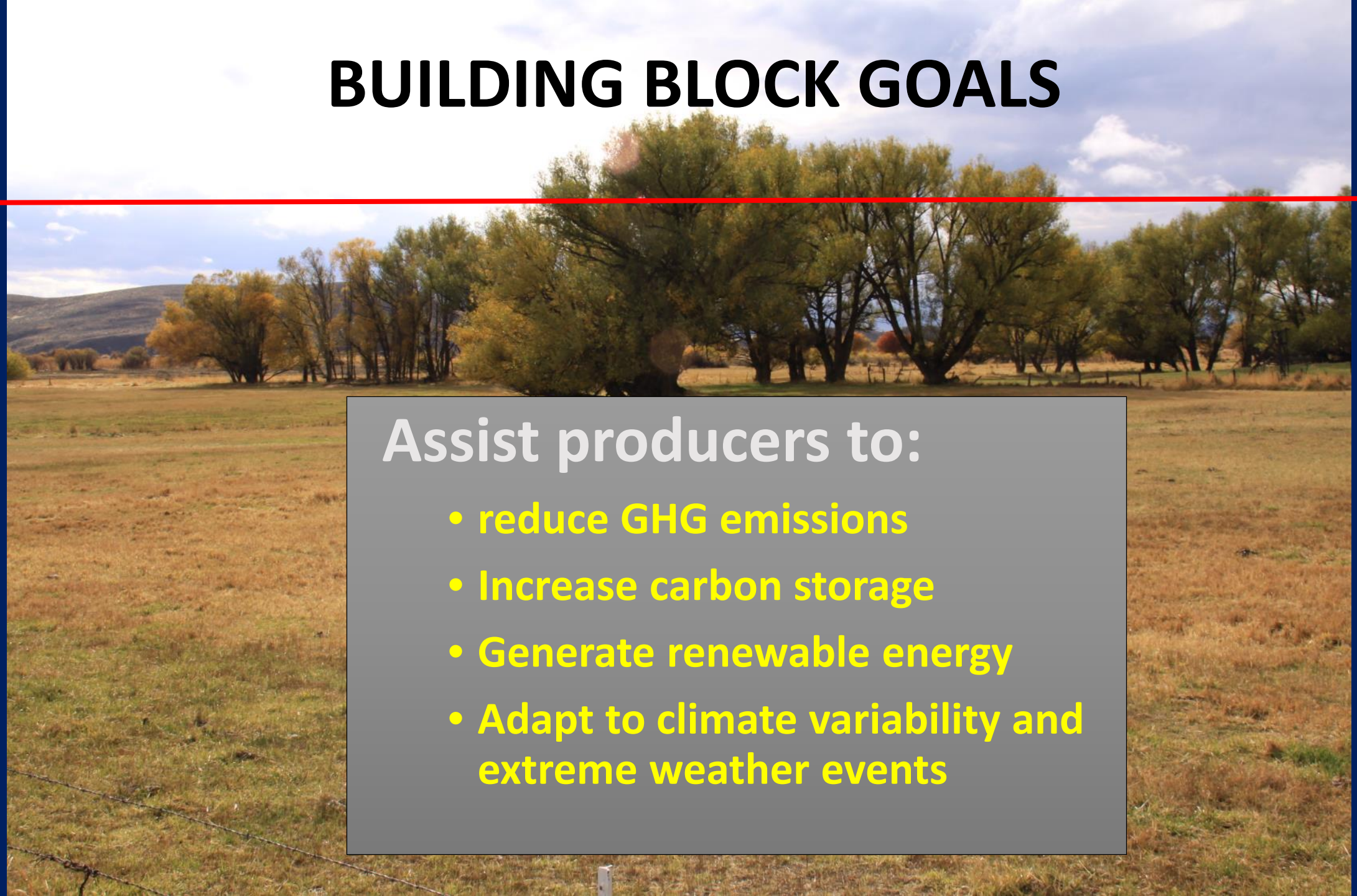


USDA Building Blocks for Climate Smart Ag and Forestry

Building Blocks Lead: USDA Climate Change Program Office

Agencies: NRCS, USFS, RD, FSA, ARS, NIFA, ERS, RUS

BUILDING BLOCK GOALS



Assist producers to:

- reduce GHG emissions
- Increase carbon storage
- Generate renewable energy
- Adapt to climate variability and extreme weather events

