Quantifying Farm-Scale Greenhouse Gas Fluxes in Agriculture and Forestry

Coalition on Agriculture Greenhouse Gases

Denver, CO

July 15, 2014
Goal: To create a standard set of GHG quantification methods and tools for landowners, USDA, and other stakeholders.

- Phase 1: Report outlining comprehensive science-based methods for entity-scale GHG estimation.
- Phase 2: Develop a user-friendly tool that follows the methods report to provide land owners and managers with reliable and understandable estimates of GHG emissions and C sequestration.
REPORT LAYOUT AND CONTENT

- Executive Summary
- Introduction
- Considerations
- Crop and Grazing
- Wetlands
- Animal Systems
- Forest lands
- Land Use Change
- Uncertainty Assessment
The Methods Report is designed to be:

- A scientifically vetted means for USDA to provide local-scale, standardized and transparent estimation of GHG fluxes
- Consistent with the USDA and EPA national GHG inventories
- Aligned with NRCS’s COMET Farm and other USDA GHG tools.
- Coordinated with water quality or other tools to assess environmental services benefits
CHALLENGE: Vetting the methods. Establishing the rigor and transparency of the report.

Science-Based Methods

CCPO
Inter-Agency Tech. Rev. May 2012
Scientific Experts Feb – March 2013
Public Comment, Final Inter-Agency and USDA Review Sept - Oct 2013
Final Report Release July 2014

- 38 expert authors
- 29 scientific reviewers
- 21 subject matter experts

Federal agency experts
KEY CONSIDERATIONS

1. Transparency
2. Consistency
3. Comparability
4. Completeness
5. Accuracy
6. Cost effectiveness
7. Ease of use

BALANCING ACT
✓ Maximize accuracy … but maintain ease of use
✓ Complete … but cost effective
✓ Stand alone … but consistent and comparable
✓ Transparent … but with scientific rigor … and user-friendly
CHALLENGE: Capturing management of the whole operation
<table>
<thead>
<tr>
<th>Category</th>
<th>Practices</th>
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| Cropland            | - Fertilizer management  
                      - Tillage management  
                      - Crop rotations  
                      - Cover cropping  
                      - Water or residue management in cultivated rice  
                      - Drainage  
                      - Irrigation  
                      - Biomass burning |
| Grazing Land        | - Fertilizer management  
                      - Grazing management  
                      - Species enhancement  
                      - Drainage  
                      - Irrigation  
                      - Prescribed burning |
| Livestock           | - Animal housing  
                      - Feeds and additives  
                      - Feeding management  
                      - Manure collection and storage  
                      - Composting  
                      - Land application of manure |
| Forestry            | - Thinning and harvest  
                      - Fertilizer management  
                      - Species management  
                      - Irrigation  
                      - Biomass burning  
                      - Planting/re-establishing  
                      - Clearing and/or land conversion |
| Agroforestry        | - Windbreaks  
                      - Alley cropping  
                      - Silvopasture  
                      - Riparian forest buffers  
                      - Forest farming  
                      - Species selection/management  
                      - Cropping system/management |
| Managed Wetlands    | - Species mix  
                      - Biomass management  
                      - Water management |
CHALLENGE: Bringing all the methods together into a seamless estimation tool.

ARS Tools like DairyGEM, the work of Rotz and others

Other equations, emission factors, or new hybrid approaches.

USFS Tools like FVS, FOFEM, and iTree
Integrating the methods into COMET-Farm . . .
Entity-Scale GHG Methods Report

COMET USDA GHG Tool

Energy Use

Cropland / Grazing Land

Livestock

Output Reporting for GHG Decision Support, Quantification and Documentation

USDA Forest C Tool

Forestry

REVISIT / REVISE /
UPDATE

VALIDATION

Research and Data

R&D

VERITING

IPCC Tier 1
CHALLENGE: Assessing uncertainty.

