

*Applying knowledge to improve water quality*



# National Water Program

*A Partnership of USDA CSREES  
& Land Grant Colleges and Universities*

## Building a National Network of Excellence

*Essential Catalysts and Critical Elements  
for Water Research, Education, and  
Extension Programs*



The  
Land-Grant  
University  
System

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*A network that responds to water resource  
issues by advancing knowledge through  
research, education and extension projects.*

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## Introduction

A wide array of successful Land Grant Institution (LGI) initiated programs and partnerships exist across the country to address water quality and public health issues. CSREES and the National Integrated Water Quality Program, funded through Section 406, have provided funding and shared leadership with the nation's LGIs to make these successes possible.

Successful programs first and foremost serve the LGI clientele and stakeholders. They can also help us learn new approaches to program development, and the ingredients that foster and sustain productive collaborations. Sharing the LGI's best stories throughout the National Integrated Water Program network and with existing and potential partners, may stimulate further success and increase the effectiveness of water quality research, outreach, and management nation-wide.

To this end, the Regional Liaison Standing Leadership Team (SLT) solicited samples of the best stories from the CSREES State Water Quality Coordinators and other regional program participants. Solicited programs were required to have strong elements of partnership and multi-state activity or potential activity. The nation-wide pool of submissions was reviewed for patterns in issue areas, national capacity, and elements that led to their success. In addition, the Regional Liaison SLT and Committee for Shared Leadership pooled their knowledge of important initiatives in their respective regions.

The National Integrated Water Quality Program network conducts numerous educational and applied research activities individually and in partnership with regional agencies and organizations. However, from this solicitation emerged a story of significant capacity and need in six issue areas, and several key elements of success. These issue areas span several National Themes, the most pertinent being Animal Waste Management, Nutrients and Pesticide Management, Watershed Management, and Drinking Water and Human Health.

The six issue areas and their sub-categories are:

1. On-site Systems
  - Private Water Wells (research and outreach)
  - On-site Septic Education
2. Animal Agriculture
  - Manure Management
  - CAFO Training
  - Manure Hauling/Transport
3. Stormwater Education
4. Evaluation of NPS Projects
5. Volunteer Water Quality Monitoring
6. Watershed Education for Professionals

In the pages that follow is a collection of stories intended to provide LGI educators, researchers, and specialists with a snapshot of successes that colleagues across the country have had utilizing Section 406 funding in two of the six issue areas:

- On-site Systems: Private Water Wells and Septic Systems
- Animal Agriculture: Production and Manure Management

The information contained in these two compilations identifies the catalysts that inspired initiation of the programs, essential elements for their success, and fundamental partnerships (pages 4 and 7). This assemblage complements the National Impact Report, which is a more in-depth look at the impacts of individual programs as a result of partnerships and collaboration, by providing national summaries by issue area with additional program development and “how-to” information. Additionally, the catalysts and critical elements from these stories were distilled and categorized to show programmatic similarities and directly reveal the necessary components for success (page 10).

To review the complete story for each of the successful programs mentioned in the following compilations, visit the National Water Program website ([www.usawaterquality.org](http://www.usawaterquality.org)). Subsequent documents will include information regarding other successful programs from the four remaining issue areas:

- Stormwater Education: With new stormwater regulations in effect, Cooperative Extension is addressing the issue by working with key audiences on ways to reduce storm water, mitigate its impacts, and how to look at stormwater from a watershed perspective.
- Evaluation of NPS Projects: The research and extension mission of the land grants creates a culture that values evaluation of effectiveness and impact. LGIs across the country assist federal, state and local nonpoint source programs in examining and improving their performance, as well as evaluating the success of their own education and outreach efforts.

- Volunteer Water Quality Monitoring: Expanding needs for water quality data and declining government resources have made volunteer water quality monitoring programs an essential part of meeting monitoring needs. LGIs have stepped up to the task of developing training materials for volunteers and ensuring quality control of the collected data.
- Watershed Education for Professionals: Changing regulations and evolving science make ongoing education of water related issues a necessity for several groups in associated fields. Regulators, planners, and elected officials, among other professionals, are targeted audiences for LGI-sponsored watershed education programs around the country.

If you have questions on this compilation or would like to submit a success story about a program you are involved with, please contact your Regional Liaison (contact information located on page 11).

