

USDA Climate Change Activities



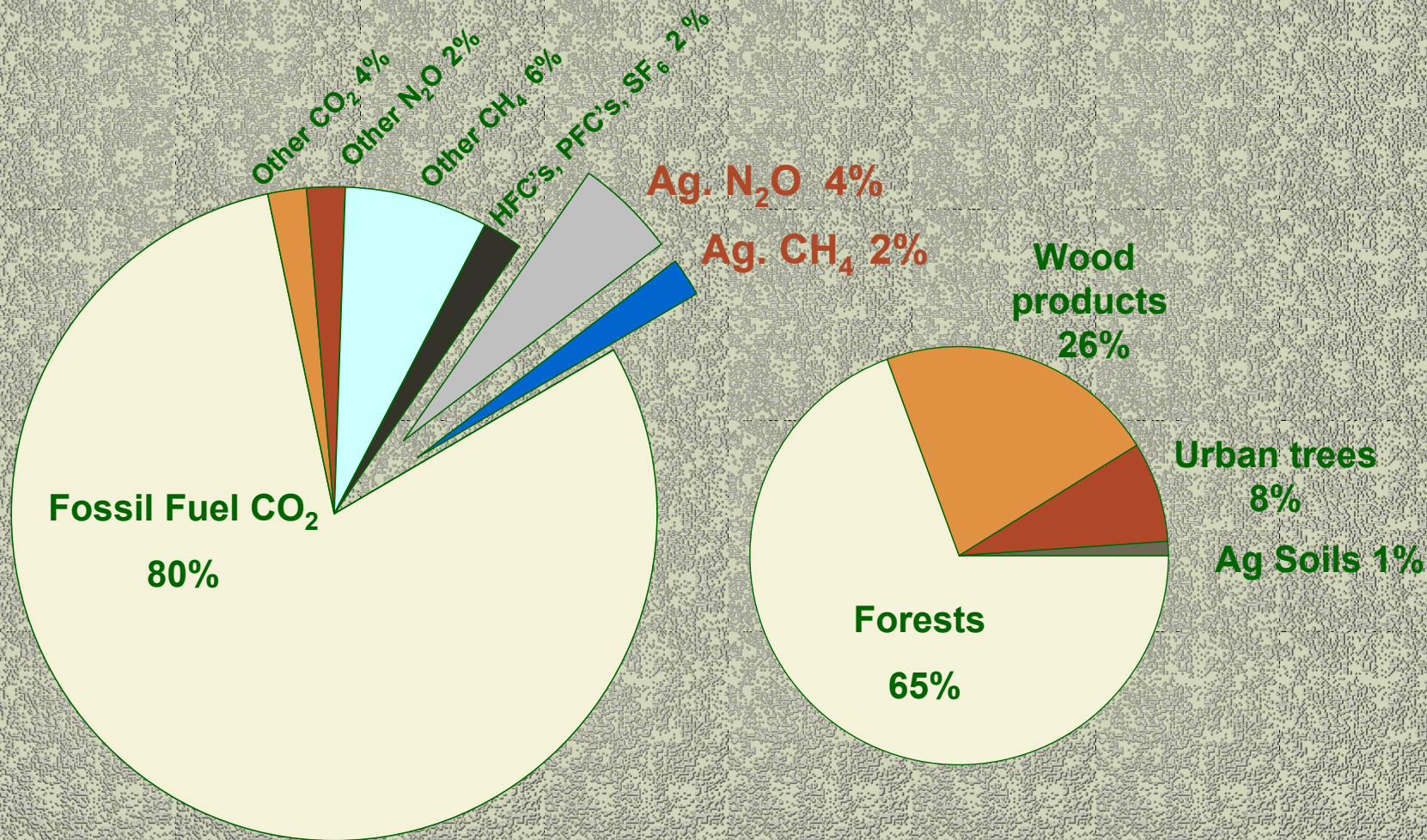
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What are greenhouse gases?

- Carbon dioxide, Methane, Nitrous Oxide, synthetic chemicals (HFC, PFC, SF6)
- Agriculture is a source of methane and nitrous oxide emissions
- Agriculture and forestry can be either a source or a sink of carbon
- Attributes:
 - Well mixed in the atmosphere
 - Relative impacts can be compared (using a Global Warming Potential factor)

The contribution of agriculture and forests to overall U.S. greenhouse gas emissions in 2003



Total Emissions: 6,900.2 MMTCO₂E

Carbon Sequestration: 828.3 MMTCO₂E
(12% of U.S. GHG Emissions)



USDA's Climate Change Priorities

- **Targeted incentives: Implement actions under USDA's conservation programs**
- **Voluntary GHG Reporting: Develop methods for estimating sources and sinks from agriculture and forestry**
- **Develop technologies: Support the Government-wide Climate Change Technology Program**
- **Implement the Climate Change Science Program Strategic Plan**
- **Cooperate with the Department of State on bilateral and multilateral agreements**



