

# Improving America's Conservation Efforts

Adoption of conservation techniques by many of this nation's private landowners has helped reduce the impacts of food and fiber production on soil, water and air quality. Conservation of the land's resources is an ongoing process, however. Much remains to be done to ensure the healthy soils and clean water and air needed to support urban and rural communities, a strong economy and important environmental attributes such as wildlife habitat.

As examples, 29.9 percent of working U.S. cropland is eroding at rates great enough to have adverse impacts on long-term soil productivity and overall soil quality. Agriculture production continues to contribute to water quality problems through sediment, inefficient irrigation, misuse of pesticides and seepage of excessive livestock and poultry nutrients. Air quality is affected by agricultural production — emissions from farm machinery, dust from cultivation and unpleasant odors from animal feeding operations. But agriculture also plays an important role in helping the nation achieve the so-far elusive "no net loss of wetlands" goal.

The nation has expressed a strong will to address conservation issues through federal legislation such as the Wilderness Preservation Act, National Historic Preservation Act, Soil and Water Resources Conservation Act, National Environmental Protection Act, Clean Water Act and Clean Air Act. Numerous states and localities have adopted environmental policy and land-use planning legislation. Public opinion polls continue to rate

conservation of natural resources as a major concern.

To determine soil, water and related conservation needs and approaches to meet those needs, USDA drew from regulatory and legal requirements, its own expertise and the work and reports of other federal agencies, local conservation districts and state agriculture and forestry departments.

USDA examined the findings from a diverse array of agricultural-related entities and forums, including presidential and congressional commissions such as the National Drought Policy Commission and the Commission on 21st Century Production Agriculture; examined testimony from nationwide hearings of the House Agriculture Committee; and reviewed the results from national listening sessions of the Soil and Water Conservation Society and USDA's Policy Advisory Committee. The Department also requested comments and information from approximately 60 agricultural and environmental interest groups.

Major conservation needs and recommendations for improvement from these sources are presented in this section, organized in three general categories: (1) enhance USDA technical assistance and service delivery; (2) improve research, development of technology and technology transfer; and (3) expand economic incentives for conservation.

Appendix B provides an overview of public attitudes and common themes running through many of the reports and publications used in preparation of this report and their suggestions for action.

*Conservation of the land's resources is an ongoing process. Much remains to be done to ensure healthy soils, clean water and viable habitat for wildlife.*

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## 1. Enhance USDA technical assistance and service delivery

USDA faces challenges in key aspects of its conservation programs. The Soil and Water Conservation Society, for example, held public meetings across the nation in 2000 with local and state leaders who are well versed in USDA conservation programs (Soil and Water Conservation Society 2000). In relation to the demand for technical assistance, the Society found, "Many more producers ask for conservation assistance than can be accommodated...."

Participants expected the gap between demand for conservation assistance and its supply to widen over the next few years unless action is taken soon."

Furthermore, "Conservation programs currently work better for row-crop operations than for other types of farms and ranches. As a result, there was strong sentiment among many participants that large regions of the country do not receive their fair share of conservation assistance even though they face important conservation and environmental problems."

The National Drought Policy Commission reported concerns about equitable service delivery during hearings in 1999 and 2000, finding, "Many tribes noted the need for technical and financial assistance to plan and implement conservation measures.... They emphasized that this assistance must be easily and locally accessible to tribal members."

Overarching recommendations for improvement included calls for conservation technical assistance at the levels needed to achieve program

goals. Several sources indicated the need to deliver research results and transfer technology in a more efficient manner; the need for increased electronic access to information; the need to increase USDA technical assistance in the areas of agronomy, soil science, engineering, wildlife and plant sciences; and the need for technical expertise in disciplines not currently represented in USDA's field-level workforce.

Additional recommendations include:

### Overall improvements

- Foster broad-based approaches to natural resource management, including strategies that protect whole watersheds and ecosystems.
- Provide producers increased technical assistance to help them address increasing federal, state and local legislation and regulations.
- Provide interpretation for landscape analysis and new technologies for precision farming and surface geophysical measurements.
- Restore conditions in key watersheds to support ecological functions and beneficial water uses.
- Expand federal/tribal/state/local/non-governmental organization partnerships in support of state, tribal and federal natural resource goals.

### The soil resource

- Improve control of excessive erosion through proven combinations of technical assistance,

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conservation compliance and conservation incentives.