## The Role of the Regional Liaison and the Liaison Standing Leadership Team

The Liaison Standing Leadership Team is a group of professionals dedicated to the improvement of water quality by serving their respective Regional Water Programs and the National Integrated Water Program network guided by the Committee for Shared Leadership (CSL). Individually, Regional Liaisons establish and facilitate partnerships between USDA-CSREES, the Land Grant Institutions, USEPA, and other agencies and organizations. They support communication and dialogue that transfers information and technology to and from regional clientele and stakeholders. As the Standing Leadership Team, Liaisons work together with the CSL to identify and disseminate information regarding emerging issues, key opportunities, potential partnerships, and transferable programmatic successes for the benefit of the regions and the national network as a whole.

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## On-site Systems: Private Water Wells and Septic Systems (Primary National Theme Area: Drinking Water and Human Health)

### National Overview and Introduction of Selected Programs

Private water supply systems, including wells, springs, and cisterns, are the primary source of drinking water for approximately 25% of Americans. These systems fall outside the authority of the Safe Drinking Water Act, which regulates public drinking water supplies, and often are not regulated at all. While some states and local governments do regulate private systems, the quality of water coming from the tap is largely left to the homeowner (well owner) to maintain. On-site septic systems are used for home wastewater disposal by approximately 25% of Americans. While permits are required in most states for the installation of septic systems, very few follow up with regular inspections after installation. As with private water supply systems, proper maintenance of on-site wastewater treatment systems is also left to the homeowner.

The Private Well Initiative (PWI) in New England, the Pennsylvania Master Well Owner Network, and the Rainwater Catchment System Maintenance Program in the Pacific Islands are a few examples of programs aimed at educating private well owners and cistern users on how to test, treat, and maintain their water systems. The Onsite Wastewater Education Program (OWE) reaches owners of onsite wastewater treatment and dispersal systems, as well as county and state regulators

in Arizona. These programs have been developed and implemented with support from various USDA-CSREES Regional Water Quality Programs. Some of the key elements that allowed these programs to be developed and fostered their success are summarized here.

### Getting Started – Recognizing What is Needed and Determining How to Meet Those Needs

One common catalyst for the inception of these programs was a recognized need for public education on the maintenance and treatment of onsite systems. A study by researchers at Penn State found that over 50% of private water wells in PA failed to meet at least one drinking water standard. The Palau Community College Cooperative Extension water quality program recently estimated that over 95% of rainwater catchments in Palau are not properly maintained. Other surveys have found that many owners of private water systems are concerned about the quality of their drinking water and want more information about how they can test their water and treat it if necessary. The Arizona Department of Environmental Quality has identified on-site/septic wastewater treatment facilities as the overwhelming activity contributing to water quality impairment in Arizona – over 90% of all identified activities.



To get the necessary, and desired, information out to the public, the Private Well Initiative, Master Well Owner Network, Rainwater Catchment Program, and Onsite Wastewater Education Program have all developed locally appropriate educational materials, and conducted training workshops. Well and cistern owners have been educated on topics including drinking water testing, common contaminants, and treatment methods, while septic system owners and installers have been instructed on proper installation, operation, and maintenance. Education programs have also been developed in some areas for elementary school and high school students.

The Master Well Owner Network has focused on training volunteers who can provide assistance to homeowners throughout the state. The Rainwater Catchment Program has conducted workshops targeted to different audiences, the first workshop geared toward educating community leaders and government agencies, and subsequent workshops for the general community. The PWI has developed a resource guide for New England realtors, *What Every Realtor Should Know About Private Drinking Water Wells*, and is working with realtor associations in each New England state to determine if there are additional programming and educational needs for this audience.

### Essential Program Catalysts

On-site system education and outreach programs vary according to local needs, but some basic catalysts identified as essential to getting the outlined programs off the ground include:

- Available Funding from a Regional Water Program, EPA and/or a state environmental agency
- Regional Water Program Support – Adaptation from an existing program within the region
- Partner Support – Expertise and in-kind contributions from various program partners



### Working with Partners is Critical to Program Success

While the programs mentioned all had support from their respective CSREES Regional Water Programs, partnerships with other organizations were also essential. Regional EPA offices, state departments of environmental protection, universities, and other public and private water agencies all share an interest in water quality and public education. This shared interest allowed for partnerships to develop with different partners providing funding, expertise, and/or staff as available and appropriate.

