



United States Department of Agriculture

# **2016 Report to Congress on Program Effectiveness**

## **Conservation Innovation Grants**

**December 2016**

As Required by the Food Security Act of 1985, as amended  
U.S. Department of Agriculture  
Natural Resources Conservation Service  
Washington, D.C.

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## **I. Executive Summary**

The Food Security Act of 1985 (Public Law 99-198), as amended, requests the Secretary of Agriculture to report to the U.S. Senate's Committee on Agriculture, Nutrition, and Forestry and the House of Representatives' Committee on Agriculture on the status of projects funded through the USDA Natural Resources Conservation Service (NRCS) Conservation Innovation Grants (CIG) Program. This report offers an overview of the CIG program, total investments and examples of technologies and approaches incorporated into conservation efforts implemented by the Secretary of Agriculture.

CIGs are competitive grants that stimulate the development and adoption of innovative approaches and technologies for conservation on agricultural lands. CIG uses funds from the Environmental Quality Incentives Program (EQIP) to award competitive grants to non-Federal governmental or non-governmental organizations, American Indian tribes, or individuals. Producers involved in CIG-funded projects must be EQIP-eligible.

Through CIG, NRCS partners with public and private entities to accelerate technology transfer and adopt promising technologies. These new technologies and approaches address some of the Nation's most pressing natural resources concerns. CIG benefits agricultural producers by providing more options for environmental enhancement and compliance with Federal, State, and local regulations.

For over 80 years, NRCS (previously Soil Conservation Service) has provided science-based, technically sound and proven conservation practices, advice, and alternatives to America's farmers, ranchers and forest landowners who own or manage private agricultural and forest land. Since launching the CIG program in 2004, the agency has used the program to further enhance its partnership with other USDA agencies, universities, and nongovernmental organizations to identify and refine new cutting-edge approaches and technologies through on-farm demonstrations and field tests. NRCS continually analyzes information gathered from these projects to determine how to incorporate project results into existing or new conservation tools for use by field office staff to benefit NRCS as well as agricultural producers and forest landowners.

CIGs stimulate adoption of innovative conservation approaches and technologies in agricultural production and leverage additional investments in conservation through traditional and innovative partnerships. The goals are to:

- Identify new conservation technologies and innovative approaches;
- Use on-farm demonstrations and field tests to promote adoption; and
- Integrate widely applicable technologies and approaches into NRCS practices and guidelines.

Since the program's inception in 2004, the number of grant applications and value of funding requests received annually have tripled. From 2004-2016, NRCS has awarded over \$263.6 million to fund 678 national projects. Each grant leverages a matching commitment from NRCS partners, resulting in an investment of more than \$527 million to address national conservation concerns and advance technology for farmers, ranchers, and private forest land owners. Most of the CIG funding and grants have addressed water quality resource issues.

NRCS's National Technology Integration Subcommittee supports the agency's continuing efforts to ensure transparency, transfer technology and adopt project results. As a result, networks and groups working on similar resource-based projects have been established to exchange ideas, methodologies and results among CIG recipients. In addition, a very successful on-line searchable database has been maintained and improved to share project funding, goals and outcomes and results more broadly. Additional details, including the CIG Project Tracker Tool, can be found at [www.nrcs.usda.gov/technical/cig](http://www.nrcs.usda.gov/technical/cig).

CIGs have yielded numerous successful projects that have been incorporated into NRCS practices, technical notes, training, and programs to enhance conservation of our nation's soil, water, air, plant, animal, and energy resources; while benefitting farmers, ranchers, forest landowners, and the public across the United States.

## **II. Introduction**

CIGs have played a critical role in developing and demonstrating creative ways for conserving America's private lands and strengthening rural communities. The CIG program inspires creative problem-solving that boosts production on farms, ranches, and private forests; and ultimately improves water quality, air quality, soil health, and wildlife habitat. During the past 12 years, CIGs have helped develop and demonstrate more efficient ways to manage nutrients, reduce on-farm energy use, increase irrigation efficiency and accelerate development of water quality trading and greenhouse gas markets. CIG projects have contributed to pioneering conservation work on America's private agricultural and forest lands. This report offers an overview of the CIG program, total investments and examples of technologies and approaches incorporated into NRCS's conservation toolbox as a result of the program.

## **III. Authority**

Section 2301 of the Farm Security and Rural Investment Act of 2002 (Public Law 107-171) amended section 1240H of the Food Security Act of 1985 (Public Law 99-198) to establish the CIG program with funding from the Environmental Quality Incentive Program (EQIP). Section 2509 of the Food, Conservation, and Energy Act of 2008 (Public Law 110-246), and Section 2207 of the Agricultural Act of 2014 (Public Law 113-79) reauthorized CIG. Notably:

- The Secretary delegated authority for administering EQIP, including CIG, to the Chief of NRCS, who is a Vice President of the Commodity Credit Corporation (CCC). EQIP is administered by NRCS under the authority of the CCC.
- The Chief may delegate authority to implement a separate state-level CIG program to each State Conservationist.
- The State Conservationist may delegate authority to manage items for which he/she has responsibility, unless specifically prohibited by the program manual or other agency policy.

## **IV. Purpose**

The goal of the CIG program is to stimulate adoption of conservation approaches or technologies that have been studied sufficiently by universities, other USDA agencies, or other organizations and indicate a high likelihood of success. The CIG program is not a research program; rather, it supports innovative, on-the-ground conservation projects such as pilot activities and on-farm

field demonstrations. In doing so, CIGs connect promising results from previous research with enhanced adoption opportunities.

Using EQIP funds, The CIG program provide grants through a competitive process to eligible individuals, nongovernmental organizations, private businesses, tribal organizations, and state and local governments. CIG projects are expected to result in the transfer of conservation technologies, management systems, and innovative approaches to EQIP-eligible producers in the form of technical manuals and guides and conservation practice standards, or to the private sector in the form of technology or ecosystem markets. Additionally, project benefits should apply to a larger geographic area, whether watershed, regional, or national in scope.