USDA Building Blocks for Climate Smart Agriculture and Forestry

ELEMENTS:

- Use existing conservation and energy authorities
- Voluntary and Incentive based
- Provide multiple economic and environmental benefits
- Designed for working farms and production systems – avoid actions that would inhibit production
- Cooperative and focused on building partnerships (w/industry, farm groups, conservation organizations)

NRCS Agency Lead: David Smith

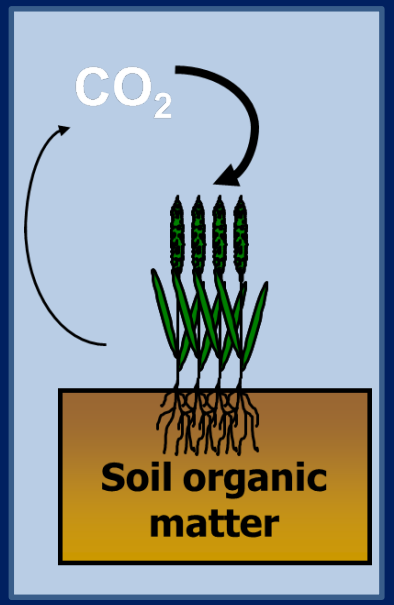
Building Block	NRCS Lead/Member	GHG Reduction by 2025 ($MMTCO_2e$ / yr)
Soil Health	Bianca Moebius-Clune	4 – 18
Nitrogen Stewardship	Norm Widman, Chris Gross, Dana Ashford-Kornburger	7
Livestock Partnerships	Glenn Carpenter	21.2
Conservation of Sensitive Lands	Mike Wilson	0.8
Grazing and Pasture Lands	Joel Brown, Sid Brantly, Dana Larsen	1.6
Private Forest Growth and Retention	Eunice Padley, Dan Lawson	4.8
Stewardship of Federal Forests	--------	2.5
Promotion of Wood Products	--------	19.5
Urban Forests	--------	0.1
Energy Generation and Efficiency	Rebecca MacLeod	60.2
Metrics and Quantification	Adam Chambers, Mike Wilson, Katie Cerretani	Total = 122-136

Soil Health
(Bianca Moebius-Clune)

- Integrate with NRCS Soil Health Initiative
- Promote CPS's that build OM, reduce emissions, and build more resilient soils
- Continue to invest in research, education, and extension on practices that promote soil health and reduce GHG emissions from cropland.

Promote Soil Health Management Systems

Conservation buffers



Conservation Tillage

Cover Crops

Nutrient Management

Water Management

Avoided Grassland Conversion (CRP)

Improved Rotations

Soil Health – 2016 Progress

- NRCS **Soil Health Division** - increase staffing, capacity building, and training
- **Partnerships:** to develop standardized comprehensive soil health assessment availability and economic data.
- **Conservation Practice Standards**—Review and update related to soil health management systems (SHMS).
- **SHIELD** - Progress toward developing the Soil Health Inventory and Evaluation of Land Use Decisions network

Soil Health Partnerships

Farmer-led Movement for Soil Health Receives $4 Million Boost

Funding will accelerate Soil Health Partnership's efforts to show farmers economic benefits of sound agriculture practices

NCGA

An NCGA Initiative

Support from
Monsanto
Natural Resources Conservation Service
United Soybean Board
The Walton Family Foundation

With Technical Support From
The Environmental Defense Fund
The Nature Conservancy

Midwest Row Crop Collaborative

Members

- Cargill
- Environmental Defense Fund
- General Mills
- Kellogg Company
- Monsanto Company
- PepsiCo
- The Nature Conservancy
- Walmart
- World Wildlife Fund – US

Nitrogen Stewardship

(Norm Widman, Dana Ashford-Kornburger)

Nitrogen Stewardship

Goal - Reduce 7 MMT CO_2e from Nitrogen Applications Annually

Enroll and maintain a total of 64 million acres of crop and pasture land under an enhanced N management plan

- Requires 4.5 million new acres each year from 2016 through 2025
- AND a "Legacy Effect" of 75% of new acres be maintained

Nitrogen Stewardship – 4R Approach

Enhanced Nitrogen Management – applying 4R principles –

- **right time**
- **right place**
- **right rate**
- **right source**

- ***Benefits extend beyond N_2O emissions***
  - **Reduced potential for nutrient runoff**
  - **Improve water quality**
  - **Improved nutrient use efficiency**
  - **Reduced fertilizer applied; reduced costs**

Nitrogen Stewardship – How?

