Chapter 7

Outreach Education and Technical Assistance: National Institute of Food and Agriculture–Conservation Effects Assessment Project

G.D. Jennings, D.LK. Hoag, M.L. McFarland, and D.L. Osmond

An effective outreach education program is essential for watershed conservation, both for guiding conservation recommendations and for receiving feedback regarding land treatment and the socioeconomic, monitoring, and modeling components. An outreach education plan should have specific goals, objectives, activities, evaluations, and opportunities for feedback and modification. Successful watershed education programs are tailored to meet the needs of target audiences, with activities designed to achieve well-defined objectives. The leader of the outreach education program is integral to the overall project team, with strong connections to watershed communities and to water quality science.

Regardless of who delivers the program, there is a need for outreach education that increases awareness and promotes implementation of conservation practices (Lemke et al. 2010; Sanders and Cahill 1999). Traditionally, cooperative extension employees have played a major role in farmer education, with partners including the USDA Natural Resources Conservation Service (NRCS), Soil and Water Conservation Districts (SWCDs), farmers, agribusiness professionals, environmental groups, and other local organizations.

Research on the effectiveness of outreach education in promoting conservation practice adoption is limited but demonstrates mostly positive associations between outreach and practice adoption. In a nationwide survey, Caswell et al. (2001) found that technical assistance had a positive effect on the adoption of soil conservation practices. Most farmers with a conservation plan had obtained technical assistance from extension or their SWCD, and more than twice as many farmers who received help developing a conservation plan adopted a conservation practice, compared to those who did not receive assistance. Feather and Amacher (1994) found that increasing information sharing about profitability and environmental benefits increased adoption and that this approach was more effective than regulations or financial incentives. In contrast, as discussed in Chapter 6, other researchers have found that increased awareness of water quality issues and impacts of agriculture does not automatically translate into greater adoption (Gale et al. 1993). Differences in results may be due to differences in outreach education program components and site-specific watershed factors.

Over the past century, extension has been a primary source of information for farmers. Hoag (2005) asserted that although extension has provided excellent value to taxpayers, farmers, and

(c) SWCS. For Individual Use Only

consumers, the organization is declining in scope and effectiveness (see also Bull et al. 2004; McDowell 2004). Extension has lost some political support and is increasingly threatened by competing government and private entities that provide education. However, competency in outreach education delivery will substantially impact program success. Furthermore, not all available information sources are unbiased, and consequently, may not be focused on optimizing conservation opportunities. Farmers have noted this decline in extension's ability to provide information due to budget cuts (Chapter 2), which will undoubtedly affect outreach efforts to increase conservation practice adoption.

Extension and other professional educators involved in watershed projects must creatively incorporate outreach education efforts into all aspects of planning and implementation in order to achieve water quality goals. A survey by Lemke et al. (2010) found that intensive education, such as one-on-one visits and farm tours, can increase conservation practice adoption. Most importantly, education and technical assistance programs should be carried out by trusted individuals who understand farmers. The Rural Clean Water Program found that having trusted local officials promote conservation practices increased adoption (Gale et al. 1993). In some watersheds, additional resources were needed to hire these individuals. The agency of the local educator is unimportant. There were some farmers, however, that were not interested in any practices, regardless of the agency conducting the outreach.

Sanders and Cahill (1999) found that conservation projects will succeed only if they provide some immediate and obvious benefit to the farmer. Practices that increase production or that cut costs and conserve soil are more likely to be adopted but must still be easy to incorporate into the existing farming system. Defining, verifying, and clearly communicating practice benefits and feasibility are critical roles for outreach education programs. Finally, and not surprisingly, outreach education has been found to be more effective when all agencies are working together (Gale et al. 1993).

Role of Outreach Education in the National Institute of Food and Agriculture–Conservation Effects Assessment Project

The National Institute of Food and Agriculture–Conservation Effects Assessment Project (NIFA–CEAP) synthesis protocol specifically required projects to learn about outreach effectiveness; the third major CEAP question was as follows: What outreach techniques were most effective at communicating information for different audiences, achieving adoption of practices, improving management, and/or improving maintenance of practices in different geographic settings?