The Onsite Wastewater Education Program has partnered with a state-wide onsite wastewater conference to provide an optimal time and venue for a pre- or post- conference workshop for onsite professionals. Registration fees from this and other workshops will soon allow the OWE to be self-supporting beyond grant funding, which is key to the Program's continued viability.

By working with volunteers, the Master Well Owner Network is supported by individuals who are motivated to help private well owners become more knowledgeable about their systems. The network has been so successful that a Delmarva Master Well Owner Network, targeted at rural underserved audiences, is being developed for selected counties in Delaware, Maryland, and Virginia.

The PWI established new partnerships and fostered increased communication with each of the New England states among Extension programs, and various agencies and organizations. This in turn led to an additional grant for the University of New Hampshire Cooperative Extension to conduct a needs survey and hold a planning meeting to identify gaps in educational programming throughout New England for private well owners, which resulted in the 2005 New England Private Drinking Well Symposium.

The Rainwater Catchment System Maintenance Program started with help from an established program in Hawaii. Other pacific islands have since become interested in the program and have plans to adapt the booklet *A Guide for Rainwater Catchment Systems in Palau* to their local conditions and translate it into several languages. The Hawaii program also helped the Palau effort off the ground by providing simple and affordable test kits for people to use to test the water from their catchment systems. The test kits have proven to be an essential component in helping users understand that their drinking water may not be as safe as they had previously believed it to be.



In short, the success of each of these programs has relied, to some extent, upon partner support and involvement. Partners, whether internal or external, have proven to be a necessary source for ideas, materials, expertise, funding, and motivation.

### Additional Information

- The Private Well Initiative: [http://www.usawaterquality.org/NewEngland/Focus\\_Areas/well/](http://www.usawaterquality.org/NewEngland/Focus_Areas/well/)
- The Master Well Owner Network: <http://mwon.cas.psu.edu>, email Stephanie Clemens, [sclemens@psu.edu](mailto:sclemens@psu.edu)
- Rainwater Catchment System Maintenance Program: email Leilanie Rechlluul, [leir@palau.edu](mailto:leir@palau.edu)
- The Onsite Wastewater Education Program: <http://ag.arizona.edu/waterquality/onsite>, email Kiff Farrell-Poe, [kittfp@ag.arizona.edu](mailto:kittfp@ag.arizona.edu)



## **Animal Agriculture – Production and Manure Management (Primary National Theme Area: Animal Manure and Waste Management)**

### **National Overview and Introduction of Selected Programs**

Although animal production has many benefits, it also creates by-products such as manure, litter, processing waste and wastewater that, unless properly managed, can cause serious human and environmental health concerns. Since 1900, the US population has increased by nearly 400% and per capita meat consumption has increased significantly. This has resulted in food production increases, greater consumption of animal products and the concentration of the industry. Disposal of waste products into water supplies, runoff spills, over-application as fertilizer and a lack of transport programs are common issues, however, manure management and Concentrated Animal Feeding Operation (CAFO) regulations vary widely among the states.

The coordination and facilitation of university and agency responses to CAFO rules and other manure management issues in the Heartland is an example of a program which fosters multi-state communication and identification of needs related to CAFO regulations. A program aimed at educating farmers of small pig operations in the Pacific Islands, a training and certification program targeting for-hire manure applicators in the Great Lakes Region, and a Master

Cattle Producer Program in Louisiana are examples of Extension directly educating farmers and transporters. Meetings with stakeholders in the Mid-Atlantic were used to develop an excess manure strategy that is designed to manage the overall nutrient balance in the region to help the states meet water quality standards. The multi-state approach used by the regional programs has been very important to the overall success of these efforts.

### **Getting Started – Recognizing What is Needed and Determining How to Meet Those Needs**

The success of the varied manure management programs introduced above generally began with the identification of a basic problem or need that could be addressed. In the Mid-Atlantic and Louisiana, animal waste has been identified as a significant source of the nutrient and bacterial loads entering water bodies, with small and mid-size animal operations identified as potential sources of those loads.