## V. Basic Requirements

NRCS annually publishes a CIG announcement for program funding (APF) on the Federal electronic grants portal, [Grants.gov](https://www.grants.gov). The APF identifies the topic areas eligible for CIG funding along with application details.

**Eligibility:** Applicants may be state or local units of government, federally recognized American Indian tribes, nongovernmental organizations, or individuals. NRCS accepts applications from all 50 states, the District of Columbia, and the Caribbean and Pacific Islands Areas. Proposed projects must involve farmers, ranchers or forest landowners eligible to participate in EQIP. To encourage participation of historically underserved producers, including beginning, military veteran, and limited resource farmers ranchers and forest landowners, as well as American Indian tribes, up to 10 percent of national CIG funds each year are set aside for applicants who qualify in those categories.

**Matching Contributions:** Selected applicants may receive CIG grants of up to 50 percent of their total project cost, not to exceed the APF Federal project cap. CIG recipients must match the USDA funds awarded on a dollar-for-dollar basis from non-Federal sources with cash and/or in-kind contributions. Grantees must also provide the technical assistance to complete the project successfully.

**NRCS Oversight:** NRCS provides administrative and technical oversight of each project and, after project completion, evaluates whether the demonstrated practices should be offered on an ongoing basis in the Field Office Technical Guide. Experts from NRCS's regional and state offices, or one of the three National Technology Support Centers serve as technical specialists and provide oversight for each project. The technical contacts specialize in fields relevant to the grant activity, provide support for issues and concerns, and track project milestones with grantees.

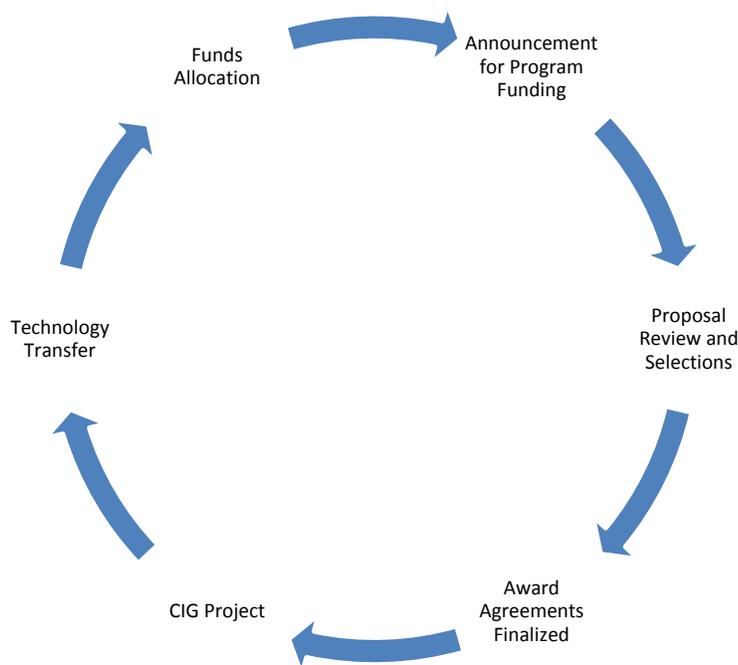
## VI. Competition and Grant Management Process

The CIG program funds projects targeting innovative, on-the-ground conservation, often employing pilot projects and field demonstrations. The APF identifies high priority natural resource concerns/issues eligible for funding. Proposals are required to describe the use of innovative technologies or approaches to address those concerns/issues.

NRCS awards single- or multi-year projects, not to exceed 3 years, through a nationwide

competitive grants process. National CIG competitions emphasize projects that have a goal of providing benefits over a large geographic area. These projects are generally watershed, regional, or national in scope.

In addition to the nationwide grants competition, states have the option to hold its own CIG competition annually. State CIGs emphasize projects that are designed to offer benefits within a limited geographic area. Projects may be farm-based, multi-county, small watershed, or statewide in scope. Each participating state publishes its announcement to alert interested individuals and organizations about CIG funding availability on [Grants.gov](https://www.grants.gov).



As depicted in Figure 1, once funds are allocated for the national CIG program, NRCS develops an APF which is posted on the [Grants.gov](https://www.grants.gov). The funding notice is also posted on the CIG webpage at: [www.nrcs.usda.gov/technical/cig](https://www.nrcs.usda.gov/technical/cig). The CIG application period is usually open for 60 days. Applications that meet program eligibility are sent forward to technical specialists for review. The technical peer review panel consists of technical specialists from NRCS and other appropriately related federal and non-federal agencies. The technical peer review panel evaluates each proposal against criteria identified in the funding notice.

Figure 1. Annual CIG Cycle

- Announcement for Program Funding
- Proposal Reviews and Selections
- Award Agreements Finalized
- CIG Project Implemented
- Technology Transfer Developed (?)
- Funds Allocated

The technical peer review panel then forwards its recommendations to the Grants Review Board (GRB), which consists of NRCS national leaders. The GRB certifies the panel's recommendations and ensures the evaluations are consistent with program objectives. The GRB forwards its recommendations to the NRCS Chief for final review and selection.

After the Chief of NRCS announces the awardees, NRCS creates a partnership with each CIG recipient through a grant agreement. All agreements are administered in accordance with 2 CFR 200 and the NRCS Federal Grants and Cooperative Agreements Handbook. NRCS assigns a technical specialist, administrative specialist, and a program contact to each project to work with

the partner and ensure technical compliance and provide oversight throughout the life of the award.

## VII. Types of Competitions

As previously mentioned, the NRCS Chief has the authority to offer two components of CIG, a national component and a state component.