To accomplish 64 million acres goal to mitigate N_2O emissions,

NRCS will need to:

- Increase funding for NRCS TA/FA and Technical Service Providers (TSP)
- Recruit and train additional TSP's.
- Prioritize use of nutrient management conservation activity plan (CAP 104)
- Develop partnerships with ag industry, especially agronomic consultants and ag retailers

Nitrogen Stewardship – 2016 Progress

- Provided training and technical assistance on nutrient management to NRCS agronomists and technical service providers.

- Building partnerships with industry and agribusiness professionals on nutrient management plan implementation and data collection.

Partnerships

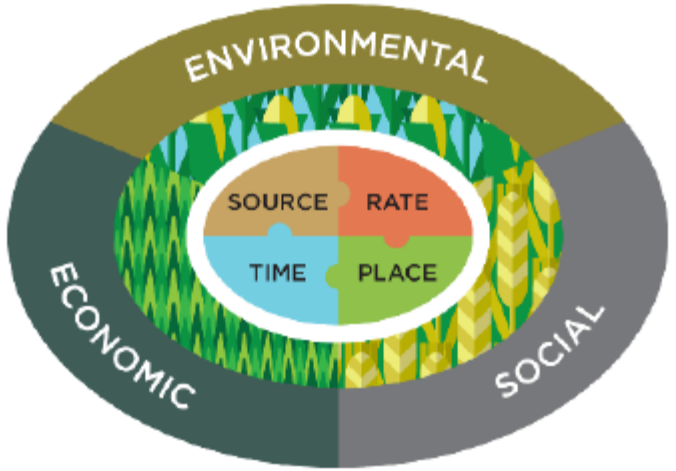
The Fertilizer Institute
Nourish, Replenish, Grow

Responsible AG SUPPORTER

Vision

All plant nutrients are applied using a measurable and recognized 4R nutrient stewardship framework, evidenced through better crop performance, improved soil health, and cleaner air and water.

4 nutrient stewardship



Livestock Partnerships
(Glenn Carpenter)

- Reducing methane emissions from livestock manure management
- Options include: anaerobic digesters, covers with flares, solid separation, and others

Livestock Partnerships – 2016 Progress

- **Webinar Training** on stacking practices among NRCS and RD to install digesters.
- NRCS contracted three new **digester projects**
- NIFA Funded three **competitive projects** on livestock and climate change- Okla St, Montana State, and South Dakota State Universities.

Conservation of Sensitive Lands
(Mike Wilson)

Soil and landscapes that are valuable due to properties (e.g., high organic matter) or function (e.g., wildlife habitat, water filtration)

- **Enroll C-rich soils (riparian, wetlands, Histosols) in CRP**
- **Enroll expiring CRP lands into permanent or long-term easements**

Sensitive Lands– 2016 Progress

- 118K new acres of riparian forest buffers and wetlands signed up in CRP.
- FSA provided support to Chesapeake Bay states by hiring several foresters
- Initiated a research study with Center for Behavioral and Experimental Agri-Environmental Research (CBEAR), FSA, NRCS, and ERS on effectiveness of outreach methods to producers with organic rich soils.
- Developing information to increase understanding of Service Center staff on role of easements in targeting C-rich soils

Grazing and Pasture Land
(Joel Brown)