The NIFA–CEAP watershed studies were designed to be retrospective, with the focus on the effects of previously implemented conservation practices on water quality. Outreach activities occurring before project inception often continued during the NIFA–CEAP and may or may not have been integrated with NIFA–CEAP outreach education activities. One NIFA–CEAP in the Lincoln Lake Watershed in Arkansas funded education directly through cooperative extension. Outreach in the other watersheds was provided by multiple sources: land-grant university extension services; grant programs, such as the US Environmental Protection Agency Section 319; SWCDs; farmer organizations; and other nonprofit groups. In the Kansas Cheney Lake Watershed and New York Cannonsville Reservoir projects, education and promotion of conservation practices were conducted by farmer-led organizations in association with state and county agencies.

(c) SWCS. For Individual Use Only

Five NIFA–CEAP studies had stated goals and/or objectives for outreach. Most projects did not include an evaluation of their own outreach efforts or an adaptive management plan. Because of the retrospective nature of the projects, outreach objectives often focused on transferring project results to multiple audiences: extension, farmers, and partners (e.g., SWCDs, watershed associations). For instance, outreach objectives for the Paradise Creek NIFA–CEAP in Idaho were to provide information about the effectiveness of specific conservation practices to (1) growers and residents of the watershed, (2) local and state officials, (3) federal stakeholders, and (4) active watershed groups. The Little Bear River Watershed NIFA–CEAP in Utah was likewise focused on transferring information to two different target audiences.

Several NIFA–CEAP watershed studies partnered with existing nonprofit watershed organizations to disseminate project information, sometimes in association with other organizations, such as cooperative extension, USDA Agriculture Research Service, or SWCDs. The NIFA–CEAP studies that used nongovernment organizations were the Little River Experimental Watershed Project in Georgia (South Georgia Regional Development Center), the Eagle Creek Watershed Project in Indiana (Eagle Creek Watershed Association), the Walnut Creek Watershed Project in Iowa (Friends of the Prairie Learning Center Neal Smith National Wildlife Refuge), and the Rock Creek Project in Ohio (Sandusky River Watershed Coalition).

Some NIFA–CEAP watershed studies actively sought to work within existing outreach structures. The Cheney Lake NIFA–CEAP in Kansas formed a working relationship with the local SWCD and the Citizen's Management Committee (a farmer-led outreach group that had been active for almost 20 years). Meetings among organizations were held twice a year to discuss results of monitoring and modeling. The Cheney Lake NIFA–CEAP personnel provided results to the Citizen's Management Committee demonstrating that many conservation practices had not been targeted to critical areas. As a consequence, the Citizen's Management Committee responded by changing the criteria for types and placement of conservation practices in the watershed. Similarly, the Goodwater Creek Watershed NIFA–CEAP in Missouri provided watershed maps to chemical dealers that outlined sensitive areas from which herbicide losses could be high. In Arkansas, information on project progress was given to the watershed council, and feedback was solicited on how to improve water quality.

Some NIFA–CEAP watershed studies targeted very specific audiences for education. For example, the primary stakeholder of the Cannonsville Reservoir Project in New York was the New York City Department of Environmental Protection due to the focus of the project on the City's drinking water supply and modeling effort. The Lincoln Lake NIFA–CEAP in Arkansas hired an extension agent to work exclusively with farmers on conservation practice adoption (nutrient management in particular). As part of his activities, the agent developed a newsletter for beef cattle operators on the benefits of pasture and nutrient management, wrote two fact sheets, produced numerous newspaper articles, and trained nutrient management planners.

The principal outreach education activities in each of the 13 NIFA–CEAP watersheds are summarized in table 7.1. Because all projects provided presentations at regional or national meetings, these activities are not listed in the table. Table 7.2 lists outreach education activities occurring in the watersheds separate from the NIFA–CEAP studies. Details of project outreach education activities are described in Part II: Chapters 9 to 21.

(c) SWCS. For Individual Use Only

Table 7.1
Summary of outreach education activities in the National Institute of Food and Agriculture–Conservation Effects Assessment Project (NIFA–CEAP).