### National Competition

The national component may be divided into geographic, natural resource, technology, or other categories as identified in the APF. The NRCS Chief reviews and updates conservation priorities each year to ensure that CIG-funded technologies and approaches continue to address critical, current, and emerging natural resource conservation needs.

NRCS received approximately 150 proposals when it offered CIG for the first time in 2004. Since 2009, the CIG program’s popularity has significantly increased. From Fiscal Years 2009 through 2015, NRCS received approximately 400 applications annually (Fig. 2). In 2016, a decision was made to reduce the number of categories available in that year’s funding opportunity. A smaller number of proposals were submitted as a result. The number of awards made annually has stayed relatively steady, approximately 40-50 for the national competition.

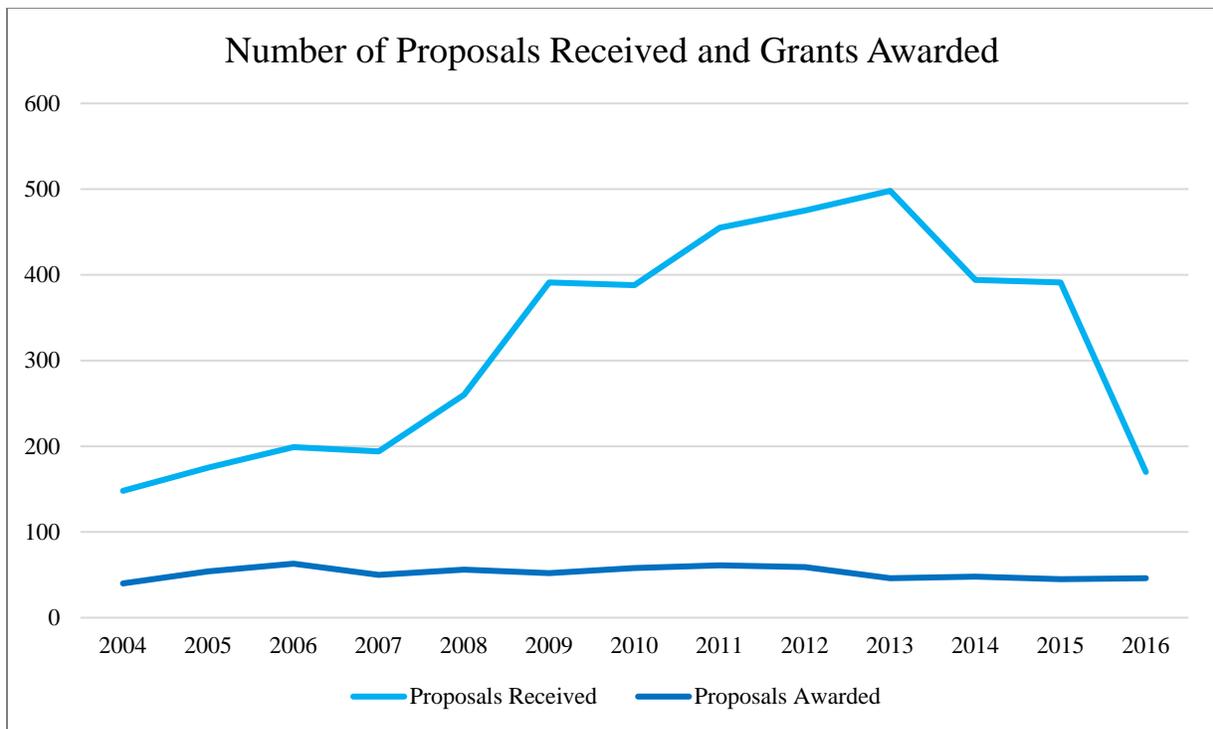


Figure 2. Number of national proposals received and grants awarded from 2004-2016.

Similarly, the gap between funds requested and awarded has increased substantially since 2004, with considerably more funding requested than awarded. Specifically, from 2009-2014, only 6-8 percent of the funds requested were awarded (Fig. 3).