Roles of the USDA Agencies

■ ARS

- Assess potential impacts and vulnerabilities to agriculture
- Identify opportunities to respond and adapt to climate change
- Develop technologies and practices to mitigate greenhouse gases

■ Forest Service

- Assess and manage potential impacts on forests
- Improve the information on carbon cycling and inventories and collect information through the Forest Inventory and Analysis system
- Provide landowner assistance
- Develop methods to estimate forest carbon stocks and fluxes

■ CSREES

- Support the national UV-B monitoring network
- Provide competitive grants to assess impacts and mitigation of greenhouse gases
- Oversee the CASMGS consortium conducting a major soil carbon study

■ NRCS

- Implement major conservation programs with greenhouse gas benefits
- Develop methods to estimate agricultural GHG sources and sinks
- Provide technical assistance to farmers including helping farmers plan and implement conservation systems
- Maintain soil survey, National Resources Inventory and SNOTEL and SCAN networks

■ Others agencies with roles: FSA, ERS, RUS, FAS, NASS

New Voluntary
Greenhouse Gas Reporting Guidelines (1605b)



Importance of 1605(b) to USDA

- Provides landowners with a tool to quantify and record greenhouse gas benefits of actions such as:
 - Using no-till agriculture
 - Installing a methane digester
 - Improving nutrient management
 - Managing forestland
- Provides opportunities for agriculture and forestry to:
 - Partner with industry
 - Document benefits of actions for future use
 - Link reporting with conservation programs, e.g., CSP




Greenhouse gas reductions in the U.S. are voluntary

- Various systems are in operation or under development
 - **Federal:** Department of Energy 1605b Guidelines (under revision)
 - **State:** e.g. California Climate Registry
 - **Private:** e.g. Chicago Climate Exchange
- Industry can make voluntary commitments under federal climate programs
 - DOE Climate Vision
 - EPA Climate Leaders
- The Federal 1605b program will provide “registered reductions” to entities that meet reporting requirements



Features of the Revised DOE 1605(b) Voluntary Greenhouse Gas Reporting System

- Overall quality of reported information will improve
 - Consistent inventory methods. Inventory method rating system to determine eligibility for registration
 - Requirements in order to “register reductions”
- Large entities (emissions over 10,000 tons CO₂/yr) must report annual entity-wide inventories to be eligible to register reductions
- Small entities (emissions less than 10,000 tons CO₂/yr) can register reductions from specific activities
- Aggregators can report emissions and reductions of other entities



Mechanism to Quantify the Environmental Good/Service: DOE 1605(b) Guidelines

1605b will provide:

- **Inventory methods for agriculture sources**
 - Enteric fermentation
 - Animal waste
 - Rice cultivation
 - Crop residue burning
 - Nutrient and lime applications
- **Inventory methods for agricultural soil carbon sequestration**
 - COMET model – produces default sequestration rates
 - Protocols for periodic sampling
- **Inventory methods for forest and wood products carbon stocks and fluxes**
 - Default tables by region, species, management intensity, productivity class
 - Measurement and sampling protocols
 - Guidance on the use of models
 - COLE model – produces default forest carbon sequestration rates
- **Methods for estimating reductions from carbon sequestration**



Simple emission factor methods

CO₂ emissions from gasoline combustion

Emissions = **gallons** * 19.84 lbs CO₂ emissions/gallon

N₂O emissions from fertilizer

Direct:

- Emissions = **N applied** * fraction (d) * 0.02

Indirect:

- Volatilization = **N applied** * fraction (v) * 0.016

- Runoff/leach = **N applied** * fraction (r) * 0.04



COMET: Carbon Management Evaluation Tool

- Provides carbon fluxes for agricultural land management practices
- Requires simple input data for each tract of land
- Underlying model is:
 - Based on results from the Century SOM Model
 - Based on 20 Land Resource Regions with subdivisions
- NRCS computed:
 - An average of 3.6 million records per LRR (90 million total)
 - Calculations take ~ 2500 CPU hours
 - Takes ~20 working days to recalculate entire dataset
 - ~ requires 60 Gig of data storage



Simple Modeling Tools: COMET – soil carbon

Inputs needed:

- **Location**
 - **State and County**
- **Parcel Information**
- **Soils Information**
 - **Soil Texture/Hydric Condition**
- **Management History (crop rotations, tillage systems or grazing systems)**
 - **Pre 1970's**
 - **1970's-1990's**
 - **Base: 1990's-Current**
 - **Reporting Period: Current + 10 years**

Output: Tons of carbon per acre



Status of Implementation of 1605b

March'
05

Release draft technical guidelines through FRN

Public review of proposed revised guidelines

--DOE public workshop

--USDA public workshop on agriculture and forestry guidelines

Response to public comments

Release of revised 1605(b) guidelines

New forms and instructions

June
06'



Concluding points

- Demand for greenhouse gas reductions are driven by voluntary commitments.
- Agriculture and forestry practices offer low-cost opportunities for greenhouse gas reductions.
- Current accounting systems for greenhouse gas reporting vary significantly in quality.
- Increasing standardization can improve confidence and reduce transaction costs.