Project	Principal activities
Arkansas	• Outreach education focused on nutrient management was coordinated by a grant-funded University of Arkansas extension educator. • Watershed focus group and steering committee was formed to guide the outreach. • Stakeholder survey was used to develop new outreach educational materials. • Education activities included one-on-one farm visits, group meetings, on-farm demonstrations, field days, newsletters, and a stewardship recognition program.
Georgia	• Water quality outreach to landowners and farmers was conducted through presentations at the annual Upper Suwannee River Watershed Initiative Conference. • Workshops on conservation practices at the University of Georgia Cooperative Extension's Winter School focused on conservation tillage and nutrient and pest management. • Slide sets were provided to the South Georgia Regional Development Center to provide outreach to community leaders.
Idaho	• Four newsletters about the Paradise Creek project were developed and sent to 350 stakeholders in Washington, Idaho, Oregon, and California. • Talks on the Idaho NIFA–CEAP were presented to the regional US Environmental Protection Agency Executive Committee, to regional US Environmental Protection Agency staff in Seattle, to state USDA Natural Resources Conservation Service offices in Idaho and Washington, to the Soil Conservation Commission staff members in Idaho and Washington, and to local attendees of Soil and Water Conservation District association meetings. • Newsletter-ready articles were developed for county agents.
Iowa	• Research information was disseminated to the public at the Friends of the Prairie Learning Center, Neal Smith National Wildlife Refuge, in special interest group presentations, and via the news media.
Kansas	• Research and modeling results were provided to the Cheney Lake Watershed, Inc. and to the Citizen's Management Committee. • Seven fact sheets were produced from project results.
Missouri	• Watershed maps were distributed to chemical dealers to identify atrazine critical areas. • Watershed maps were developed for the USDA Natural Resources Conservation Service to target conservation practices. • Field days and public meetings were conducted and newspaper articles were published in the watershed.
New York	• Information was provided to the farmers of the farms where research was conducted. • Information and support were provided to New York City Department of Environmental Protection personnel relative to water quality modeling.
Ohio	• Outreach education activities were provided by Ohio State University Extension and included field days and newsletters. • A conservation practice survey was conducted, and the results were disseminated to farmers.
Oregon	• Project results were presented to farmers at the annual Grass Seed Growers Association meeting. • Annual project findings were reported to the Calapooia Watershed and the Long Tom Watershed councils, as well as to other watersheds. • Project findings were published annually in Oregon State University's Grass Seed Agriculture Extension Reports, which reach all grass seed farmers in the Willamette Valley.
Pennsylvania	• One landowner meeting was held to discuss the buffer survey and to provide results from the paired-watershed study.

Continued

(c) SWCS. For Individual Use Only

Table 7.1 Continued

Project	Principal activities
Utah	• Two-page fact sheets were created that included project findings, the implications of the findings for monitoring programs, expectations of watershed-level response to implementation, and total maximum daily load targets. • Workshops were provided, and a detailed training manual was designed to transfer lessons learned from the NIFA–CEAP to watershed managers and agency personnel concerning alternative water quality monitoring approaches, realistic expectations of the effectiveness of implementation, expected time lags, and how to deal with natural variability. • Presentations were made to farmers about lessons learned about the effectiveness and necessity of correct operation and maintenance of conservation practices.

Table 7.2
Summary of outreach education activities in the project watersheds prior to National Institute of Food and Agriculture–Conservation Effects Assessment Project (NIFA–CEAP) or separate from NIFA–CEAP outreach education activities. All watersheds had active technical assistance through the local Soil and Water Conservation Districts and the USDA Natural Resources Conservation Service conservation programs.

Project	Principal activities
Arkansas	• Because of long-term nutrient issues in the Lincoln Lake Watershed, multiple extension outreach education activities occurred prior to the NIFA–CEAP, which included material development, extension presentations, and approaches to encourage conservation practice adoption. • Watershed or county extension councils were formed to guide extension work.
Georgia	• Long-term education of farmers was provided by the University of Georgia Cooperative Extension.
Idaho	• Long-term government-funded effort to reduce soil erosion in the Palouse (Solutions to Environmental and Economic Problems—STEEP) included an aggressive extension component. • Soil and Water Conservation District and Natural Resources Conservation Service personnel provided outreach education through a US Environmental Protection Agency Section 319 project. • A University of Idaho and Washington tillage specialist provided outreach education.
Indiana	• Conservation practice implementation and environmental outreach to area farmers was provided by the Eagle Creek Watershed Alliance and was funded by a US Environmental Protection Agency Section 319 grant. The Alliance hired a farm promoter, who was a retired Natural Resources Conservation Service conservationist, to persuade farmers to adopt conservation practices. • Construction of a bioswale, which collects water from tile drains, is used as a demonstration during field days. • Indiana State Department of Agriculture is working with 16 farmers using the On-Farm Network to coordinate interaction and learning among farmers to improve nitrogen management.
Iowa	• The Fish and Wildlife Service has slowly purchased more land for restoration to native prairie in the Neal Smith National Wildlife Refuge and currently provides education at the Center to multiple audiences.
Kansas	• Farmer-to-farmer outreach was conducted by the Citizen's Management Committee in collaboration with the Soil and Water Conservation District. The effort was funded by the City of Wichita. • Kansas State University Cooperative Extension provided outreach.