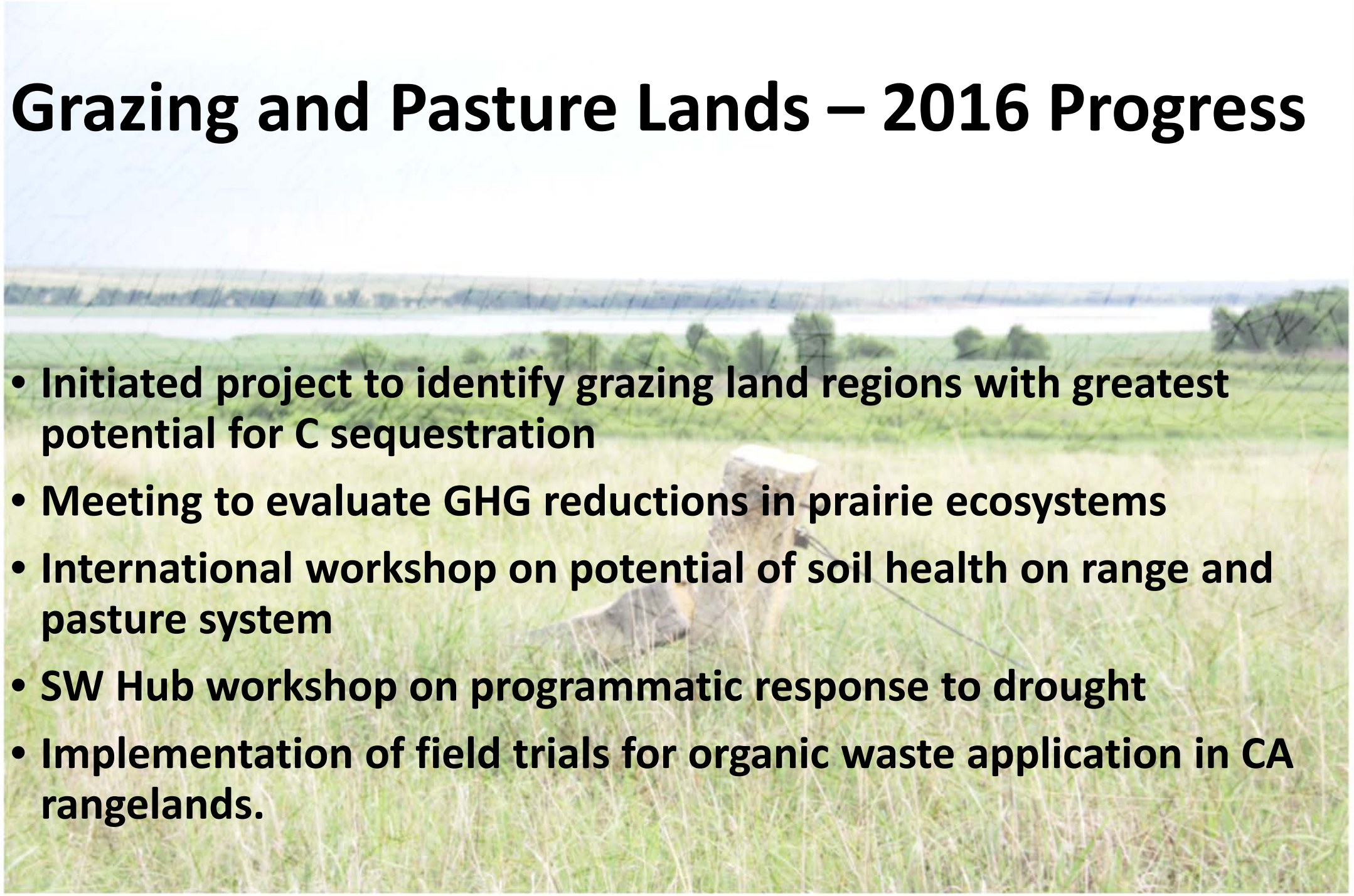
Focus:

- Prescribed Grazing
- Forage and Biomass Planting
- Range Planting

Goal: Establish grazing management plans on an additional 9 million acres (for total of 27 million acres)

Challenge: Carbon flux is dominated by rainfall and temperature (i.e., outside of manager's control)

Grazing and Pasture Lands – 2016 Progress



- Initiated project to identify grazing land regions with greatest potential for C sequestration
- Meeting to evaluate GHG reductions in prairie ecosystems
- International workshop on potential of soil health on range and pasture system
- SW Hub workshop on programmatic response to drought
- Implementation of field trials for organic waste application in CA rangelands.

Private Forest Growth and Retention
(Eunice Padley)

- Establish trees and shrubs on an additional 1 million acres of non-industrial private forestland through NRCS conservation programs
- Consider new building block for agroforestry

Private Forest Growth and Retention – 2016 Progress

- Developed **new CSP enhancements and EQIP payment scenarios** to provide more avenues for landowners to establish trees and shrubs
- Conducted **national training** on Windbreak Technology via NEDC
- **Windbreak establishment** being promoted by conservation districts, National Agroforestry Center, and Climate Hubs

