



Target Audience Research References and Abstracts

This document lists references and abstracts for publications that were reviewed to identify audience-specific best education practices (BEPs). They are sorted alphabetically by author.

AUTHOR: Al-Jamal, M.S., Sammis, T.W., & Ball, S.T.

TITLE: A case study for adopting the nitrate chloride technique to improve irrigation and nitrogen practices in farmers' fields.

SOURCE: Applied Engineering in Agriculture [St. Joseph, MI: American Society of Agricultural Engineers], v. 17, no. 5, pp. 601-610, Sept 2001.

ABSTRACT: Groundwater contamination caused by nitrate-nitrogen (NO₃(-)-N) leaching through soils is becoming a serious problem in the irrigated Mesilla Valley of southern New Mexico. The greatest groundwater contamination probably results from large amounts of nitrogen fertilizer being applied to shallow-rooted, high-value vegetable crops (i.e., onion, lettuce, and Chile). The main objective of the study was to demonstrate to farmers that a chloride tracer could be used to determine the irrigation and nitrogen-use efficiency of their management system and how decreasing nitrogen (N) inputs will affect profitability. Five farmers (representing 60% of the farmers that are the technology diffusion leaders in the county) were chosen as innovative farmers who would transfer the technology to others. The average estimated irrigation efficiencies obtained from the farmers' fields were high, ranging from 87 to 97%. These unexpectedly high irrigation efficiencies under furrow irrigation were a result of the farmers practicing deficit irrigation due to limited water resources. However, deficit irrigation resulted in yields below maximum yield (considered to be near the average county yield). The amount of NO₃(-)-N leached ranged from 9 kg/ha under fall lettuce to 152 kg/ha under Chile. The 152 kg/ha obtained from the Chile fields had a calculated average N application efficiency of 57%, resulting in an average NO₃(-)-N concentration greater than the maximum contamination level allowed for drinking water of 10 mg/L. Although the NO₃(-)-N leached below farmers' fields was high, the farmers did not think it was their responsibility to change management practices unless their profits would increase. Farmers rejected the adoption of the technology because they felt the costs outweighed the benefits. Consequently, transfer of this technology to the farmers failed. The farmers indicated that they would adopt the technology only if forced to by a regulatory agency.

AUTHOR: Ashby, J. A., Beltran, J. A., Guerrero, M. D. P., & Ramos, H. F.

TITLE: Improving the acceptability to farmers of soil conservation practices

SOURCE: Journal of Soil and Water Conservation [Ankeny, Iowa: Soil and Water Conservation Society], vol. 51, no. 4, pp. 309-312, 1996

ABSTRACT: Non-adoption of soil conservation practices by farmers in low-income countries is a major obstacle to reversing soil degradation. Farmer involvement in designing these practices is required to improve adoption. This study tested participatory research methods which dramatically increased adoption among 115 farmers over the first year, and stimulated farmer-to-farmer recommendations leading to adoption by an even larger number of farmers. Farmers' evaluations were shown to predict future acceptability of optional practices. When participatory research methods are used to elicit farmers' input into the design of recommendations, these can help to realize the potential of many hitherto unadopted conservation practices.

AUTHOR: Beiswenger, R., Sturges, E. L., & Jones, R.

TITLE: Water education in Wyoming: Assessing educators' knowledge of water topics and their use in the elementary curriculum.

SOURCE: Journal of Environmental Education, v. 23, no. 11, pp. 24-29, 1991

ABSTRACT: A water education questionnaire was developed to assess elementary educators' knowledge of 22 water topics, the priority given to each topic in their curricula and the type of incentives needed for water topics to be included in them. A total of 450 educators completed the questionnaire. The results indicate that educators perceived that they had adequate knowledge for relatively few water topics and failed to give these topics priority in their curricula. The need for development of an elementary water curriculum accompanied by intensive workshops with follow-up is indicated.

AUTHOR: Berry, K. A., Markee, N. L., Stewart, M. J., & Giewat, G. R.