Continued

(c) SWCS. For Individual Use Only

Table 7.2 Continued

Project	Principal activities
Missouri	• Outreach education was coordinated by the University of Missouri Extension and focused on conservation tillage and nutrient and pest management. • The *Ag Connection* newsletter is published monthly for Central Missouri farmers by cooperative extension.
Nebraska	• Outreach efforts included the Hall County Water Quality Special Project (1980 to 1984) and the Platte Valley Nitrogen and Irrigation Management Demonstration Project (1984 and is on-going). • Regulatory efforts, which started in 1988 with the Central Platte Natural Resources District Groundwater Management Area, require farmer training. • Outreach education was coordinated by the University of Nebraska Extension focused on conservation tillage and nutrient/pest management.
New York	• Outreach education was coordinated by New York City Watershed Program, Cornell University Extension, and the Watershed Agricultural Council. This effort was funded by New York City. • Cornell Cooperative Extension trains 25% of the watershed farmers every year. • Outreach education activities are based on farmer surveys and include farmer-to-farmer training, classroom training, tours, group meetings, on-farm demonstrations, field days, certification, fact sheets, newsletters, and manure management calendars.
Ohio	• Outreach education was coordinated by Ohio State University Extension and a local watershed group.
Oregon	• Outreach education was provided by an Oregon State Cooperative Extension agent who connected farmers with each other to transfer technical information. • Cooperative extension provided training at annual farmer meetings and through fact sheets.
Pennsylvania	• Initial outreach education was coordinated by a scientist advocate at Pennsylvania State University. • Outreach education activities included one-on-one farm visits and on-farm demonstrations.
Utah	• Extensive outreach was performed by Utah State University Water Quality Extension personnel from 1992 to 1997, which resulted in over 100 visits per year in the watershed to six target audiences: landowners, general public, public schools, civic groups, and Utah State University personnel. • Activities included demonstrations, presentations, and fact sheets.

The following outreach education activities were used by the NIFA–CEAP watershed studies to encourage conservation practice adoption:

- One-on-one farm visits
- Group meetings and presentations
- On-farm demonstrations
- Field days
- Newsletters
- Fact sheets
- Training and certification
- Community networks
- Watershed maps
- Electronic presentations

Some NIFA–CEAP studies employed surveys to improve education efforts by better understanding their stakeholders' needs. In the Paradise Creek Watershed Project in Idaho, a survey

(c) SWCS. For Individual Use Only

of state legislators revealed that they knew very little about conservation needs or solutions, but the survey prompted some legislators to inquire. The Little Bear River Watershed Project in Utah surveyed farmers to determine the effectiveness of outreach retrospectively because a prior water quality Hydrologic Unit Assessment Project had included significant outreach.

Results: Contributions to Knowledge/Science from Outreach Education

The contribution or impact of outreach education to knowledge and science is not directly obtainable from the NIFA–CEAP watershed studies. Nevertheless, some conclusions can be drawn indirectly based on the literature, actions taken by the projects (which reveal what project personnel think is effective), and the key informant survey (Chapter 2).

As described in the introduction, research documents a positive correlation between education and conservation. The NIFA–CEAP personnel offered several anecdotal conclusions about what types of outreach methods worked well. In some cases, their views were supported by watershed surveys. However, the key informant survey (Chapter 2) and descriptions of the education programs (summarized in table 2.1) indicate that a majority of projects' outreach education efforts were not driven by strategic goals and planning. While the key informant survey showed that government personnel often believe that they are very effective at extending knowledge, the survey also demonstrated that farmers did not share this same opinion. Furthermore, the educational approach used, even for extension, seemed to be "learn by doing," rather than a deliberately designed approach based on research findings about effective education.