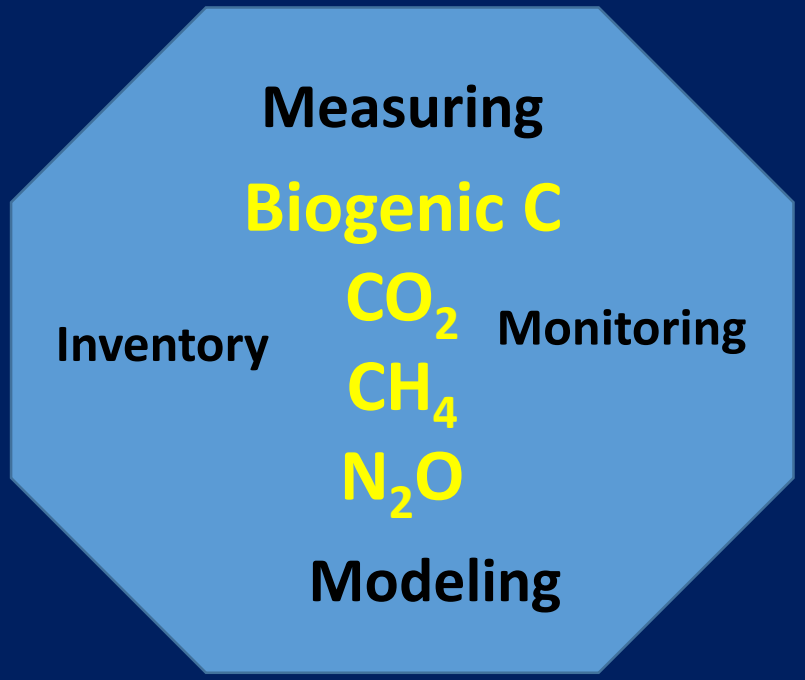
Energy Generation and Efficiency
(Rebecca MacLeod)

- **Programs** for renewable energy technologies and improved energy efficiency
  - **NRCS** EQIP National On-farm Energy Initiative (NOFEI)
  - **RD** Rural Business Service
    - Rural Energy for America Program (REAP)
    - REAP Energy Audit program development grants
    - Biofuel assistance
  - **RUS** Energy Efficiency and Conservation Loan Program (EECLP)

Energy Generation and Efficiency 2016 Progress

- **Meetings in ten Strikeforce states** to highlight energy projects and outline potential for collaborative financing approach.
- **Improved cooperation** between RD and NRCS to align standards for energy audits and TSPs/auditors.
- **EQIP NOFEI FY16**: 45 States $23M in obligations for CAP128 and 3 practices (FY15: $17M)
  - Additional TA allocation $360,000 for design

Metrics (Adam Chambers)



Two purposes

- **Document results**
- **Track progress toward the goals**

Two parts

- **Practice and technology data**
- **Greenhouse gas calculations**

Tracking both direct impacts of USDA actions and indirect effects of practice and technology diffusion