TITLE: County commissioners' water knowledge

SOURCE: Water Resources Bulletin, vol. 32, no. 5, pp. 1089-1099, Oct 1996

ABSTRACT: This study examines the social construction of county commissioners' knowledge about water. Factors that influence what commissioners know about water include each commissioner's personal characteristics, education, experience in natural resources management, involvement in policy making, and use and evaluation of various sources of information. This study focused on county commissioners representing rural, mixed, and urban counties in Arizona, Nevada, and Utah and collected data through mail surveys and interviews. County commissioners in the survey were well educated; however, few had taken college courses directly addressing technical, management, or legal aspects of water issues. Approximately one-third had direct experience in farming and ranching; nearly two-thirds indicated that farming and ranching played a major role in their communities. Respondents had experience with a broad range of water policy issues. In evaluating thirteen information sources in terms of their frequency of use, relevancy, and reliability, respondents assessed fellow commissioners and local government staff and managers most positively and nonprofit organizations most negatively. The media was also broadly rated as less relevant and reliable than other sources of information. The commissioners in the study expressed a high level of general concern about water issues and a strong preference for local sources of information.

AUTHOR: Boiarsky, G., Long, M., & Zimmerman, D. E.

TITLE: Pollution-prevention information campaigns for small businesses: An audience analysis.

SOURCE: The Journal of Environmental Education, v. 30, no. 3, pp. 29-36, 1999.

ABSTRACT: A random phone survey of 300 small businesses in Colorado was conducted to help the Colorado Pollution Prevention Partnership develop a pollution-prevention campaign. Results showed respondents understood the concept of pollution prevention and were taking steps to reduce their pollution. Costs appeared to be the most serious barrier to pollution prevention. Many companies were reducing wastes because they believed it was the moral thing to do. Finally, businesses preferred to obtain their information from suppliers, publications, and other companies.

AUTHOR: Bosch, D. J., Cook, Z. L., & Fuglie, K. O.

TITLE: Voluntary versus mandatory agricultural policies to protect water quality: adoption of nitrogen testing in Nebraska.

SOURCE: Review of Agricultural Economics [Manhattan, KA: Department of Agricultural Economics, Kansas State University], v. 17, no. 1, pp. 13-24, Jan 1995.

ABSTRACT: Agriculture is an important source of nonpoint source pollution and potential damage to water quality. Voluntary incentives and regulatory policies are followed by both the states and the federal government to reduce water quality damage from agricultural practices. Policy makers are concerned about the relative effectiveness of each approach for protecting water quality. The effectiveness of regulation versus a combination of voluntary incentive approaches are evaluated for an area in central Nebraska. Policy effectiveness is measured in two parts: (1) whether farmers receiving incentives are more likely to conduct soil or tissue nitrogen (N) tests; and (2) whether farmers use the test results as the most important factor in N management decisions. Personal interview surveys of Nebraska farmers were analyzed to determine farmers' use of soil and/or tissue testing to help make N fertilizer decisions on fields planted to corn. The effects of regulation and voluntary programs on the use of N testing were evaluated. The effects on adoption of farmers' education and experience; type, size, and tenure status of the farm; irrigation; and soil characteristics of the sample field were also considered. The results show that while regulation leads to higher levels of N test adoption, it does not have an "educational" effect on adopters. Voluntary incentive policies appear to be more effective in encouraging farmers to use information from N tests. Regulation to enforce adoption of practices to protect water quality may not induce the desired behavioral changes. Educational programs may be needed to complement regulations to insure that farmers change their behavior to achieve the goals of water quality protection programs.

AUTHOR: Brody, M.

TITLE: Development of a curriculum framework for water education for educators, scientists, and resource managers

SOURCE: The Journal of Environmental Education, v. 26, no. 4, pp. 18-29. 1995

ABSTRACT: This study sampled a total of 268 people involved in natural resource research and management education: elementary (n=59), middle (n=39), secondary (n=44),

K-12 (n=22), and nonformal (n=30) educators; university researchers (n=24); and natural resource agency managers (n=50) representing every state in the United States. A traditional Delphi survey approach was used to determine what concepts, skills, and affects should be included in the National Project WET water and water resource curriculum framework. The analysis resulted in an 80-item curriculum framework to guide development of educational materials in this area. Differences among regions of the country and between educators and resource managers are noted.