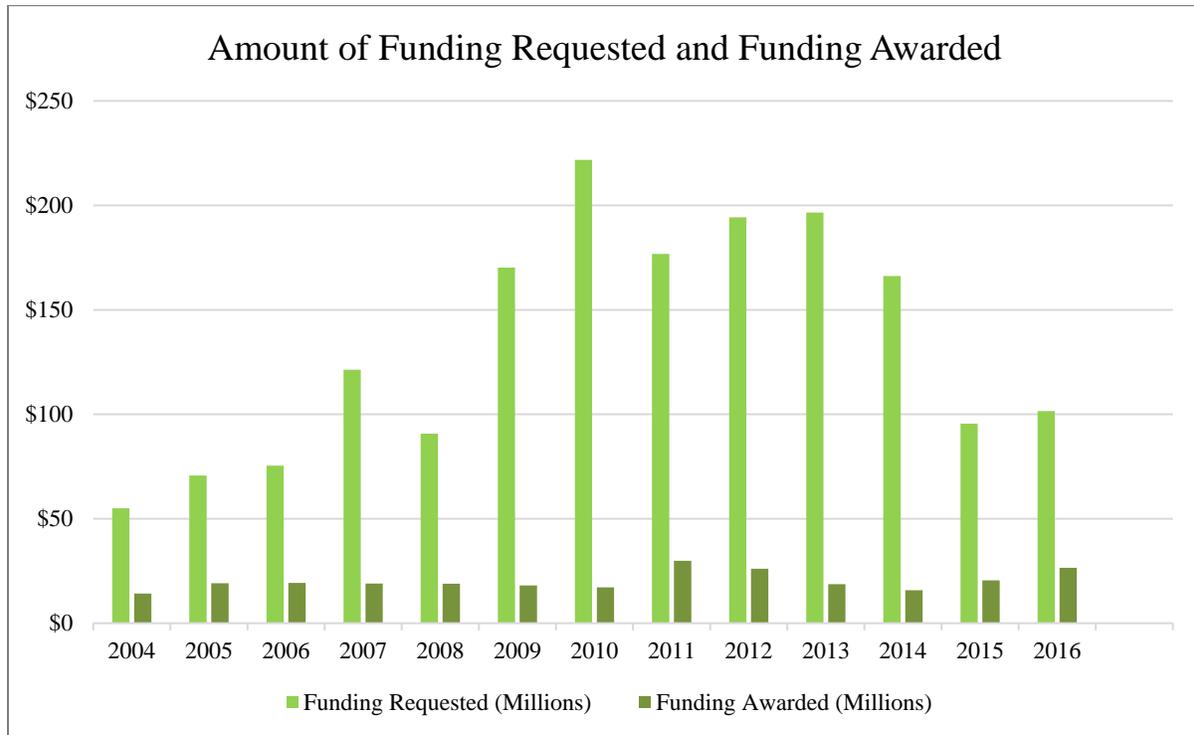


Figure 3. National CIG funding requests and awards from 2004-2016.

### State Competition

In addition to the national competition, some NRCS state offices offer their own state-level competitions. They are administered with the same guidelines as the national competition, but focus on resource concerns identified within the particular state.

This component of CIG enables NRCS state leadership to make funding available to individuals and organizations with promising innovations that might be too small to compete well in national-level competition. Each state conservationist or director determines whether to offer CIG funding as well as the amount of funding. Each state CIG cannot exceed \$75,000.

## VIII. Funding Awarded

From 2004-2016, the number of national CIG awards has ranged from 40-63 per year, with a funding range from \$14.2 - \$29.9 million per year (Table 1).

**Table 1. Projects awarded and funds approved (millions) in national competition from 2004-2016.**

<b>Fiscal Year</b>	<b>National Competition</b>	
	<b>Projects Awarded</b>	<b>Funds Approved (\$ Million)</b>
2004	40	14.2
2005	54	19.1
2006	63	19.3
2007	50	19.0
2008	56	18.9
2009	52	18.1
2010	58	17.7
2011	61	29.9
2012	59	26.1
2013	46	17.6
2014	48	16.6
2015	45	20.5
2016	46	26.6
<b>Total</b>	<b>678</b>	<b>263.6</b>

NRCS widely distributes CIG awards across the U.S. to address several critical natural resource concerns (Fig. 4). In each NRCS administrative region, water quality is the predominant resource concern for which CIG projects have been awarded (Fig. 5), with 35 percent of the funds awarded in the Northeast directed to water quality related projects. Other significant topics funded included soil, energy, and ecosystem service markets. CIG funding to address wildlife and air quality are proportionally greater in the West Region than in other regions of the U.S. (Fig. 5).