COMET Farm | NRCS USDA Colorado State University

Whole farm and ranch GHG accounting tool

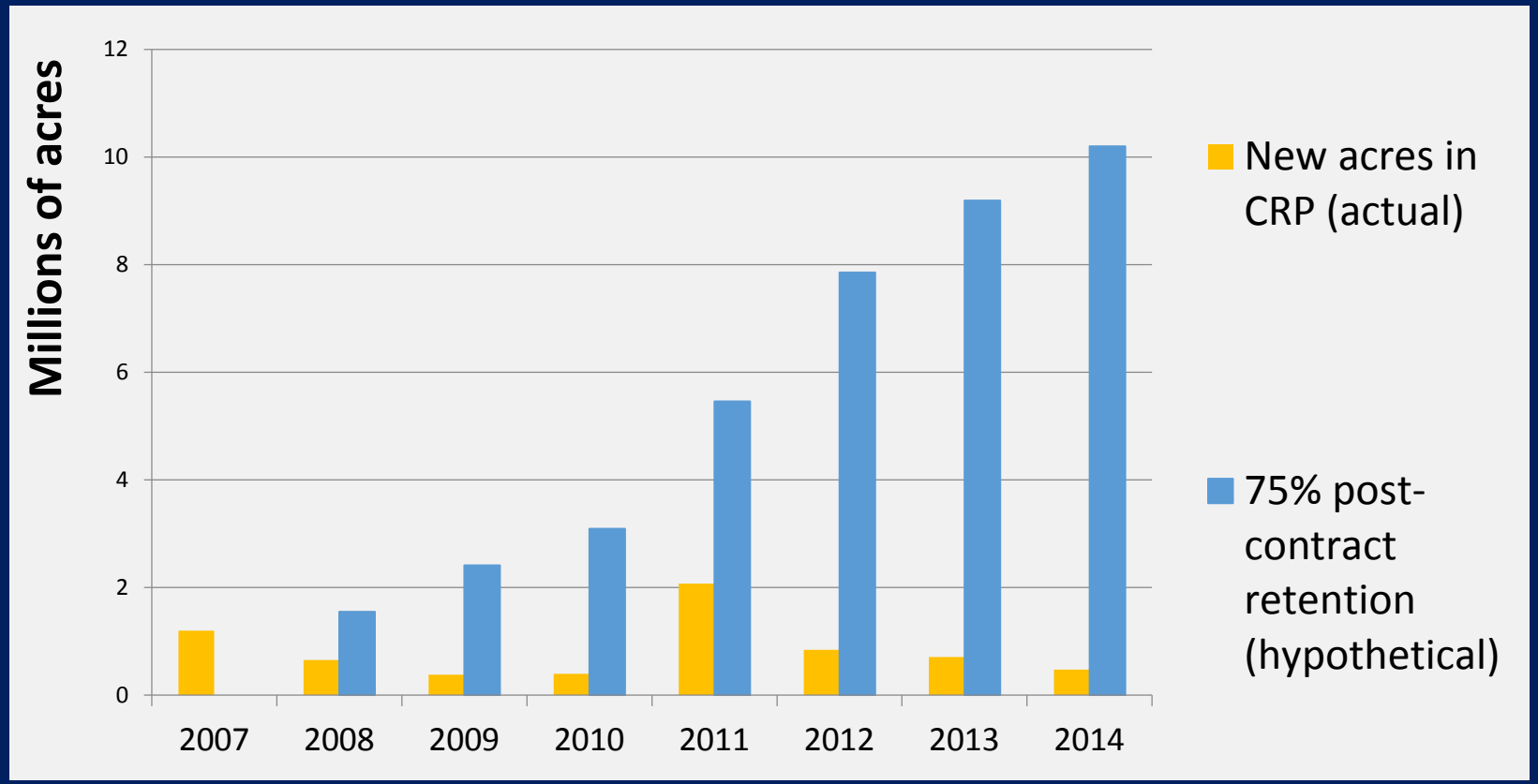
USDA CARBONSCAPES

A national look at carbon landscapes and a central location for USDA Carbon inventory, modeling and mapping of terrestrial biosphere carbon

A national look at carbon landscapes and a central location for USDA Carbon Inventory, modeling, and mapping of terrestrial biosphere carbon

Key Metrics Factors

Direct support/Legacy effect of USDA programs



Also:

Multiplier Effect – Farmers adapting management practices without USDA support; possibly with assistance of crop advisors, others

NRCS Commitment for USDA Building Blocks – 2016 Additional EQIP Funding

- Additional $72.3 million in EQIP financial assistance (FA) and technical assistance (TA) to states
- Targeted funds for conservation practices that align to GHG Building Blocks

Climate Smart EQIP Practice Priorities FY 2016

Climate Mitigation Building Block	Code	Conservation Practice
Soil Health	327	Conservation Cover
	328	Conservation Crop Rotation
	329	Residue and Tillage Management, No Till
	330	Contour Farming
	332	Contour Buffer Strips
	340	Cover Crop
	342	Critical Area Planting
	345	Residue and Tillage Management, Reduced Till
	386	Field Border
	393	Filter Strips
	412	Grassed Waterways
	585	Stripcropping
	601	Vegetative Barriers
	603	Herbaceous Wind Barriers
Nitrogen Mgt	590	Nutrient Management

Climate Smart EQIP Practice Priorities FY 2016

Climate Mitigation Building Block	Code	Conservation Practice
Livestock Partnership	366	Anaerobic Digester
	367	Roofs and Covers
Grazing & Pasture	512	Forage and Biomass Planting
	528	Prescribed Grazing
	550	Range Planting
Energy Efficiency	372	Combustion System Improvement
	374	Farmstead Energy Improvement
	670	Lighting System Improvement
	672	Building Envelope Improvement
Private Forests	380	Windbreaks and Shelterbelts
	381	Silvopasture Establishment
	390	Riparian Herbaceous Buffer
	391	Riparian Forest Buffer
	612	Tree and Shrub Establishment
	645	Upland Wildlife Habitat
	650	Windbreak Renovation