AUTHOR: Brody, M.

TITLE: An assessment of 4th-, 8th-, and 11th-grade students' environmental science knowledge related to Oregon's marine resources

SOURCE: Journal of Environmental Education, v. 27, no. 3, pp. 21-27. 1996.

ABSTRACT: This study assessed 4th-, 8th-, and 11th-grade students' understanding of science concepts related to Oregon's marine resources. A sample of public school students (N = 159) in nine Oregon schools was interviewed on a variety of concept principles. Concepts related to Oregon's marine resources included geology, physical and chemical characteristics, ecology, and natural resources. Results were summarized in generalized correct concept statements indicating the extent of student science knowledge. Common misconceptions were also noted. The results of the study have implications for teaching and learning about the marine environment.

AUTHOR: Burger, J. & Waishwell, L.

TITLE: Are we reaching the target audience? Evaluation of a fish fact sheet

SOURCE: Science of the Total Environment, v. 277, no. 1-3, pp. 77-86, 28 Sep 2001.

ABSTRACT: According to the US Environmental Protection Agency, over 16% of freshwater lakes and 7% of the rivers are under some sort of fish consumption advisory because of the presence of toxic chemicals. There is considerable interest in the issuing of information, advisories, and fact sheets concerning the consumption of wild-caught fish from contaminated waters, and in the actual consumption patterns of subsistence and recreational anglers. Despite the large number of consumption advisories issued by state agencies, there is little information on how these advisories, or other forms of risk communication, are perceived by target audiences, notably fishermen and women of child-bearing age. The states of South Carolina and Georgia issue consumption advisories for fish from the Savannah River, among other sites. To gain a greater insight into the perception of anglers about a supplemental fish fact sheet jointly developed by South Carolina, Georgia, federal agencies, and the Consortium for Risk Evaluation with Stakeholder Participation, we interviewed fisherman along the Savannah River. The objectives were to determine: (1) whether they had previously read the Fish Fact Sheet or had heard about the consumption advisories; (2) what major message they obtained from the sheet; (3) who they felt the fact sheet was aimed at, and who should get the Fish Fact Sheet; (4) who should be concerned about health risks from consuming the fish; and (5) the best method of disseminating such information. We interviewed 92 fishermen (37% black, 62% white) during the fishing season of 1999. Half had heard some information about consumption advisories, mainly from the media (64%). The study concluded that there

were no ethnic differences in whether they had heard about the advisories, understood the major message of the fact sheet, felt they could reduce their risk from consuming the fish, or felt that it made a difference which agency issued the fact sheet. There were significant ethnic differences in the ways people thought the risk from eating fish could be reduced, sources of information about the risks from consuming fish, and what other information they would like about the risks associated with contaminated fish.

AUTHOR: Caffey, R. H. & Kazmierczak, R.F., Jr.

TITLE: Factors influencing technology adoption in a Louisiana aquaculture system.

SOURCE: Journal of Agriculture and Applied Economics [Lexington, KY: Southern Agricultural Economics Association], v. 26 no. 1 pp. 264-274, July 1994.

ABSTRACT: A multinomial logit model was estimated and used to analyze the impact of various producer characteristics on the adoption of flow-through and recirculating technology in soft-shelled crab production. Because of the industry's geographic isolation and high turnover rate, data was collected by personal interviews in 1991. The results suggest that increased adoption might be fostered by targeting education programs towards full time, family operated businesses in non-traditional production regions. However, development of effective education programs may be hindered by the lack of a significant relationship between producer adoption decisions and the information provided by university or extension personnel.

AUTHOR: Cameron-Howell, K.

TITLE: Factors leading to permanent adoption of best management practices in South Dakota Rural Clean Water Program projects.

SOURCE: Proceedings: the National RCWP Symposium, 10 years of controlling agricultural nonpoint source pollution, the RCWP experience, Sept 13-17, 1992, Orlando, Florida. Washington, DC: U.S. Environmental Protection Agency, pp. 255-259, 1992.