Most of the NIFA–CEAP studies were focused on transferring knowledge rather than on changing behavior. Considering the short duration and retrospective nature of these projects, changing behavior would have been difficult. However, a few projects clearly demonstrated behavior change through NIFA–CEAP activities (e.g., the Lincoln Lake Watershed in Arkansas and the Cheney Lake Watershed in Kansas). Many other projects demonstrated changes in conservation implementation, but these changes occurred over a long period (up to 30 years) and involved multiple agencies, changes in production technologies, and other factors. Only the Lincoln Lake Watershed NIFA–CEAP in Arkansas hired an extension agent to work directly with farmers to implement conservation practices. All other NIFA–CEAP watershed studies used existing extension personnel and other organizations to provide outreach.

According to socioeconomic studies (Chapter 6), two substantial obstacles to conservation practice adoption by farmers are lack of control and lack of trust, both of which can be addressed by outreach education. Farmers frequently commented that USDA NRCS standards do not provide necessary flexibility to adapt best practices to individual circumstances (lack of control). And due to limited resources, extension often does not have the necessary specific knowledge on practice compatibility and economics that farmers seek (lack of trust). In some cases, trust was lost when different messages were presented by multiple organizations working in the same watershed. For example, in the Goodwater Creek Watershed in Missouri, contradictory claims concerning water quality problems associated with atrazine were made by University personnel and an advocacy group. As a consequence, farmers lost trust, the outreach message was diluted and contradicted, and participation in the project by farmers decreased.

Another issue key to the long-term success of conservation efforts is sustained adoption and maintenance of practices over time. In the Little Bear River Watershed in Utah, 61% of the man-

(c) SWCS. For Individual Use Only

agement practices and 35% of the structural practices were not maintained after the Hydrologic Unit Area (HUA) Project was completed. While various factors affected abandonment of practices, the key informant survey indicated that lack of follow-up by project staff due to agency policies and resource or personnel limitations played a role. Postinstallation outreach education follow-up and support are important to ensure not only that practices are implemented but also to assist farmers with adaptive management to promote long-term sustainability.

In the Little Bear River Watershed, a prior HUA program had a major objective of educating the community and public. The HUA project conducted an extensive outreach effort from 1992 through 1997 to six target audiences: landowners, general public, public schools, civic groups, Utah State University Extension personnel, and others. Extension personnel made over 100 visits per year to the watershed. Extension used newsletters, field trips, workshops, seminars, and visits to landowners to reach watershed residents. The NIFA–CEAP evaluated the impact of the HUA program on farmers. Farmers did understand that there was a water quality problem and that the program was trying to improve water quality. Three primary reasons that farmers participated in the project were cost share, desire for the specific project, and/or desire to improve farm operations. Since technical assistance was provided by the USDA NRCS and the Soil and Water Conservation District staff, these agencies had the greatest effect on farmer participation. For the most part, farmers did not influence each other, and 60% did not attend field days. Demonstrations seemed to have little effect on participation in conservation programs.

One of the most important outreach education results from the NIFA–CEAP watershed studies was learning that one-on-one contact is the most effective means of education. This conclusion is also supported by the literature and key informant survey; the same conclusion was reached previously in the Rural Clean Water Program (Gale et al. 1993). The NIFA–CEAP studies applied three approaches of one-on-one outreach: (1) an extension agent was hired to work directly with a small number of farmers in the Lincoln Lake Watershed in Arkansas, (2) an extension agent provided a farmer-to-farmer training program in the Calapooia Watershed in Oregon, and (3) farmer-led programs that included extension or SWCDs were funded by outside sources (Cheney Lake Watershed in Kansas and Cannonsville Reservoir in New York). Only the extension agent in Arkansas was funded by the NIFA–CEAP.

An effective one-on-one education program was coordinated by the NIFA–CEAP extension agent in the Lincoln Lake Watershed in Arkansas. Because he was able to build trust with the farmers he served, conservation practice (nutrient management) adoption increased, allowing him to write nutrient management plans for approximately 3,525 ha (8,710 ac). He used results from the stakeholder survey to develop new, more specific education materials for nutrient management trainings, conservation practice field days, beef cattle short courses, pesticide applicator trainings, one-on-one farm visits, and a stewardship recognition program. The combination of working with key and informed stakeholders and a stakeholder steering committee, as well as in one-on-one settings and large groups with indirect and direct education methods, resulted in high adoption levels of one or more conservation practices and high quality data for the NIFA–CEAP.