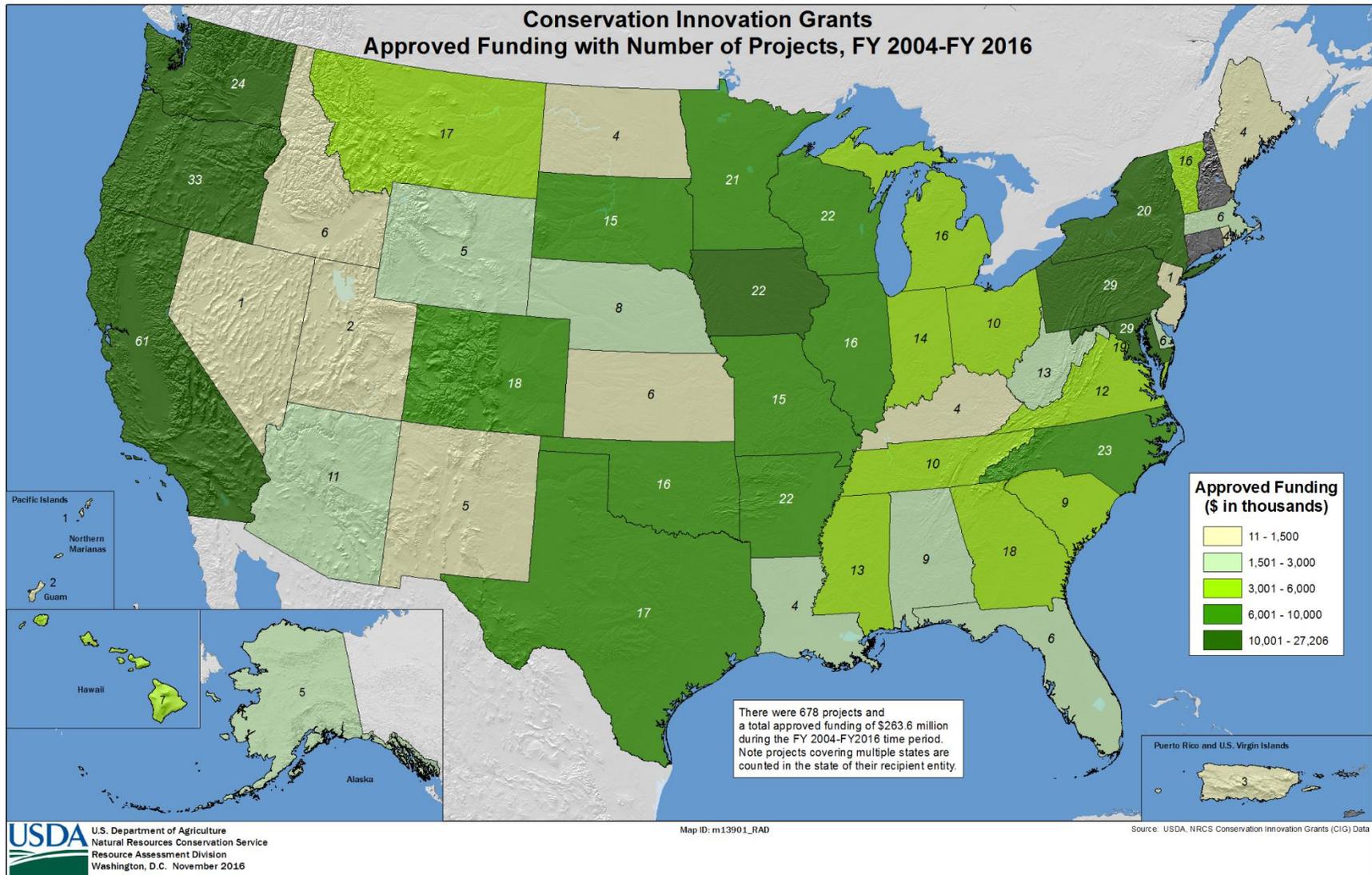


Figure 4. Distribution of CIG awards across the U.S. from 2004-2016.

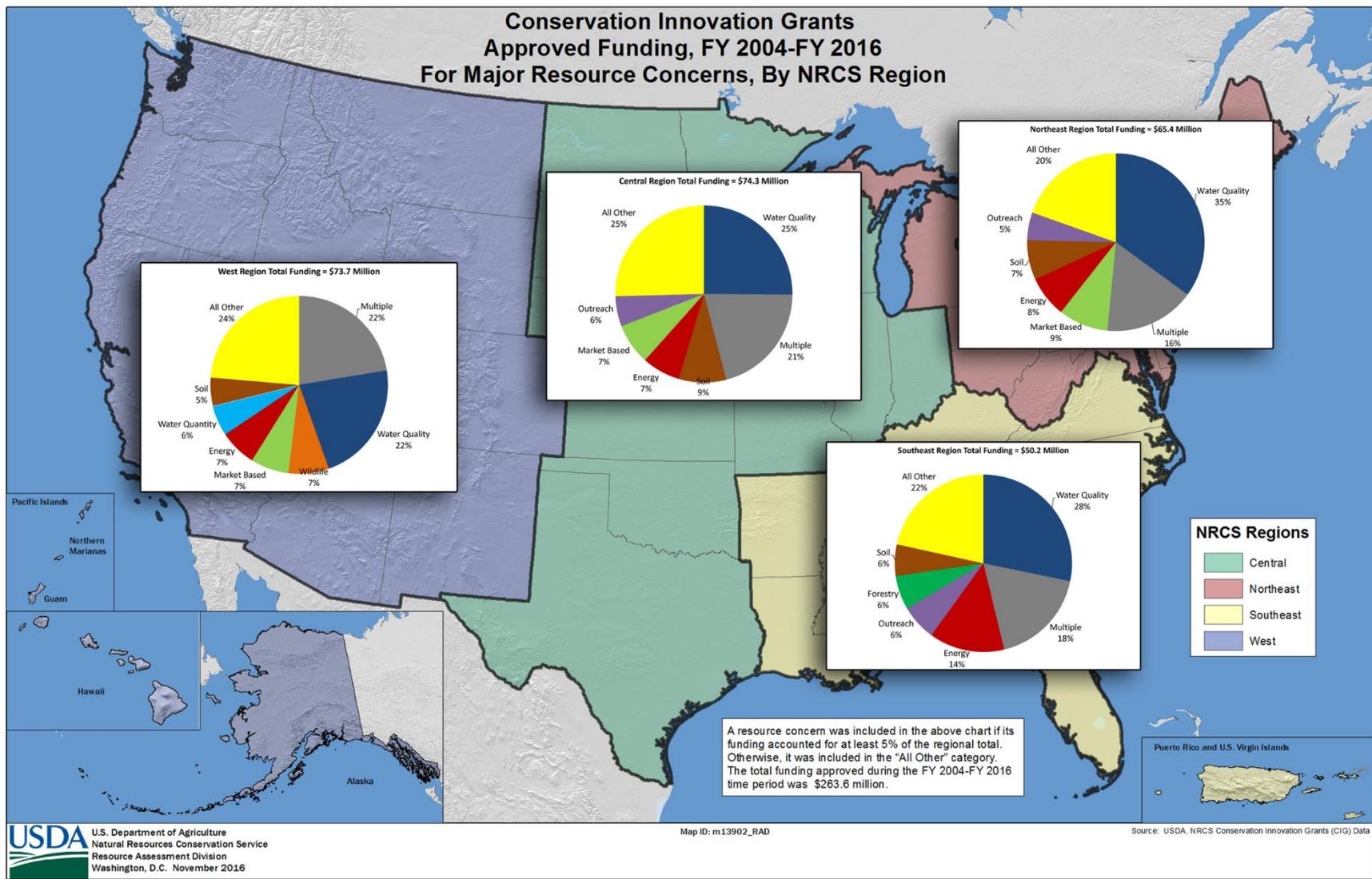


Figure 5. Distribution of CIG awards by resource concern/topical category for each NRCS administrative region.

## **IX. Technology Transfer and Integration**

NRCS incorporates successful CIG technologies and approaches into programmatic and technical manuals, guides, activities, and references. The focus of the CIG program is to identify, test, and demonstrate new technologies, or new applications of existing technologies. Therefore, technology transfer (sharing ideas and experiences during and after the life of the grant) and technology integration (incorporating the findings and lessons into NRCS and other conservation activities) are important aspects for both the grantee and the agency.

NRCS evaluates findings from CIG projects to determine whether results indicate that new practices should be added to the NRCS practice standards offered, previous practices should be modified or eliminated, or additional study and pilot projects are needed.

The integration process includes the following elements:

- identifying and training technical contacts at the national and state levels;
- reviewing project progress and final reports;
- conducting project evaluations;
- distributing findings and recommendations for use by national and state technical specialists; and
- incorporating innovative technologies and approaches into NRCS manuals, practice standards, programs, etc.

