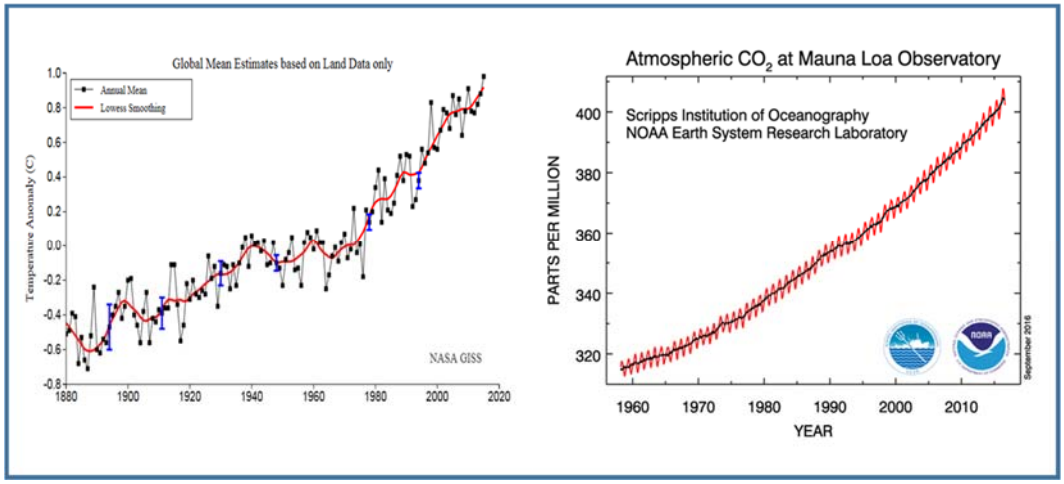
October 5, 2016

USDA Building Blocks for Climate Smart Agriculture and Forestry
NRCS Implementation

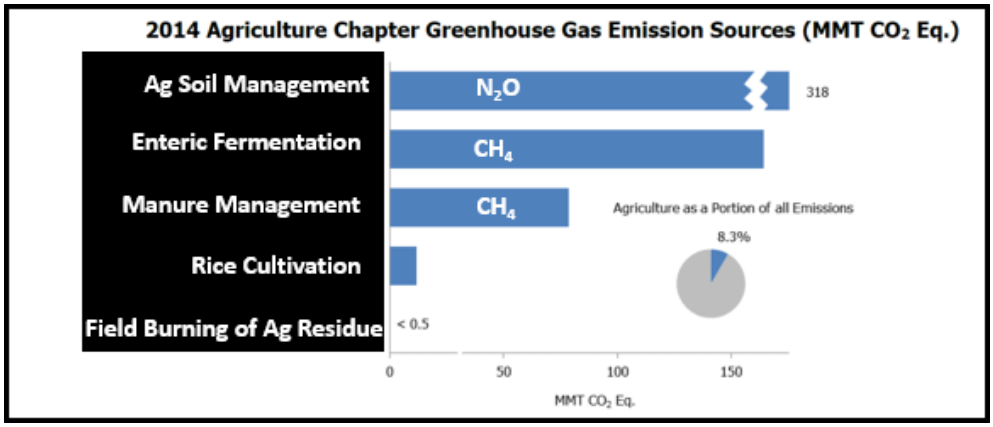
A. Introduction: Anthropogenic inputs from burning fossil fuels are the principal cause of increasing levels of atmospheric CO_2. The overall increase in greenhouse gas (GHG) concentration (currently > 400 ppm CO_2) is unprecedented within modern history and has resulted in changing trends, patterns, and events of weather and climate on a local and regional basis. These climate changes and extreme weather events are also leading to increasing global temperatures, sea level rise, acidification and warming oceans, decreasing snow and ice cover, as well as increasing diseases, droughts, and floods (http://climate.nasa.gov/).



The U.S. is providing global leadership for addressing climate change. The President's Climate Action Plan has three key pillars and is the foundation for creating the USDA Climate Hubs, National Drought Resilience Partnership, Climate Data Initiative, and Climate Resilience Toolkit. The Action Plan also directs increasing emphasis on federal agency adaptation, identifying new approaches to reduce emissions from land-use, and to protect and restore critical landscapes such as forests, grasslands, and wetlands. These concepts have resulted in creation of the USDA Building Blocks for Climate Smart Agriculture and Forestry, which rely heavily on the success of Natural Resources Conservation Service (NRCS) programs.