Farmers can be an excellent source of one-on-one training. In the Calapooia Watershed in Oregon, the local extension agent created a clever solution to address his lack of information for certain problems that farmers were inquiring about. He asked another farmer. This is a low-cost, high-impact way to provide effective outreach education. When farmers asked him how to improve seed to soil contact in no-tillage, for example, he found a farmer who had solved that

(c) SWCS. For Individual Use Only

problem and then held a field day on his farm. The innovative farmer, and his system, quickly became the focus of the program, and the agent accomplished his education objectives.

There were two examples of NIFA–CEAP farmer-to-farmer programs: the Cannonsville Reservoir in New York and the Cheney Lake in Kansas projects. In New York, an agricultural council formed the bond between farmers, environmental groups, extension, the USDA NRCS, the SWCD, and others. The council trains 25% of the farmers in the watershed each year and, in addition, their outreach included all important aspects: technology, education, and funding. Funds for these efforts came from New York City. A farmer-led conservation committee in the Cheney Lake Project was funded by the City of Wichita, Kansas. The committee provided education to farmers (farmer-to-farmer program), determined what conservation practices would be funded, and determined where practices would be placed. Coordination was done through the local SWCD and a paid project manager. These programs effectively rallied extension, USDA NRCS, and other organizations into a coordinated program. Most areas, however, would have difficulty accomplishing this level of cooperation without additional funds as a catalyst.

Many of the NIFA–CEAP watershed studies operated their outreach education programs through nonprofit organizations, such the South Georgia Regional Development Center, the Eagle Creek Watershed Association, Friends of the Prairie Learning Center Neal Smith National Wildlife Refuge, and the Sandusky River Watershed Coalition. These organizations provided information, but did not have the structure or resources to change behavior as did the organizations in Kansas and New York.

Extension and USDA NRCS efforts were active in many of the NIFA–CEAP watersheds; however, it was clear that when resources are scarce, the outreach networks are likely to be weak. When farmers were asked in the key informant survey about where they get their information, the most frequent source of information was other farmers or self research (Chapter 2). Extension was mentioned by some people, but several others noted that extension programs have been diluted due to shrinking budgets, by working in multiple counties, and by tackling too many topics. Some people said that they no longer considered extension to be a credible source of information and that it was behind the times. In only two locations was extension extremely important: Cannonsville Reservoir in New York and Lincoln Lake Watershed in Arkansas. And in those cases, funding was abundant. Extension also was favored in high production areas, like Iowa, for its role in traditional production and marketing. Farmers noted the same things about USDA NRCS technical assistance; assistance was in decline. In an era of diminishing public resources, both agencies should reconsider how they provide outreach education and technical assistance to improve their effectiveness.

Lessons Learned

Programs achieve greater success with clearly stated goals and objectives. Much of the outreach education programming in the NIFA–CEAP watershed studies was based on providing traditional programs without well-defined independent goals and objectives for achieving conservation practice adoption. Projects like the Lincoln Lake Watershed in Arkansas, the Cheney Lake Watershed in Kansas, and the Cannonsville Reservoir in New York appeared to have better cooperation and impact because they had a plan that included goals, objectives, strategic activities, evaluations, and feedback. They also appeared to have better success when integrated with other ongoing efforts (see next lesson). There may be justification to consider independent

(c) SWCS. For Individual Use Only

programs for conservation, as opposed to adding these educational demands onto other agent responsibilities. This would enable extension to provide customized and authoritative information and to address the unique educational needs required to help farmers identify, adopt, and sustain conservation systems that meet their needs and the needs of the watershed.

Coalitions working together improve impacts. Effectiveness was enhanced by interaction with networks of local stakeholders representing target audiences. In the Lincoln Lake Watershed in Arkansas, the Cheney Lake Watershed in Kansas, the Eagle Creek Watershed in Indiana, the Cannonsville Reservoir in New York, and Rock Creek in Ohio, local watershed stakeholder groups helped guide outreach education activities. These groups included farmers, environmental interest groups, and resource agency professionals with thorough understanding of the people, farming practices, and water quality issues in the local watersheds. Outreach education programs were tailored to meet local needs based on feedback from these networks. Strong networks provided opportunities for low-budget outreach education programs to extend their influence. Strong networks also provided an opportunity to package what each group has to offer in one place. For example, extension can provide educational assistance with technical advice being provided by USDA NRCS or the SWCD and funding for cost sharing provided by the Farm Service Agency or other special funding programs. Finally, this cooperation reduces the likelihood of conflicting messages.