Specific State and National NRCS Actions *for Building Block Success*

Continued internal training to:

- **Increase knowledge** of mitigation/adaptation, Building Blocks, ect. to better understand how NRCS and U.S. farmers and ranchers are impacted
- Communicate to staff the **urgency and win-win opportunities** in implementing activities for mitigation and adaptation
- Assist employees in **framing climate-related discussions** with clients. (e.g., leverage the soil health movement to discuss importance of soil C sequestration

Specific State and National NRCS Actions *for Building Block Success*

- **Success stories -** Document and highlight on special EQIP funding and other adaptation/mitigation related issues.
- **Refocus NRCS financial and technical assistance -** Assess opportunities to identify actions that capture and store carbon, mitigate GHG's, or foster adaptation.
- E.g. **EQIP ranking criteria -** evaluate and adjust to:
  - Target vulnerable, C-rich soils and landscape for easements
  - Emphasize mitigating and adapting practices, including anaerobic digesters

Specific State and National NRCS Actions *for Building Block Success*

- **Reinforce partnerships** with agribusiness, NGOs, and other agencies
  - **Non-profits/NGO's -** central to success of Building Blocks. (e.g, TFI is assisting in expanding nutrient management, and is a source of educational materials for the 4R's.)
  - **Involvement from industry** - Livestock Partnerships BB will benefit - a number of very large commercial scale digester projects have been announced
  - **Benefit of "stackability" -** Leverage specific funding from various USDA agencies: Staff should understand of TA/FA benefits for digesters from NRCS and RD's "REAP" program

Specific State and National NRCS Actions *for Building Block Success*

- **Producer groups or soil health networks –** developed by local ag (facilitated by agency staff) to support and accelerate implementation in the field – demonstration farms, local technical support.

- **Large farming operations -** Promote the building blocks to large operations. (The $450K cap on EQIP might provide assistance for only a very small portion of a project in a large operation, but that assistance might provide impetus)

Specific State and National NRCS Actions *for Building Block Success*

Research needs

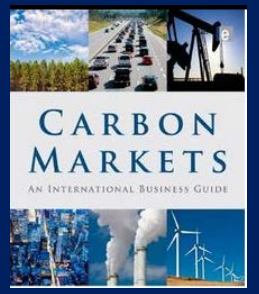
- Environmental impacts (benefits/limitations) of conservation practices
- Evaluate existing data or conduct studies on a regional/state-wide basis
- Develop spatially explicit analysis for cost-benefit from practice implementation

NRCS and Climate Change

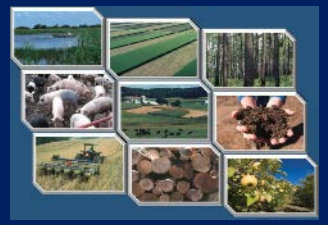
Climate Hubs

Snow Survey and
Water Supply Forecasting

National Soil Moisture Network
Drought Early Warning System



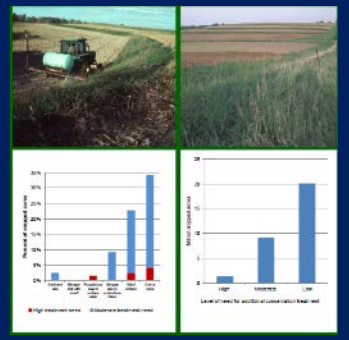
Environmental Markets



USDA Building Blocks
for Climate Smart Agriculture and Forestry

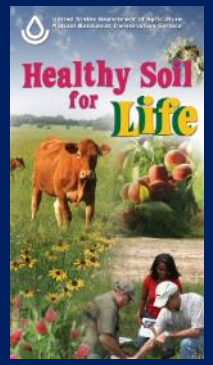
COMET Farm

USDA CARBONSCAPES



NRI/CEAP/
Soil Monitoring

FY16 EQIP Funds targeting
Climate Change



Soil Health

CIG Grants
*(Markets/Nutrient Mgt/
Air &Water Quality/
GHG Markets/Water Qual Trading
Conservation Finance)*

Soil Survey
Ecological Site

NRCS—A pioneer in conservation for over 80 years, working with landowners, local and state governments, tribes, and other federal agencies to maintain healthy and productive working landscapes.

QUESTIONS/DISCUSSION

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