- Create a national soil quality goal; for example, "By the year 2015, all lands will be eroding at a non-degrading level to the greatest extent possible."
- Promote practices that build up the level of soil organic matter on lands where soil erosion is not excessive. Such practices also help control erosion and protect water quality.
- Ensure that soil survey information is made available to previously underserved areas.

## The water resource — quality issues

- Increase assistance to landowners for better management of nutrients and pesticides to reduce the risk of contaminating water resources. Help livestock and poultry producers reduce their potential for contributing to water quality and associated natural resource problems.
- Implement a system with national standards to assess watershed conditions.
- Provide more information to landowners concerning buffers, particularly their economic and operational benefits.

## The water resource — quantity issues

- Update appropriate planning and application tools and increase assistance to implement innovative on-farm water management techniques such as off-stream storage and water

harvesting to decrease irrigation's dependency on groundwater and stream flow.

- Encourage water management activities through enhanced support of federal/state/local coalitions that coordinate water quality goals and water quantity needs at all levels of activity.
- Conduct on-going hazard mitigation planning to help communities reduce their vulnerability to aging watershed projects through more comprehensive programs.
- Evaluate methods to determine when dams should not be rehabilitated but removed.

## Climate change

- Using information and education, expose field staff, conservation partners and land managers to the basics of global climate change and principles of mitigation and adaptation.
- Establish a network of watershed-scale pilot projects to serve as demonstration sites for the development of information, technology, outreach and application.

## Sprawl, land use and planning

- Identify science-based principles and criteria to help local communities manage growth and assist communities with land evaluation and area-wide planning.
- Improve guidance and create database tools to assist federal agencies in complying with the Farmland Protection Policy Act,

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which requires NRCS to monitor federal agencies and provide them with technical assistance to hinder the conversion of agricultural lands to non-agricultural uses.

- Ensure that urban-influenced conservation districts receive technical assistance relating to soil information, storm-water management, erosion control and floodplain and wetlands protection.

## Wetlands

- Continue assessment of wetlands through wet-soil monitoring to support ecosystem and landscape analysis of wetlands in degraded settings.
- Continue investigations and development of sub-aqueous soil mapping techniques in tidal and freshwater marshes.
- Continue development of hydric soil indicators for use in identifying wetlands.
- Conduct routine, multi-tiered assessments and monitoring for a sample of wetlands restoration and enhancement sites in different settings.

## Grazing land

- Provide more technical assistance to landowners in applying the latest technology for grazing land management decisions.
- Encourage owners of grazing lands to consider diversification so that they and society can achieve multiple benefits from grazing lands.

## Private forestland

- Promote reforestation after timber harvest to reclaim marginal or degraded areas, control erosion and capture the benefits of carbon sequestration.
- Increase technical assistance in the areas of forest education and forest management planning.
- Emphasize forest planning that meets the objectives of the landowners and responds to increasing public demands for water, recreation, wildlife habitat, timber, carbon sequestration and other public benefits from forestland.

## Wildlife habitat

- Reduce the adverse effects of agricultural production practices on fish and wildlife populations through broader adoption of integrated pest management systems, conservation tillage, conservation buffers, effective nutrient management, water conservation and similar measures.
- Increase fish and wildlife habitat-oriented technical assistance to private landowners and managers during the conservation planning process.
- Expand partnerships with landowners, tribes, private organizations and public agencies to foster fish and wildlife conservation on private lands.

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## 2. Improve research, development of technology and technology transfer

The Commission on 21st Century Production Agriculture Resources, echoed by the findings and recommendations of many other parties, identified research as a significant need for USDA conservation programs into the future. The Commission emphasized four research areas for improvement: providing voluntary incentive-based programs to enhance agriculture's positive contribution to air and water quality; developing a means to compensate producers who establish environmentally beneficial practices, with funding from a separate environmental program; establishing a baseline measure of agriculture's positive contribution to air and water quality; and focusing on priority issues including, but not limited to, carbon sequestration, control of greenhouse gases emissions, manure management and alternative fuels.

Other entities focused on the need to fill critical data gaps on the current status of watersheds and ecosystems and for better technology to monitor the effects that conservation practices and systems have on water quality and watershed health. Some pointed to the need for greater cooperation among USDA and private entities such as certified crop consultants who are engaged in assessing natural resource conditions and providing assistance to landowners.

USDA's Agricultural Air Quality Task Force noted several research needs to improve air quality. Foremost, data are currently inadequate to determine the effectiveness of control measures for

agricultural operations. Observations must be augmented with reliable scientific evidence, particularly in regard to data that can quantify reductions in air quality associated with specific techniques and practices.