Certain educational methods are more effective than others. Ten educational tools used in the thirteen NIFA–CEAP watershed studies were listed. However, the key informant survey showed that not all extension education methods are effective. A review of the literature and lessons from the thirteen projects provides some guidance about what works best. This is not to say that other methods do not also work, but these have a proven track record and should be considered when developing an outreach education program. Perhaps the two most important lessons are that farmers need to be shown how conservation programs benefit their farms and that information is best received from a single, trusted professional or from peers.

The literature indicates that increasing profit is the most effective way to increase conservation practice adoption, a point confirmed by our findings (Chapters 2 and 6), and outreach education activities were most effective when focused on the most meaningful farmer incentives of profit, flexibility, and ease of adoption of the conservation practice. Educators might make their message more effective if they consider these three factors as part of their outreach education program. For example, outreach education programs should include information or self-help tools that show how each conservation practice affects profit and should look for ways to present that information in a format that is easy for farmers to observe. Profitability should be the focus of outreach education where possible, even when the objective of the educator is conservation practice adoption. The conservation benefits are also important to include but may be secondary considerations to many farmers. Educators should consider whether it is preferable to help farmers find profitable "second best" conservation strategies or to encourage them to adopt better but unprofitable conservation practices. Another option is to package the technology with conservation funding. Whatever the approach, it will be more effective if the education program and the funding program work in concert. Educators can package and adapt their programs to take these and other important factors into consideration. For example, in the Cannonsville Reservoir in New York, many educational tools were used to support implementation of nutrient management plans and were coordinated with financial incentives. Outreach education efforts included manure management calendars, calibration field days, and regular training updates

(c) SWCS. For Individual Use Only

with emphasis on voluntary compliance to avoid regulation. The benefits of a practice should also be easy to see and to adapt into current farming systems.

Outreach education activities were most effective in promoting conservation practice adoption when conducted one-on-one and coordinated by a trusted, local education point-of-contact who was experienced with local farming practices and was respected in the agricultural community. In the Lincoln Lake Watershed in Arkansas, a full-time extension educator funded through the NIFA–CEAP worked with farmers specifically on nutrient management plans. This person gained the trust of clients through ongoing personal contacts and familiarity with local farming practices. In the Eagle Creek Watershed in Indiana, a retired USDA NRCS conservationist was hired using US Environmental Protection Agency Section 319 funds to promote farm conservation practices for effective nutrient management. Sometimes, the best messenger to use is a peer farmer. In the Calapooia Watershed in Oregon, the local extension agent used early adopters as models for neighbors to observe conservation practices on the ground. This approach also was used in Indiana and Arkansas to provide opportunities for farmer-to-farmer informal education. The farmers in the Cheney Lake Watershed in Kansas specifically designed and implemented a farmer-to-farmer education program. In the Spring Creek Watershed in Pennsylvania, the original project leader, a university scientist, worked with farmers one-on-one to help them understand the importance of fencing and stream buffers to maintain healthy trout streams on their properties. The one-on-one approach and meeting farmers on their properties was most effective in changing behaviors and promoting adoption.

There were many other lessons discussed in the previous chapters about how to approach farmers and what to tell them. Conservation education has some unique aspects, since the benefits accrue to both the farmers and society. Educators can and should study these lessons in order to design more effective programs.

Recommendations: What Would Make Outreach Education Better?

Based on the lessons learned from the case-study NIFA–CEAP watersheds, this synthesis recommends the following steps to improve the application of outreach education to enhance implementation of conservation practices:

- Educational programs in conservation must be dedicated components of the overall watershed project. More importantly, the education, technical assistance, and financial assistance components of conservation programs must work in concert. This will require detailed organization and planning and close coordination among personnel from multiple agencies and organizations to develop, package, and deliver information and technical and financial assistance to land owners and managers that promotes active and sustained participation in conservation programs.
- Outreach education programs must develop comprehensive plans with goals, objectives, target audiences, implementation strategies, and well-defined responsibilities. A substantive evaluation plan must be included to continuously assess progress and enable adaptive management to optimize educational outcomes.
- The education plan should identify and focus on factors that represent the greatest incentives for farmers in a given watershed. These most often primarily will be profit,

(c) SWCS. For Individual Use Only

flexibility, and ease of adoption but also can include yield, aesthetics, neighborliness, wildlife, labor reductions, and regulatory avoidance.