B. Agriculture and Greenhouse Gases: Climatic changes are impacting agriculture in multiple ways, e.g., water availability, erosion, pests, cropping practices, and yields. The rate of climate change and increasing extremes in weather events, combined with the increasing world population, require modifications to agricultural systems in the U.S. and around the world. These changes can be costly and difficult to enact. In addition, agriculture plays a significant role in greenhouse gas emissions, contributing 8.3% of total U.S. emissions in 2014. These emissions are from three principal sources: fertilizer management (N_2O), enteric fermentation

(CH_4), and manure management (CH_4). USDA and NRCS are addressing these issues from the context of both adaptation and mitigation.



Climate change impacts all SWAPAE+H natural resource areas and is increasing the importance of conservation. The financial and technical assistance for conservation systems that NRCS provides to private land owners specifically address carbon related to climate change: decreasing atmospheric GHG concentrations, reducing energy emissions, and increasing soil carbon through conservation practices (e.g., reduced tillage, cover crops, agroforestry). Subsequently, there are co-benefits of our practices with other resource areas.

C. Building Blocks: USDA, through leadership of the Climate Change Program Office, has created the USDA Building Blocks for Climate Smart Agriculture and Forestry. These ten building blocks are general categories of emphasis.

Building Block	NRCS Lead/Member	GHG Reduction by 2025 ($MMTCO_2e$)
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

D. Foundation: The building blocks are based on several broad concepts or elements:

ELEMENTS:
1. Use existing conservation and energy authorities
2. Voluntary and Incentive-based-programs that provide technical and financial assistance for resource management
3. Provide multiple economic and environmental benefits - efficiency improvements, co-benefits, improved yields, or reduced risks
4. Designed for working farms and production systems – avoid actions that would inhibit productivity and efficiency
5. Cooperative and focused on building partnerships (w/industry, farm groups, conservation organizations)

E. Actions and Goals by 2025: NRCS has a core role to the success of the building blocks. Scientists from NRCS and other USDA agencies were involved in developing the actions of each building blocks and our state and field offices are directly involved in achieving the goals. A recent report (May, 2016) documents the progress to date.

Soil Health:

2025 Goals: Integrate with the NRCS Soil Health Initiative and promote implementation of more than 10 NRCS conservation practices as soil health management systems that improve soil organic matter, reduce emissions from soils and equipment, and promote healthier, more climate change resilient soils nationwide.

2016 Progress: Increased staffing, capacity building, and training from the Soil Health Division and others; integration of soil health management systems into CPS's, working to leverage partnerships, building the Soil Health Inventory and Evaluation of Land use Decisions (SHIELD) network.

Nitrogen Stewardship:

2025 Goals: Reduce nitrous oxide emissions and provide cost savings by focusing on the right timing, type, placement, and quantity of nutrients.

2016 Progress: Provided training and technical assistance on nutrient management to NRCS agronomists and technical service providers, building partnerships with industry and agribusiness professionals regarding nutrient management plan implementation and data collection.

Livestock Partnerships:

2025 Goals: Install 500 anaerobic digesters; install impermeable covers and flares on 10 percent of dairy cattle and swine operations.

2016 Progress: Webinar training conducted on stacking practices among NRCS and RD staff to install digesters. Recognize that this goal will require increase in funding for staff and operating budget to increase progress. NRCS has contracted three new digester projects,

and NIFA has funded three competitive projects on livestock and climate change (grants to Oklahoma St, Montana St, and South Dakota State Universities).

Conservation of Sensitive Lands:

2025 Goals: Enroll 400,000 acres of Conservation Reserve Program (CRP) with high GHG benefits; protect 40,000 acres through easements; transfer expiring CRP acres to permanent easements.

Progress: 118,000 new acres of riparian forest buffer and wetlands were signed up in CRP in FY2016. FSA also provided support to Chesapeake Bay states to hire several additional foresters. Initiated cooperative study with the Center for Behavioral and Experimental Agri-Environmental Research (CBEAR), FSA, NRCS, and ERS on effectiveness of outreach methods regarding conservation to producers on organic-rich soils. Also, initiated discussions with Land Trust Alliance.