Additional recommendations for research and technology development and transfer include:

### Overall improvement

- Develop new technologies and improved management practices that enable landowners to minimize the impact of their activities on the environment.
- Expand research in support of integrated, system-wide approaches to meet the ecological challenges of water quality and management.
- Ensure that education, extension and technology transfer activities encourage the adoption of more environmentally friendly practices.
- Deliver research results and transfer technology in a more efficient manner.

### The soil resource

- Provide digital soil surveys to properly analyze watersheds and landscapes for their non-point source pollution potential and effects through ecosystem modeling.
- Conduct research and economic analysis on the potential to increase storage of carbon in the soil. Identify and validate carbon credits for agriculture and forest conservation practices.
- Research the use of carbon credit trading, which holds the potential to enhance soil quality

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through the build-up of soil organic matter and help sequester carbon to reduce greenhouse gases.

- Provide statistical data and analysis on agricultural chemical uses, production methods, land productivity and integrated pest management practices and establish relationships with local soil and resource inventories.

## The water resource — quality issues

- Conduct additional research related to the effectiveness of buffers at specific sites and for specific purposes to update practice specifications. Document results that can be achieved through the use of buffers on a watershed scale.

## The water resource — quantity issues

- Increase USDA research for irrigation and related water resources activities to assure continued development and implementation of state-of-the-art water-saving technology.
- Incorporate digital soil survey and landscape analysis modeling in irrigation design systems.
- Conduct landscape modeling on a watershed basis for improved efficiency of water use.
- Assess the condition of all watershed dams as well as the population at risk, hazard classification and risk of failure across the nation. Provide geophysical measurement tools to measure sediment load and potential weaknesses in dam structures.

## Air quality

- Define appropriate and effective particulate control measures that are economically and technologically feasible. Quantify particulate reductions resulting from each control measure.
- Develop accurate emissions inventories for agricultural operations.
- Support the priorities and funding for research recommended by USDA's Agricultural Air Quality Task Force.
- Conduct research to improve prediction models for downwind concentrations of particulate matter, develop the best sampling techniques for monitoring agricultural burning, determine emission factors, evaluate techniques for reducing harmful emissions from agricultural burns and create alternatives to agricultural burning.

## Climate change

- Conduct research and economic analysis concerning the potential to increase storage of carbon in vegetation and soil.
- Develop quantitative use-dependent databases, including ecological site descriptions, for all soil mapping units and link them to spatial databases.
- Develop new risk management tools integrating support payments and private markets to underwrite adoption of conservation technologies at the farm level.
- Increase collaboration among NRCS and research institutions, including universities, the

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Agricultural Research Service and others to refine and develop improved models, further improve measurement technologies and systems and improve understanding of the ecological processes that support agricultural production.

## Sprawl, land use and planning

- Expand development and transfer of “green infrastructure” technology to manage storm water and control sediment.

## Wetlands

- Research a comprehensive conservation approach to wetlands that takes into consideration the condition of the landscape as well as the treatments needed to maintain or improve wetlands functional conditions.
- Identify geographic locations in the current National Resources Inventory that continue to exhibit significant declines in wetlands acreage. Conduct a detailed examination of the causes of those declines and identify strategies to achieve the nation's no net loss of wetlands acreage goal on private lands.
- Increase the use of non-invasive geophysical measurement tools such as ground penetrating radar and electromagnetic induction to measure water tables, depth of peat material and deep-water sediment loads.
- Continue development of hydric soil indicators for use in identifying wetlands.

## Grazing land

- Develop and improve treatments to assure the long-term productivity and ecological health of U.S. grazing lands.

## Private forestland

- Develop strategies to minimize the impact of urban sprawl on forestlands.
- Provide research assistance on forest stewardship.
- Digitize and update soil surveys in forested areas to support more intensive uses.
- Expand development of new agroforestry technologies to treat waste, provide odor and visual screens, develop alternative crops, diversify incomes and improve productivity on limited acres.

## Wildlife habitat

- Continue to restore and enhance aquatic habitats and improve current technology to achieve this objective.
- Improve technology and the capability to reduce the impact of invasive plant and animal species on native ecosystems and fish and wildlife communities.
- Develop mechanisms to minimize the impact of suburban sprawl and urban development on agricultural lands and the wildlife they support.
- Create effective methods to monitor the response of fish and wildlife populations to agricultural conservation practices and land management activities.

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## 3. Expand economic incentives for conservation

Nearly all comments, identified needs and recommendations concerning future agricultural conservation efforts emphasized the need to continue or expand existing economic incentive programs and consider the creation of new incentives.