- Outreach education must be integrated into the overall project leadership team with a designated coordinator participating in all aspects of project planning and decision making. The outreach education leader should be well-connected to science-based knowledge on water quality conservation practices and to the local farming communities in the target watershed. The project leadership team should follow well-documented methods for team building, and the education plan should integrate targeted outreach education activities focused on key conservation practices into ongoing farmer education programs led by extension, SWCDs, and agribusiness professionals.
- Project leadership teams should appoint a local outreach education point-of-contact who is familiar with local farming practices and is trusted in the watershed. This person may be an extension agent, soil and water conservation technician, or other unbiased local resource professional with existing landowner relationships.
- The education leader should develop an outreach education advisory network consisting of representatives from each target audience who can provide guidance and feedback on educational strategies and activities.
- The project team should tailor conservation practices to the farm management systems used within each watershed and should incorporate sufficient flexibility such that practices can be adapted to meet the needs and expectations of individual farmers, while still achieving conservation goals. Educators can then stimulate adoption by developing and delivering marketing programs that communicate and demonstrate how specific conservation practices help both the farmer and the watershed.
- Education strategies should build on the way most farmers learn–from each other (Chapter 2), developing a network of early adopter farmers to serve as demonstration farms for neighbors to learn about conservation practices through observation.
- Outreach personnel must learn from peers and experiment with what works for a given situation. For example, personnel should focus on methods that can demonstrate how conservation practices provide business benefits to farmers and should team up with other conservation groups, especially with groups that can provide funding, to build a network that has broad participation and focused goals. Consider a portfolio of conservation planning that matches people to the land. That is, emphasize what works best for different land types, crops, topography, and other factors.

Beyond a specific project focus, there is a need to charge and support extension with national-scale ongoing conservation education. Such outreach is needed in all watersheds and could be amplified where specific water quality impairments exist. This would recognize the need for extension's continued role in USDA programs. Sufficient resources must be dedicated to effectively implement the outreach education plan with professional educators committed to conservation practice implementation. Further, these educators should be charged with leading outreach efforts to ensure long-term adoption, maintenance, and effectiveness of implemented practices. Conservation practice outreach education must have long-term funding to hire dedicated staff to work one-on-one with farmers as technical-transfer agents. Most conservation outreach personnel that work directly with farmers are funded by short-term grants that end before or just as essential trust-based relationships that can truly achieve change are formed.

(c) SWCS. For Individual Use Only

References

Bull, N., L. Cote, P. Warner, and R. McKinnie. 2004. Is extension relevant for the 21st century? Journal of Extension 42(6). http://www.joe.org/joe/2004december/comm2.php.

Caswell, M., K. Fuglie, C. Ingram, S. Jans, and C. Kascak. 2001. Adoption of Agricultural Production Practices: Lessons Learned from the U.S. Department of Agriculture Area Studies Project. USDA Economic Research Service Agricultural Economic Report No. 792. Washington, DC: USDA Economic Research Service.

Feather, P., and G. Amacher. 1994. Role of information in the adoption of best management practices for water quality improvement. Agricultural Economics 11(2-3):159-170.

Gale, J.A., D.E. Line, D.L. Osmond, S.W. Coffey, J. Spooner, J.A. Arnold, T.J. Hoban, and R.C. Wimberley. 1993. Evaluation of the Experimental Rural Clean Water Program. National Water Quality Evaluation Project. EPA-841-R-93-005. Raleigh, NC: North Carolina State University Water Quality Group, Biological and Agricultural Engineering Department.

Hoag, D. 2005. Economic principles for saving cooperative extension. Journal of Agricultural and Resource Economics 30:397-410.

Lemke, A., T. Lindenbaum, T. Perry, M. Herbert, A. Tear, and J. Herkert. 2010. Effects of outreach on the awareness and adoption of conservation practices by farmers in two agricultural watersheds of the Mackinaw River, Illinois. Journal Soil and Water Conservation 65(5):304-315, doi:10.2489/jswc.65.5.304.

McDowell, G. 2004. Is extension an idea whose time has come--and gone? Journal of Extension 42(6). http://www.joe.org/joe/2004december/comm1.php.

Sanders, D., and D. Cahill. 1999. Where incentives fit in soil conservation programs. *In* Incentives in Soil Conservation: From Theory to Practice, ed. D.W. Sanders, P.C. Huszar, S. Sombatpanit, and T. Enters, 11-24. Enfield, NH: World Association of Soil and Water Conservation, Science Publishers.

(c) SWCS. For Individual Use Only