The Heartland region has identified a basic need for technical and regulatory agencies, the livestock industry and TSPs to find common ground in addressing CAFO requirements and to improve multi-state





communication efforts. A series of unrelated manure runoff events in Wisconsin in 2002 convinced that state's industry that something needed to be done to improve their professionalism. Concurrently, manure applicators in Michigan were inquiring about available training programs. In the Pacific Islands, pig wastes are usually removed from pens by flushing or spraying with water and then diverted into a nearby stream leading to significant water supply contamination, yet EPA regulations do not apply to the small-scale piggeries.

Many of these programs have developed educational materials and held training and educational workshops. To get the necessary information to the public, the Mid-Atlantic and Heartland regions have made use of facilitated discussions on regional and state levels to target CAFO issues. The Heartland and Great Lakes regions adapted existing materials or created regionally targeted versions of the Livestock Environmental Curriculum materials. Louisiana's three-phase certification program teaches environmental stewardship as it relates to water quality, instills the value of implementing reduced impact practices, and assists in the development of farm-specific conservation plans. The program in the Pacific Islands has focused on educating farmers through a series of educational workshops and production of a video to reach a greater audience.

### **Working with Partners is Critical to Program Success**

The programs and efforts listed above, while supported by the various Regional Water Quality Programs, required significant partnering to be successful. State and federal agencies, nonprofit organizations, land grant

universities and the industry itself realize that by working together with common goals they can better protect the environment and educate the public. Partnering efforts have provided the necessary resources and expertise to allow for the success of these initiatives.

The Heartland Regional Water Coordination Initiative has involved virtually all interests in the region that are working on manure management regulation, research and extension. The animal manure management issue team facilitates regular regionally - inclusive discussions of CAFO regulations, compliance and Comprehensive Nutrient Management Plan (CNMP) issues. These multi-partner forums have resulted in increased interagency cooperation and input of land grant institutions to regional and national training and implementation programs. Participation of EPA program specialist with Heartland issue teams has had the full support of the regional EPA Administrator. As a result, extension and other partners have developed a better understanding and closer working relationships with regulatory agency than they had achieved before in the Heartland. All partners have requested continuation of facilitated discussions and annual manure management conferences.

### **Key Critical Elements for Success**

**Animal agriculture and manure issues vary throughout the country but successful management of these issues reveals some similar elements critical to the success of the mentioned programs and activities.**

**These include:**

- **The structure of the Regional programs.**
- **Partnering with universities, industry, and state and federal agencies.**
- **Stakeholder involvement.**
- **Program staff and Extension participation.**
- **Funding provided by CSREES and Regional Program partners**



The partnership between LSU AgCenter, Louisiana Cooperative Extension Service, Louisiana Agricultural Experiment Station, USDA, NRCS, NACD, NOAA, state governmental agencies and commodity groups was established four years ago as an innovative way to help farmers learn to reduce runoff into Louisiana's waterways and improve water quality. The LA legislature passed a bill in 2003 referred to as the 'Presumption of Compliance'. The bill acts as an incentive to participate because it assumes, once certified, producers are proactively modifying their operations for the betterment of water quality and the environment. This is seen as a preventative mechanism to avoid costly and inefficient regulations. To date, 2300 producers have completed Phase 1 and are expected to complete Phase II within the next year. State specialists work directly with parish agents to develop and deliver the educational workshops.

Partnering and increased communication among the Great Lakes states between Extension, state agencies, insurance companies and professional associations following the creation of a train-the-trainer program has led to an increased willingness to report manure spills. Some critical elements allowing for this success include the involvement of industry members and Extension staff as the initial trainers, and the availability of market-based incentives created by a partnership with the insurance industry allowing small businesses participating in the program to save money.



Additionally, in Wisconsin, the program has prevented the state from implementing a regulatory program for the industry resulting in taxpayer savings. Within-industry partnerships have experienced significant increases as a result of this program, allowing for increased learning and resource sharing.

With a request from EPA for help in the effort to control wastes from numerous small scale pig operations in the Pacific Islands, the Southwest States and Pacific Islands Regional Water Program responded. Numerous additional local and regional partners were recruited to join the effort to promote farmer education and implementation of alternative practices such as the Marianas Dry Litter System. Support from local farmers, including one who has turned his operation into a demonstration site to encourage others, has been an invaluable resource for the program.