- Merging models and input data sources
- Including expert judgment for variables and error
- Issues of scale

Monte Carlo Simulation

- How to establish PDFs for variables that don't have data?
CHALLENGE: Statistics!

• Extrapolating from sites to all areas of the U.S.
• Accounting for Climate / soils / management interactions
• Comprehensively accounting for all cropping systems and practices
  – Agroforestry
  – Specialty crops
  – Cover cropping
  – Fertilizer application
  – Biochar application
• Uncertainty Assessment
Other News from USDA:

- Adaptation Planning
- Climate Hubs
- Food Security Report
- Biogas

### Notices

This section of the Federal Register contains documents other than rules or proposed rules that are applicable to the public. Notices of hearings and investigations, committee meetings, agency decisions and rulings, delegations of authority, filing of petitions and applications and agency statements of organization and functions are examples of documents appearing in this section.

**DEPARTMENT OF AGRICULTURE**

Office of the Chief Economist; Global Climate Change, Food Security, and the U.S. Food System

**AGENCY:** Office of the Chief Economist, U.S. Department of Agriculture.

**ACTIONS:** Request for nominations of expert peer reviewers.

**SUMMARY:** The U.S. Department of Agriculture (USDA) invites the public to nominate scientific experts to be considered as peer reviewers for the external peer review of the draft document entitled, “Global Climate Change, Food Security, and the U.S. Food System.” The draft document was prepared by USDA and a team of multi-institutional experts to support the National Climate Assessment. The draft document is a technical analysis of the issues, and policy considerations are outside its scope.

**DATES:** Responses to this notice should be submitted by 11:59 p.m. Eastern Time on August 7, 2014.

**ADDRESSES:** Any interested person or organization may nominate scientific more information and necessary materials.

**FOR FURTHER INFORMATION CONTACT:** Questions concerning nomination receipt should be directed to Margaret Walsh of the Climate Change Program Office via Email: opgo@noco.usda.gov or by telephone 202-720-9978.

**SUPPLEMENTARY INFORMATION:**

I. Information on the Draft Documents for Global Climate Change, Food Security, and the U.S. Food System

This report will be published as a USDA technical document. Publication is anticipated in the Fall of 2015. Connections between weather, climate, and food security have long been recognized. This report evaluates the possible changes to each element of the food system and food security as a result of changes in climate based on information in the peer-reviewed scientific and economic literature. Temperature and precipitation patterns, as well as changes in weed, pest, and disease prevalence are already occurring under a changing climate. These effects are expected to result in transformations in ecosystem functioning and in the economic viability of agriculture in many regions of the world, as well as in the refrigeration requirements of food products, transportation patterns, and other effects. The U.S. is currently a major food importer and exporter, and provides a safety net for many food insecure nations. Global changes both in climate and in food security are therefore likely to influence the U.S. and present implications for U.S. producers and consumers.

II. How To Submit Nominations for Peer Reviewers

Expertise Sought: USDA is seeking candidates who are nationally and/or internationally recognized scientific experts to serve as external peer reviewers. Nominees should possess and demonstrate background knowledge and experience in one or more of the following areas: Food security; food systems; agricultural production; economic access to food; food utilization; stability of food availability, access, or utilization; climate change; food production; agricultural employment; food storage; food transportation; food processing; food packaging; food retailing; food consumption and food disposal. Reviewers may not be authors or technical contributors to the draft report. Qualified experts representing a range of educational institutions, institutional institutions, non-governmental/non-profit organizations, private industry, independent scientific institutions, and the Federal service are desired for the final review panel. No travel will be required, but nominees must be available between September 18, 2014 and November 7, 2014 to comprehensively review the 250 (estimated) page draft report. A form will be provided to reviewers for comments and proposed edits.

**Selection Criteria:** Selection criteria for individuals nominated to serve as...
Thank you!

Marlen Eve
U.S. Department of Agriculture
Climate Change Program Office
meve@oce.usda.gov
(202) 401-0979

www.usda.gov/oce/climate_change