People focused on the ability of land easement and reserve programs, as well as other economic incentive-based approaches, to reward landowners for resource conservation practices. They called for extension and modification of existing programs, including increased funding and expanded eligibility. For example, USDA's broad-based conservation program, the Environmental Quality Incentives Program (EQIP), offers financial assistance for conservation practices based on the level of expected environmental benefits. Data indicate that demand for EQIP assistance is three to four times more than available funding.

The incentives just mentioned focus on future conservation efforts. But there is a growing interest in a new economic incentive that rewards private landowners for conservation goals that they have already achieved because of the secondary benefits (public goods) that have accrued from past resource conservation on private lands.

Among the recommendations were the following:

### Overall improvements

- Provide financial and other incentives to landowners to

practice good stewardship.

- Increase funding for the Environmental Quality Incentives Program.
- Emphasize federal/state/local partnerships in support of state and federal funding initiatives and devise a priority ranking system for watershed project rehabilitation.

### The soil resource

- Expand reserve programs to retire highly erodible or other fragile lands while allowing agricultural and forest lands to maintain their productivity.

### The water resource — water quality

- Within the Conservation Reserve Program: (1) refine statutory language and program administration to ensure flexibility in the use of buffers for achieving water quality and other conservation purposes at the farm or ranch level, (2) maintain the holdback acreage for buffers, (3) create financial incentives to encourage landowners to act collectively along a stream course or within a watershed and (4) make all agricultural land eligible for participation in the continuous sign-up.

### The water resource — water quantity

- Expand pilot watershed rehabilitation projects.
- Fund rehabilitation through loans and cost-share assistance.

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## Air quality

- Develop a guidance document for agricultural producers to include control measures and estimated reductions of particulates associated with each abatement strategy.
- Assist local elected officials from soil and water conservation districts in administering voluntary air quality compliance programs.
- Develop state implementation plans, allocating credits based on the rate of participation (percentage of land mass and/or percentage of participants) and on yearly certification by conservation district officials.
- Forego record keeping and reporting requirements by participants beyond those already needed for participation in other USDA programs.
- Address smoke management using a two-tiered approach: Tier 1 — a voluntary program for areas where agricultural burning rarely causes or contributes to air quality problems, and Tier 2 — a more structured program for areas where agricultural burning contributes to violations of air quality standards or to visibility impairment in federal Class I areas.

## Climate change

- Structure farm and ranch support programs to optimize all environmental benefits, including improvements in operation-level greenhouse gas balances, using pilot projects as models.

## Sprawl, land use and planning

- Increase funding and enrollment of farmland in perpetual easements to slow development of prime farmland.
- Provide cost-share and direct payments to agricultural producers to strengthen the economic and ecological viability of farms, decrease the amount of land sold to developers and permit greater appreciation of rural landscapes through local cultural and heritage tourism programs.

## Wetlands

- Increase enrollment of wetlands and associated uplands in the Wetlands Reserve Program.

## Grazing land

- Create a grazing land or grassland reserve program.

A recent study (Environmental Defense 2001) based on USDA data found that inadequate funding of USDA conservation incentives prevents: (1) half of the farmers and ranchers seeking technical assistance to improve tillage practices or install streamside buffers from getting that assistance; (2) three out of four farmers seeking financial assistance to restore lost wetlands and woodlands, use less water or improve manure management from receiving that assistance; (3) more than 2,700 farmers hoping to restore 560,000 acres of wetlands from participating in the restoration program.

In addition, thousands of farmers in the path of sprawl offered to sell their development rights to USDA or state and local programs, but there were insufficient funds to accommodate them.

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## Private forestland

- Increase enrollment in forestry programs that emphasize reforestation and promote wise use of forest resources such as timber, carbon sequestration, wildlife habitat and recreation.
- Expand current cost-share and incentive programs to encourage owners of non-industrial private forestland to manage their lands for private and public benefits.

## Wildlife habitat

- Increase financial incentives to farmers and ranchers for activities that help to maintain stable wildlife populations and increase populations that have experienced recent declines.
- Preserve habitat gains made through incentive programs by linking eligibility for financial incentives with basic conservation standards.
- Maintain existing and establish additional conservation programs and incentives to restore, protect and manage (over the long term) native communities such as wetlands, native grasslands and riparian areas.
- Create incentives such as Safe Harbor Agreements for landowners to improve habitat for listed and candidate threatened and endangered species and provide landowners assurances regarding future use of lands that support these species.