### Additional Information

- What's Under the CAFO Radar Screen?: [www.smallfarmwater.aers.psu.edu/](http://www.smallfarmwater.aers.psu.edu/), email Charlie Abdalla, [cabdalla@psu.edu](mailto:cabdalla@psu.edu)
- Coordination and Facilitation of University and Agency Responses to CAFO Rules and Other Manure Management Issues: [www.heartlandwq.iastate.edu/manuremanagement](http://www.heartlandwq.iastate.edu/manuremanagement)
- Manure Hauler Certification Program: email Kevin Erb, [kevin.erb@uwex.edu](mailto:kevin.erb@uwex.edu)
- Marianas Dry Litter System: email Lawrence Duponcheel, [lawontinian@vzpacifica.net](mailto:lawontinian@vzpacifica.net)
- Managing Surplus Nutrients from Agricultural Animal Manure and Poultry Litter in the Chesapeake Bay Watershed: [www.chesapeakebay.net/newswaterstore111005.htm](http://www.chesapeakebay.net/newswaterstore111005.htm)
- Louisiana Master Cattle Producer Program: email Jason Rowntree, [jrowntree@agcenter.lsu.edu](mailto:jrowntree@agcenter.lsu.edu)

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## A quick look. . .

Catalysts and Critical Elements from Water Research, Education, and Extension  
Success Stories

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**CATALYSTS** that provided the necessary ‘spark’ to get a program off the ground included the following:

### Available Funding

Multiple funding sources (for a single project): EPA grant - regional program funding, and state department of environmental quality.  
USDA funding

### Existence of the Regional Program

Multi-state/regional structure and network  
Regional program provided regional lead  
Support and encouragement from a similar program already existing in another part of the region

### Timing – Right Place / Right Time

New regulation(s) coming  
Recent formation of a statewide industry group

### External Request

Request from EPA to help with a problem outside their scope of authority  
Public concern

### Internal Recognition of Need

Recognition by technical specialists for need of coordinated training  
Having an individual acting as the project champion  
Results from a public attitudes survey

### Partner Support

Expressed interest by regional EPA  
Expertise on the project issue from various partners

**CRITICAL ELEMENTS** that provided the necessary ‘fuel’ to make a program a viable success included the following:

### Available Funding

Collection of fees from workshops to allow for self support (project can continue w/o grants)  
Grant funding (EPA 319)  
Funding from regional program

### Existence of the Regional Program

Established regional structure and organization  
WQ Coordinators pool/share funding

### Materials and Tools

Readily available local materials/tools  
Translating materials into several languages to reach underserved audiences  
Easy to use/read/understand materials  
Simple and affordable test kits available

### Available Expertise

Varied expertise of team members  
Staff with long-term practical experience  
Train the trainer program gave flexibility to training schedules

### Partner Support

Involving industry members in training  
Availability of local contacts for support and follow-up  
Partnering with an existing complementary program  
Strategic partnering with agencies/ organizations that have the necessary tools and/or project materials  
Involvement with national associations that may provide ideas and/or materials

### Other

Incorporating audience feedback  
Motivated volunteers

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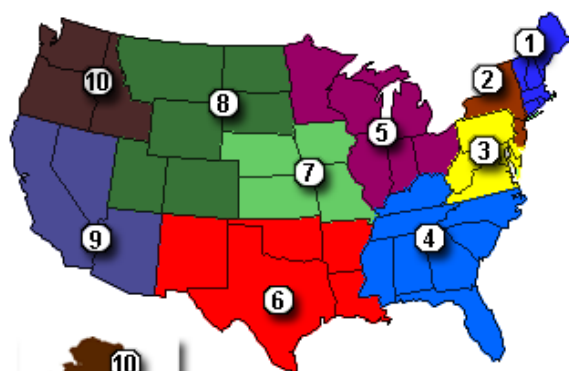
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### ...other Region 2 sites

- Puerto Rico
- Virgin Islands



### ...other Region 9 sites

- Guam
- American Samoa
- Freely Associated States of
  - Federated States of Micronesia
  - Republic of the Marshall Islands
  - Republic of Palau
- Commonwealth of the Northern Mariana Islands

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