ABSTRACT: The Oakwood Lakes/Poinsett Rural Clean Water Program (RCWP) project has had a permanent influence on the farming practices within and around the project area. Project participation accelerated after key community persons became active and after a local technical planner was hired. Cash incentives were the primary reason persons signed up for RCWP; however, most continued applying best management practices (BMPs) even after cash incentives ceased. A post-RCWP questionnaire was given to all participants to find out how the program influenced them, why they signed up, and if they changed farming methods as a result of the program. This paper describes the methodology used to assess these permanent influences.

AUTHOR: Chaloupka, C. & George, M.

TITLE: Range water quality planning: Voluntary rangeland management eases impacts on California watersheds.

SOURCE: Section 319 success stories III, the successful implementation of the clean water acts section 319 non point source pollution program. 16 April 2002. Retrieved from http://www.epa.gov/nps/Section319III/inform_ca.htm, 26 Jan 2005.

AUTHOR: Cobourn, John & Donaldson, Sue

TITLE: Reaching a New Audience.

SOURCE: Journal of Extension, v. 35, no. 1, on-line access, Feb 1997. Available at: <http://www.joe.org/joe/1997february/a3.html>.

AUTHOR: Constance, D. H., Rikoon, J. S., & Ma, J. C.

TITLE: Landlord involvement in environmental decision-making on rented Missouri cropland: pesticide use and water quality issues.

SOURCE: Rural Sociology [Urbana, Ill.: Rural Sociological Society], v. 61, no. 4, pp. 577-605, Winter 1996.

ABSTRACT: The need to better understand landlord involvement in decision-making related to pesticide use and water quality issues is evidenced by several trends. These trends include the increasing documentation of water pollution by farm pesticides, the changing characteristics of farm ownership and operator tenure, and evolutions in resource policy and protection planning. This paper utilizes a theoretical approach to the sociology of land tenure to interpret results from an investigation of landlord involvement in environmental decision-making regarding pesticide selection on rented land. Eight counties with high susceptibility of water contamination by pesticides were selected for study. Structured, in-person interviews were administered to in-county landlords, and a mail survey was used to poll out-of-county landlords. Results indicate that participation is generally low with very little difference between landlord groups. Renters make most of the organizational and operational decisions on rented farmland. Landlord participation is predominantly based on economic, rather than on social or environmental, factors. Furthermore, while economic variables are important predictors of participation for both groups, gender and social ties to the renter tend to increase local landlord involvement, but not absentee involvement. These results have important implications for both federal programs and further research on land tenure and environmental stewardship.

AUTHOR: Contant, C. K., & Young, C. L.

TITLE: Evaluating the effectiveness of field demonstration programs.

SOURCE: The Extension [Ames, IA: IFM Iowa State University Ext.], v. 6, 17 p., May 1990.

AUTHOR: Cooper, D., Giebink, B., & Olson, K.

TITLE: Water quality education to protect Minnesota's Anoka Sand Plain Aquifer.

SOURCE: Clean water, clean environment, 21st century, team agriculture, working to protect water resources, conference proceedings, March 5-8, 1995, Kansas City, MO /. St. Joseph, MI: ASAE, v. 3, pp. 69-72, 1995.

AUTHOR: Curtis, A. & DeLacy, T.

TITLE: Evaluating landcare groups in Australia: how they facilitate partnerships between agencies, community groups, and researchers.

SOURCE: Journal of Soil and Water Conservation [Ankeny, Iowa: Soil and Water Conservation Society], v. 50, no. 1, pp. 15-20, Jan-Feb 1995.

ABSTRACT: An analysis of landcare groups in Australia is presented. Landcare groups have been embraced by governments throughout Australia as a model for effective community action toward more sustainable resource care.

AUTHOR: Davis, C. T., & Clatterbuck, W. K.

TITLE: Role of the Tennessee Master Logger Program in implementation of Best Management Practices on non-industrial private forests.

SOURCE: Southern Journal of Applied Forestry [Bethesda, MD: Society of American Foresters], v. 27, no. 1, pp. 36-40, Feb 2003.