NRCS assigns staff to serve as national technical contacts for all CIG project awardees. These technical contacts are trained to conduct status reviews, evaluate implementation progress, and to ensure that CIG projects achieve their objectives and align with grant agreement deliverables. They provide technical feedback on any proposed agreement amendment. The status review process is a key internal control to ensure conservation activities are properly applied and meet the goals of both the participant and NRCS.

Because of the diverse natural resource concerns addressed by NRCS programs, a correspondingly wide range of CIG project topics has been funded. Technology transfer of these results has taken different forms since the first projects from 2004 were completed in 2007. Between 2007 and 2010, a primary mechanism for transferring technology was through NRCS's collaboration with the Soil and Water Conservation Society (SWCS). At each annual conference, SWCS provided a "CIG Showcase" so grantees could present their results to a national audience representing multiple disciplines. This effort also helped develop networks of grantees and other interested parties often conducting relevant research or having a stake in the outcome.

In 2013, NRCS established its National Technology Integration Subcommittee (NTIS) to build synergy and enhance the technology transfer process among related projects. The NTIS assesses project evaluations and final reports for all completed CIG projects, and uses those results to offer technology transfer and integration recommendations. The new NTIS process has proven successful in providing new recommendations for integration that include:

- new NRCS Web-based planning tools;
- revised NRCS conservation practice standards and specifications;

- revised NRCS program incentive payment schedules; and
- new NRCS guidelines on such topics as pollinator habitat improvement and vegetative specifications.

In 2014, NRCS developed an on-line CIG [Project Search Tool](#) to enhance transparency, technology transfer, and technology adoption. This searchable database significantly increases public access to CIG project information including objectives, methods, and results.

## **X. Project Examples and Incorporation of Results**

Following are examples of specific CIG products and outcomes that have benefitted NRCS conservation programs, agricultural producers, and the environment:

### **Air Quality Assessment Tool**

For several years, NRCS has supported efforts by a consortium of universities working to develop a National Air Quality Site Assessment Tool (NAQSAT) for livestock and poultry operations. NRCS first awarded CIG funding for this project in 2011. After many years of development, refinement and testing, the NAQSAT was adopted in 2015 as NRCS' official Air Quality Site Assessment Tool. The present online version can be found at <http://naqsat.tamu.edu>.

### **Seasonal Riparian Management Areas (SRAM)**

South Dakota conservation districts, private partners, and the City of Sioux Falls – have teamed up to launch a model payment-for-ecosystem-services project that will generate significant water quality improvements in the Big Sioux Watershed. Through SRAM, producers are paid rental rates to erect fencing or provide alternative water sources for their livestock to keep them out of riparian areas during six crucial months between spring and fall. These payments can be as high as \$75 per acre depending on where producers' operations are located within the watershed.

### **Certified-Organic Teaching Farm**

The Minnesota Food Association manages Big River Farms, a 150-acre, certified organic teaching farm. Historically underserved immigrants and refugee farmers can enroll in a three-year training program to learn about local soils and growing conditions, receive training in organic certification and farming methods, and are provided a large plot of land to manage. They learn the full farm-to-market process. While they're practicing sustainable, organic farming methods, farmers also learn how to market and sell produce through Community Supported Agriculture and farmers markets.

### **Soil Water Retention Technology (SWRT)**

SWRT doubles the retention of soil water and nutrients in plant root zones. This new water, nutrient and energy conservation technology has been developed to protect groundwater and other fresh water sources from contamination by nearby production of food and cellulosic biomass cropping systems. Michigan State University and the University of Arizona used collaborative soil physics and engineering research to model, develop and field test the importance of strategically installing U-shaped polymer trough membranes to maximize the capture and retention of water and nutrients available to

plants. Based on a four-year average, this new technology provided gains of 229 percent production than non-irrigated controls and 97 percent more maize biomass than irrigated controls. Four years of incorporating these high maize stover biomass production rates added approximately 10 tons of carbon sequestered per acre for these sand soils.

### **The Central Valley Habitat Exchange Model**

The Central Valley Habitat Exchange (The Exchange) offers landowners an opportunity to generate new revenue sources from floodplain restoration while continuing agricultural production. The Exchange provides a mechanism to compensate growers and ranchers for land stewardship activities that result in quantifiable floodplain habitat benefits in the context of a working landscape. The Exchange has developed tools to quantify the suitability of floodplain lands for agriculture and as habitat for various floodplain-dependent species including Chinook salmon, Swainson's hawks, riparian song birds, and giant garter snakes. These tools can help landowners design and implement management practices that restore habitat on working agricultural lands. The Exchange has developed administrative infrastructure to expedite transactions between buyers and sellers to enable agricultural producers to profit from habitat restoration. They are working with EQIP-eligible producers, flood and water management agencies, and regulatory agencies to enable landowners to obtain and sell credits for the habitat they create. The Exchange will create a model that is broadly applicable to floodplains and agricultural lands across the Central Valley, California, and the Nation.

### **On-Farm Grazing Land Management Demonstrations**

The National Grazing Lands Coalition (NGLC) is using rainfall simulators at on-farm demonstrations for limited resource and historically underserved farmers, ranchers and forest landowners. NGLC is using outreach techniques to determine how prescribed grazing impacts pasture and range productivity, conservation and soil health. NGLC targets community-based organizations that serve these farmers, ranchers and forest landowners. Project partners in Texas, Louisiana, South Dakota, South Carolina and New York conduct hands-on workshops as part of the on-farm demonstrations to enhance assimilation and adoption of grazing land management practices.