Grazing and Pasture Lands:

2025 Goals: Establish grazing management plans on an additional 9 million acres for a total of 27 million acres.

2016 Progress: Initiated a project to identify regions with greatest potential for C sequestration via grazing; professional meeting to evaluate GHG reductions in prairie ecosystems; international workshop on potential of soil health on range and pasture systems; SW hub workshop regarding programmatic response to drought; and implementation of field trials for organic waste application on rangeland in CA.

Private Forest Growth and Retention:

2025 Goals: Establish trees and shrubs on an additional 1 million acres of nonindustrial private forestland through NRCS conservation programs.

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 through conservation districts, the National Agroforestry Center, and Climate Hubs.

Energy Generation and Efficiency:

2025 Goals: Promote renewable energy technologies and improve energy efficiency through the Energy Efficiency and Conservation Loan Program, High Energy Cost Grant Program, Rural Energy for America Program, the National On-Farm Energy Initiative, and Rural Housing Service programs.

2016 Progress: Meetings in nine StrikeForce states to highlight energy potential of NRCS programs and explain potential impact using a collaborative financing approach.

F. Additional NRCS Efforts:

2016 EQIP Fund Allocation for Building Blocks

$72.3 million were distributed to states for FA and TA. These funds targeted conservation plans that included any of 31 practices that fit within six building blocks that would decrease GHG emissions, sequester C, or decrease energy usage.

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

Conservation Innovation Grants:

The 2016 CIG grants addressed **three focus areas**—improving water quality, advancing the conservation finance aspect of environmental markets, and boosting the number of historically underserved. There were projects that were funded that addressed topical areas of the building blocks; GHG's, soil health, and nutrient management.

G. Specific State and National NRCS Actions Needed for Building Block Success

1. Continued internal training via on-line courses, workshops, and adaptive management workbooks to:
    a. Increase workforce knowledge of climate change mitigation and adaptation, the USDA building blocks and other related efforts to better understand how NRCS and U.S. farmers and ranchers are impacted.
    b. Communicate to field staff the urgency and win-win opportunities in implementing activities for climate change mitigation and adaptation.
    c. Assist employees in how they frame their climate-related discussion of these issues with clients. For example, leverage the soil health movement's expanding momentum to discuss the importance of soil carbon sequestration.

2. Document and highlight “success stories” throughout the country on special EQIP funding and other adaptation/mitigation related issues.
3. Conduct a high-level assessment of opportunities to refocus NRCS financial and technical assistance, within existing authorities, to identify actions that capture and store carbon, mitigate GHG’s, or foster adaptation. For example, evaluate and consider adjusting EQIP ranking criteria to:
    a. Target vulnerable, carbon-rich soils and landscape for easements.
    b. Emphasize climate change mitigating and adapting practices, including anaerobic digesters.
4. Reinforce partnerships with agribusiness, NGOs, and other agencies to advance the common goals of reducing GHG emissions and natural resource protection.
    a. Livestock Partnerships Building Block will benefit from involvement from industry--a number of very large commercial scale digester projects have been announced. Be sure that NRCS works with these partners to achieve GHG goals. Also, employees should understand the benefit of “stackability” of TA and FA benefits for digesters and similar TA and FA from RD’s “REAP” program for methane to electricity generation.
    b. Partnerships with non-profits such as The Fertilizer Institute (TFI) are central to the success of the Nitrogen Stewardship Building Block. TFI is assisting in expanding nutrient management, and is a source of educational materials for the 4R’s.

5. Promote the building blocks to large farming operations; e.g., ones that are above the normal size with which NRCS commonly focuses with as clientele. The $450K cap on EQIP might provide assistance for only a very small portion of a project in a large farming operation, but that assistance might provide the impetus to adopt a GHG mitigating technology or practice.
6. Evaluate existing data or conduct studies on a regional/state-wide basis for environmental impacts (benefits/limitations) of conservation practices. It is important to have spatially explicit analysis that would allow us to get the greatest cost-benefit from practice implementation.