ABSTRACT: A field evaluation of Best Management Practices (BMPs) was used to determine the effectiveness of the Tennessee Master Logger Program (TMLP) in 1997-1998. The study was conducted on non-industrial private forestland (NIPF) and excluded harvests on land owned by forest industry or public forests. Completed logging jobs were evaluated in relation to four components of timber harvesting: (1) haul roads, (2) skid trails, (3) log decks, and (4) Streamside Management Zones (SMZs). The scores assigned during evaluation to each of the four components were added together to yield an overall score. An overall percentage score was calculated because some sites did not have all four components, for example, SMZs are not necessary on sites without streams. Of 191 randomly chosen logging sites across the state of Tennessee, 38, or 19.9%, were harvested by trained Master Loggers. A significant association ($P < 0.05$) was found between overall percentage score and logger training. The mean overall percentage score for Master Loggers was 75.1%, and the mean score for untrained loggers was 60.4%. Only 17 of the 627 possible scores or 2.6%, exhibited threats to water quality. Of these 17, Master Loggers were only responsible for 3. Point biserial correlations indicated that a substantial association ($P < 0.05$) existed between harvests completed by Master Loggers and the scores of haul roads, skid trails, log decks, and SMZ grades. This study indicates that loggers who received training from the TMLP were more likely to implement BMPs during harvesting operations on NIPF than loggers who did not participate in the Tennessee Master Logger Program.

AUTHOR: de Bruijn, Theo J. N. M., & Hofman, Peter S.

TITLE: Pollution Prevention in Small and medium-Sized Enterprises.

SOURCE: Greener Management International, v. 30, pp. 71-82, 2000.

ABSTRACT: Over the last few years major attempts have been made to transform small and medium-sized enterprises (SMEs) into more sustainable companies. In essence, these attempts aim at improving the organisational and technical capabilities of companies. Whereas larger companies have been able to appropriate the concept of pollution prevention, in many cases SMEs lack the resources to develop this new capability. SMEs may have to rely on the initiatives, knowledge and capacities of other actors. This paper reviews whether partnerships can overcome the deficiencies of SMEs by analysing the results of a decade of promotion of pollution prevention in the Netherlands. We focus on two issues. First, we evaluate the effects of partnership networks for the promotion of pollution prevention in SMEs. Second, we analyse the different roles partners can play within such networks. We conclude that most pollution prevention projects succeed in

realising environmental improvements for participating companies, but for the majority it is a one-time experience. Not much is learned about the art of pollution prevention itself. Another problem is that current partnerships are not able to involve more defensive companies through voluntary pollution prevention projects.

AUTHOR: Dietz, M. E., Clausen, J. C., Warner, G. S., & Filchak, K. K.

TITLE: Impacts of extension education on improving residential stormwater quality: monitoring results.

SOURCE: Journal of Extension, v. 40, no. 6, on-line access, Dec 2002. Available at: <http://www.joe.org/joe/2002december/rb5.shtml>.

AUTHOR: Dijksterhuis, O. W.

TITLE: Environmental education: A tool for coastal management? A study of the Caribbean region

SOURCE: Coastal Management, v. 24, no. 4, pp. 339-353, Dec 1996.

ABSTRACT: This article assesses the application of environmental education to management of the use of natural coastal resources and other issues affecting the coastal zone. Degradation of coastal habitats, on land and at sea, has drawn attention to the concept of integrated coastal management. If an integrated approach to coastal management is to succeed, there is a need for nongovernmental organizations and local communities to get involved. Environmental education can be the means by which such involvement can be achieved. Six of the small developing island states of the Caribbean region were surveyed to reveal the way in which environmental education is currently applied to achieve coastal management objectives. The study highlights the methods that are used, the problems that are encountered by organizations providing environmental education, and their strategies and the success of the service that they provide.

AUTHOR: Dow, D. & Loomis, G.

TITLE: University of Rhode Island onsite wastewater training center: Pioneering agency teaches, demonstrates innovative systems.