### **Low-Cost Irrigation Scheduling Technology**

The Flint River Soil and Water Conservation District and its partners are using a CIG to enhance irrigation efficiency. This project uses soil moisture sensors—in concert with a specialized crop model—to help farmers make more informed irrigation decisions at a lower cost. The project integrates real-time data from low-cost soil moisture sensors with automated irrigation recommendations derived from Irrigator Pro, a crop model developed by USDA's Agricultural Research Service National Peanut Research Lab. The integration is achieved through the development of a smart phone application for Apple and Android devices.

### **The SmartIrrigation Cotton App**

The University of Florida received CIG funding to develop a new NRCS water management tool. The SmartIrrigation Cotton App is currently being used by 144 unique users to schedule irrigation and improve water management in Georgia and northern Florida. The users include individual growers but also county agents who are demonstrating the application for growers as a way to gradually encourage them to adopt

it. An extension irrigation specialist is promoting use of the application at all county meetings and trainings. <http://smartirrigationapps.org/>

### **Successful Watershed Investment Programs**

The World Resources Institute (WRI) has released a new report that identifies 10 lessons for successful watershed investment programs. “Protecting Drinking Water at the Source” is a collaboration with Colorado State University’s Colorado Forest Restoration Institute. The project is based on 13 case studies from across the U.S. The project’s goal is to help unite upstream water producers, such as forest owners, with downstream water consumers, around the shared goal of watershed protection and management. NRCS funded the project through its CIG program and the U.S. Endowment for Forestry and Communities provided matching funds.

### **Adaptive Nutrient Management**

With support from a 2004 CIG award, the Iowa Soybean Association, in partnership with the Environmental Defense Fund, worked directly with producers to evaluate an adaptive nutrient management process for refining nutrient management on their farms. Project results showed that 80 percent of participating farmers changed their nutrient management practices within 2 years. The increased nutrient use efficiency made possible through adaptive nutrient management not only allowed producers to reduce their fertilizer inputs and associated costs, but also reduce the risk of nutrient loss to the environment. These results led NRCS to include adaptive nutrient management in its revised Conservation Practice Standard (CPS) 590, Nutrient Management. NRCS then developed and provided guidelines and training to field staff on implementing adaptive nutrient management, and is currently providing financial and technical support to increase adoption of this practice nationwide.

### **Cover Crop Decision Tool**

Through a CIG award and other contributions, the Midwest Cover Crops Council developed a Cover Crop Decision Tool that incorporated expert knowledge across several states into a decision support system for farmers. As a result of this project, producers throughout the Midwest can evaluate their options and receive cover crop recommendations, such as species and seeding rates, tailored to their local conditions, soils, and management goals. This helps farmers remain profitable and contributes public value through benefits to the environment.

### **Filter Mound Technology**

The Clinton Conservation District, in partnership with Michigan State University, used a 2009 CIG award to work directly with small dairy farmers to evaluate the performance of a filter mound technology for treating milking center wastewater. Results from this evaluation demonstrated both economic and environmental viability of the filter mound technology for small dairies, reporting 90 percent or more removal efficiencies for total phosphorous, ammonia, suspended solids, and *E. coli* bacteria. Based on these results, NRCS in Michigan developed two products that are available for use by small dairies--a conservation practice standard, *Milking Center Wastewater Treatment*, and design guide, *Michigan Filter Mound for Treating Milking Center Wastewater*.

### **Solar Powered Irrigation Pump Demonstration**

Tó Lání Enterprises (TLE) conducted a national pilot project that demonstrated the environmental, agricultural, economic, and socio-cultural effectiveness and benefits of solar energy systems for pumping irrigation water. The project was designed to encourage and facilitate adoption of such systems among Navajo, Hopi, and other Tribal conservation districts, farmers, and ranchers in the arid and semiarid Southwest. Results from the demonstration sites have been so promising that the solar powered system has been adopted by many Navajo farmers.

### **Adapt-N Water Quality Tool**

With funding from various sources, including CIG, Cornell University developed and tested a publicly available, cloud-based nitrogen recommendation tool, *Adapt-N*, on farms for over three years. The tool models local weather, soil, and management to provide better nitrogen recommendations. Results showed that *Adapt-N* saved producers \$30 an acre and decreased nitrogen inputs by 44 lbs per acre, without decreasing yield. The model has been successfully tested throughout the Northeast U.S. and is now being evaluated in the Midwest.

### **Drainage Water Management**

A multi-state team led by the Agricultural Drainage Management Coalition worked directly with producers in the Upper Mississippi River Basin to evaluate nutrient savings and assess the economic effects of drainage water management, a conservation practice that uses control structures to manage water table depths to reduce nutrient transport. Results from evaluations in Iowa, Minnesota, Illinois, Indiana, and Ohio showed 20 to 60 percent reductions in nitrate loss to surrounding waterways. Responding to these positive results, NRCS formed a National Agricultural Drainage Water Management Team charged with developing regional recommendations to accelerate adoption of drainage water management. By adopting conservation practices to manage subsurface runoff, producers not only promote water quality by intercepting excess nutrients, but also realized agronomic benefits by reducing water deficits during the growing season.

### **Water Temperature Trading Tool**

Oregon State University monitored water temperature and habitat value on riparian forest buffer restoration sites established by Clean Water Services (the storm and wastewater agency for the Tualatin Basin in Oregon) and Tualatin Basin landowners. A tool developed from this project provides landowners with estimates of solar heat loading along user-defined sections of streams. As a result, users can now assess the degree to which management practices, such as adding or removing riparian trees, create heat-loading credits or deficits that can be traded in local ecosystem service markets. This approach offers more cost-effective methods for reducing stream temperature to meet habitat requirements (e.g. compared to installing chillers), as well as provides another income source for landowners.

