

U.S. DEPARTMENT OF AGRICULTURE

Agricultural Research Service (ARS)
 Cooperative State Research, Education, and Extension Service (CSREES)
 Economic Research Service (ERS)
 Forest Service (FS)
 Natural Resources Conservation Service (NRCS)

Principal Areas of Focus

USDA conducts and sponsors a broad range of research that supports improved understanding of the roles that terrestrial systems play in influencing climate change and the potential effects of global change on agricultural, forest, and range systems, and on developing management systems to maintain and enhance food, fiber, and forestry production under changing conditions. Specific components of USDA’s research program seek to determine the significance of terrestrial systems in the global carbon cycle, to promote the capture and use of methane emitted from livestock waste facilities for on-farm power generation, to assess the potential of bioenergy as a substitute for fossil fuels, to identify agricultural and forestry activities that can help reduce greenhouse gas concentrations and increase carbon sequestrations, to quantify the risks and benefits arising from environmental changes to agricultural lands and forests, and to develop management practices that can adapt to the effects of global change, including potential beneficial and adverse effects. USDA’s research agencies also support the Department in responding to the President’s directive to develop and implement accounting rules and guidelines for carbon sequestration projects, and in contributing to the synthesis and assessment reports identified in the *CCSP Strategic Plan*.



Program Highlights for FY 2006

ARS’s national program on global change research addresses carbon cycle and carbon storage, trace gas emissions and sinks, impacts of environmental changes on agricultural systems, and feedbacks among agricultural systems, weather systems, and the water cycle. Ongoing research focuses on analyzing risks and benefits associated with global change and developing management strategies to sustain agricultural production and reduce agricultural greenhouse gas intensity (i.e., net greenhouse gas emissions per unit of commodity produced). New research being proposed will enhance ARS’s program by placing additional emphasis on quantifying agricultural contributions to greenhouse gas emissions and soil carbon sequestration and developing practices to mitigate these greenhouse gas emissions and increase soil carbon sequestration while maintaining land in productive agricultural uses. Environmentally friendly and economically feasible alternatives to the use of stratospheric ozone-depleting methyl bromide will be developed as a treatment to control pests.

CSREES will continue to support the USDA UV-B Monitoring and Research Network Program (UVMRP). Information from this research network is combined with satellite-based measurements to provide an accurate climatological UV-B irradiance database to document long-term trends and to

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support research and assessment of the potential for damage to ecosystems. The program has been providing ground-based support to NASA's Total Ozone Monitoring Spectrometer (TOMS) instruments, by providing radiometer data that have been used to assess UV-B geographic distribution, trends, and year-to-year variability in the United States. Since 2002, the NASA TOMS and AERONET (**A**Erosol **R**obotic **N**ETwork) programs and USDA UVMRP have shared equipment, personnel, and analysis tools to quantify aerosol absorption using ground-based radiation measurements. CSREES will continue to support global change research through the National Research Initiative (NRI) Competitive Grants Program and formula-funded programs. NRI includes programs for carbon and water cycles, land-use and -cover change, ecosystem, and human dynamics research. CSREES is using the *CCSP Strategic Plan* in formulating priorities under the NRI program and in shaping specific grant announcements.

The Forest Service has identified the following key issues for future program emphasis: (1) Improve observations of forest carbon stocks and flows based on development and deployment of improved field measurement techniques and measurements integration, and initiate a forest carbon-monitoring program component of the interagency North American Carbon Program (NACP); (2) integrate observations with process-level studies to better understand, forecast, and manage the relationships between forest and rangeland systems and climate; (3) develop and help deploy forest management systems and technologies that increase carbon sequestration, provide fossil-fuel offsets, enhance productivity, and maintain environmental quality; (4) provide integrated prediction models of forest carbon dynamics; and (5) improve technical information for forest greenhouse gas accounting rules and guidelines.

Related Research

In addition to research under the Climate Change Science Program, USDA maintains an active program to improve measurement and accounting of greenhouse gases from agriculture and forestry systems. USDA is developing technologies and practices to improve the utilization of biomass energy and bio-based products. The Forest Service, NRCS, ARS, CSREES, and the Rural Development mission area support biofuels and biomass-related research and development. NRCS and the Forest Service are developing new measurement technologies, analytic techniques, and information management systems to measure the benefits of conservation practices on carbon fluxes and greenhouse gas emissions. These research and development activities are reported under the Climate Change Technology Program. USDA also collects data on land use, resource conditions, and climate through the National Resources Inventory, the Forest Inventory and Analysis Program, the Soil Climate Analysis Network (SCAN), and the Snowpack Telemetry (SNOTEL) system. These networks provide critical data and information on the status of land uses in the United States in support of CCSP research.