SOURCE: Section 319 success stories III, the successful implementation of the clean water acts section 319 non point source pollution program. 16 April 2002. Retrieved from http://www.epa.gov/nps/Section319III/inform_ca.htm, 26 Jan 2005.

AUTHOR: Dresner, M.

TITLE: Changing energy end-use patterns as a means of reducing global-warming trends

SOURCE: The Journal of Environmental Education, v. 21, no. 2, pp. 41-46. 1989/90.

ABSTRACT: A simulation game was designed and used as part of an experimental effort to change participants' behavior and attitudes toward participating in supporting measures that encourage conservation at a local level. Social influence was found to be correlated significantly with the experimental treatment. Participants in the simulation game showed an increase in favorable attitudes toward home energy activism and exhibited a greater likelihood of action taking. Perceived political efficacy was seen to increase.

AUTHOR: Duram, Leslie A., & Brown, Katharin G.

TITLE: Assessing Public Participation in U.S. Watershed Planning Initiatives.

SOURCE: Society and Natural Resources, v. 12, no. 5, pp. 455-467, 1999.

ABSTRACT: A mail survey of 126 federally funded watershed planning initiatives yielded valid responses from 64 watershed contacts. Quantitative analysis revealed wide variation among watershed initiatives in terms of population size and land area encompassed. Likewise, watershed organization and participation characteristics (agencies involved, frequency of meetings, and number of active participants) vary greatly. Qualitative analysis delineated the key issues of concern to watershed contacts: agricultural land use, stakeholder awareness, and interaction between local and federal entities. While specific situations vary by watershed, results indicate that door-to-door contact, public meetings, and information programs are the most useful methods for soliciting participation. Participation was perceived to be most helpful in the planning stages of outreach, identifying issues, and prioritizing issues. The perceived effects of participatory watershed planning include increasing awareness of watershed conditions, heightening interagency coordination, reaching consensus on resource management plans, and lending legitimacy to final plans.

AUTHOR: Dwyer, William O., Leeming, Frank C., Cobern, Melissa K., Porter, Bryan E., & Jackson, John Mark.

TITLE: Critical Review of Behavioral Interventions to Preserve the Environment: Research Since 1980.

SOURCE: Environment and Behavior, v. 25, no. 3, pp. 275-321, 1993.

ABSTRACT: This review integrates and evaluates the environmental-preservation research published during the 1980s. The focus is environmental *behavior* change as targeted by behavior analysts and others designing interventions to encourage environmental-preservation behavior. A modified taxonomy of behavioral interventions, based on a taxonomy presented by Geller et al., categorizes these reported interventions by antecedent and consequence conditions. Fifty-four studies were categorized and evaluated according to which of these taxonomic interventions were reported. The conclusions were that (a) antecedent conditions using commitment, demonstration, and goal-setting strategies were generally most effective in encouraging environmentally responsible behavior, and (b) consequence conditions were effective in producing behavior change during the experiment's duration. However, some other important findings were that (a) much of the research in this field during the 1980s did not directly compare interventions, (b) few meaningful follow-up measures were reported, and those evaluations that included follow-up assessment showed little maintenance of the behavior changes, and (c) many potentially effective intervention strategies have been ignored (i.e., group interventions and penalties). Suggestions or future directions of research to produce and maintain environmental-preservation behaviors are offered.

AUTHOR: Egemen, E, Edwards, F, & Nirmalakhandan, N.

TITLE: Computer simulation models in environmental engineering education

SOURCE: WATER QUALITY INTERNATIONAL '98-PART 9. WATER QUALITY: MANAGEMENT. Water Science & Technology. V. 38, no. 11, pp. 295-302, 1998.

ABSTRACT: The traditional lecture-based teaching process has been criticized as a passive knowledge delivery process with much room for improvement in the teaching-learning process. It is now recognized that one of the essential prerequisites for improving the teaching-learning process is active and interactive participation of the students, both in and out of the classroom. In this paper, computer simulation models are identified as an effective teaching aid to promote active participation between student and teacher as well as among students. Using a sample simulation model, the different ways in which models in general can be used to encourage active and interactive participation are discussed. It is concluded that the use of such computer simulation models is appealing to students with diverse learning styles.