### **Water Temperature Credit Trading Program**

The abovementioned CIG project success led to a subsequent 2011 CIG award that was lauded by President Obama for its impact in developing a water temperature credit trading program in the Pacific Northwest. This was the first time a standing President addressed the issue of emerging markets for ecosystem services. Over the past 5 years, the Freshwater Trust has worked with the Willamette Partnership and numerous other organizations to build the science and credibility standards necessary to calculate and quantify the ecosystem services nature provides into “credits” that can be traded and purchased—in this case, by wastewater treatment facilities and power plants—to meet regulatory compliance for salmon habitat.

### **National Feed Management Education Effort**

A 2005 CIG award to Washington State University led to the development of a National Feed Management Education effort that has been incorporated into NRCS’ activities to encourage producers to adopt an NRCS feed management conservation practice. Feed management reduces nutrient concentrations in animal manure, which can improve nutrient use efficiency and reduce nutrient inputs to ground and surface water.

### **Precision Sprinkler Irrigation Water Management**

With support from a 2005 CIG award, the Cape Cod Cranberry Growers Association helped growers to install automated sprinkler systems that conserve water and reduce costs. These systems have sensors among the cranberry vines that monitor temperature and other weather conditions. Using the Internet, a grower can monitor and control the systems. Growers can use these systems to save more than 9,000 gallons of water per acre on a frost night. During the study period, the systems reduced water application times by 2 hours per application. For a typical growing season, 280,000 gallons of water per acre can be conserved employing this system.

### **NRCS Bee Habitat Improvement Reference Guide**

A 2009 CIG award to the Xerces Society developed new NRCS guidelines for improving native bee habitat. The project demonstrated that establishing native pollinator habitat in previously abandoned agriculture areas significantly increased native bee populations. The project was carried out in California where most of the nation’s fruit and vegetable crops are located. The guidelines developed led to publication of an NRCS bee habitat improvement reference guide. NRCS is now providing funding to establish bee habitat on previously unused farm areas on hundreds of thousands of acres across the nation.

### **Cover Crop Handbook**

With support from a 2007 CIG award, the Oahu Resource Conservation and Development (RC&D) Council produced new NRCS guidelines for cover crop establishment in tropical and subtropical regions, along with a new cover crop handbook that was translated into six languages. As a result, farmers in these areas can derive the benefits of improved soil health by successfully incorporating cover crops into their production systems.

### **Carbon Credit Trading Transaction (Chevrolet)**

Ducks Unlimited used a 2011 CIG award to develop a protocol for measuring and quantifying the amount of carbon stored by avoiding the conversion of grasslands to cropland. This protocol was then approved by the American Carbon Registry and used by private landowners to generate carbon credits on ranch lands in North Dakota. In 2014, Chevrolet became the first entity to purchase these credits as part of its corporate sustainability initiative. This success is being used as a model for future environmental markets to enhance conservation of our natural resources.

### **Carbon Credit Trading Transaction (Climate Trust)**

In 2011, NRCS awarded a CIG grant to the Delta Institute to develop a protocol that would allow farmers to generate greenhouse gas reduction credits arising from voluntary implementation of more efficient nitrogen fertilizer management techniques. The Delta Institute engaged a variety of partners in the project, including American Farmland Trust, Conservation Technology Information Center, Environmental Defense Fund and agricultural retailers. The end result was a methodology approved by the American Carbon Registry that allows for the generation of carbon credits (converted nitrogen oxide credits) on cropland. In a first-of-its-kind transaction, the Climate Trust purchased credits developed using the methodology in early 2014, providing a new income stream for those farmers generating the credits. This demonstrates how improving nitrogen management can be used to generate marketable credits that improve the environment and provide additional income for producers.

### **Dispersed Water Management Program**

A 2005 CIG award to the World Wildlife Fund launched the Florida Ranchlands Environmental Services Project, a stakeholder partnership that included ranchers, environmental groups, state and federal agencies, and research scientists. The pilot project's goal was to design a [Payment for Environmental Services program](#) in which willing ranch-owner "sellers" could enter into contracts with state-agency "buyers" to provide water retention and nutrient load reduction services above and beyond regulatory requirements critical to improving the health of Lake Okeechobee and the estuaries, as well as contributing to greater Everglades' restoration. The successful pilot led to creation of the Dispersed Water Management Program by the South Florida Water Management District.

Due to potential environmental concerns associated with animal manure, numerous CIG projects have successfully demonstrated innovative technologies focused on appropriate use of animal manure, as briefly exemplified by the following:

- The University of Georgia Research Foundation demonstrated the feasibility of growing an alternative crop (pearl millet) on soils with high nutrient content that restrict manure application. Growing pearl millet on these lands will not only help improve water quality, but the millet can also be used as poultry feed by these same farmers.

- The Wisconsin Department of Agriculture, Trade, and Consumer Protection evaluated various conservation practices that provided NRCS with a basis for making recommendations to mitigate odors, ammonia, and hydrogen sulfide from dairies.
- The Cayuga County Soil and Water Conservation District successfully demonstrated how a community-scale digester can be used to digest not only manure, but also other community-generated wastes.
- The Environmental Credit Group provided carbon credit incentives for adopting lagoon covers on hog farms in North Carolina and dairies in New York. This project found that the possibility of covering lagoons to flare methane is entirely possible.
- The National Fish and Wildlife Foundation demonstrated how a plenum flooring system in poultry houses can be used to reduce ammonia production (having animal health and environmental benefits).
- Cornell University demonstrated how animal waste can be used in vermin compost for recycling the manure nutrients in greenhouse systems that also protect the environment.

## **XI. Contact**

For more information about the USDA-NRCS Conservation Innovation Grants Program, please contact the CIG National Program Manager, 1400 Independence Avenue SW, Room 6143-S, Washington, D.C., 20250, telephone: (202) 720-7412, or at [nrcscig@wdc.usda.gov](mailto:nrcscig@wdc.usda.gov).

Additional information about NRCS's CIG program is available at [www.nrcs.usda.gov/technical/cig/](http://www.nrcs.usda.gov/technical/cig/)

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