AUTHOR: Fackler, Rosetta

TITLE: Kentucky Nonpoint Source Partnerships for Excellence in Water Quality Education

SOURCE: Paper presented at the Third National Conference on Nonpoint Source Pollution Information & Education Programs, Chicago, IL, pp. 117-122, Oct 20-23, 2003.

ABSTRACT: Kentucky is rich in water resources, as well as cooperative programs to improve its citizens' understandings and appreciation for them. Based on a 1999 survey by the Kentucky Environmental Education Council, water pollution is listed as the number one environmental concern for over 40% of the respondents. While much effort has been devoted to water education for school-age students, our adult population is not as well informed. A collaborative effort by over 20 partners will seek to remedy this situation. This paper will discuss the formation of the Comprehensive Commonwealth Water Education Project (CCWEP), its goals, products, and the tools that will be used to evaluate the results.

AUTHOR: Feather, P. M., Amacher, G. S.

TITLE: Role of information in the adoption of best management practices for water quality improvement.

SOURCE: Agricultural Economics, [Amsterdam ; New York: Elsevier], v. 11, no. 2/3, pp. 159-170, Dec 1994.

ABSTRACT: This study investigates the role of information in influencing the adoption of improved farm management practices. A lack of producer information regarding both the profitability and the environmental benefits of adopting improved practices may be a reason why widespread adoption of these practices has not occurred. Compared to direct regulation or financial incentives, raising producer information levels may be a more cost-effective method of increasing adoption. The United States Department of Agriculture has recently established and begun implementing a program based on this idea. To test the validity of the program, a two-stage adoption model is specified and estimated using data from a survey of producers in the program area. The results indicate that producer perceptions play an important role in the decision to adopt. Changing these perceptions by means of an educational program may be a reasonable alternative to financial incentives in encouraging BMP adoption.

AUTHOR: Fedler, A. J.

TITLE: An examination of the relationship between recreational boating and fishing participation and aquatic resource stewardship.

SOURCE: Alexandria, VA: Recreational Boating & Fishing Foundation. 2001.

ABSTRACT: Anglers and boaters have long considered themselves stewards of the nation's aquatic resources. This feeling has been manifest through paying license and registration fees; contributing to the federal Sport Fish Restoration Fund through excise taxes on fishing equipment, boat sales, and marine fuel taxes; as well as active involvement in the fisheries management and boating regulation processes. This notion of stewardship has been challenged by some who claim that angler and boater stewardship is shortsighted and self-serving since most license and tax funding is directed at sport species only and ignores the needs of non-game species and are not paid voluntarily.

AUTHOR: Fedler, A. J.

TITLE: Fishing, boating, and aquatic stewardship education: Framework and best practices recommendations

SOURCE: In A. J. Fedler (Ed.), Defining best practices in boating, fishing, and stewardship education. Alexandria, VA: Recreational Boating & Fishing Foundation. pp. 4-17. 2001.

ABSTRACT: Increasing questions about value and efficacy of aquatic and boating education programs have spurred the call for scientifically based guidance for improving and evaluating those programs. The recreational Boating and Fishing Foundation has responded to this call with the Best Practices in Boating, Fishing and Stewardship Education Project. A group of eleven aquatic, environmental and outdoor education professionals were commissioned to provide summaries of research and recommendations for the development of best professional practices for fishing, boating and aquatic stewardship education. Twenty-five researchers and educators then reviewed the research and recommendations during a workshop. They compiled, and agreed upon, guiding principles and specific best practice recommendations for planning, designing, implementing, and evaluating aquatic and stewardship education programs. Additionally, the workshop group made recommendations for improving aquatic education research. This paper summarizes the process involved in completing the project, develops the conceptual framework within which to consider the principles and recommendations, outlines the principles and best practice recommendations, and provides an overview of each background paper written by experts in aquatic, environmental, and outdoor education related fields.

AUTHOR: Fleming, W.

TITLE: Volunteer watershed health monitoring by local stakeholders: New Mexico watershed watch.

SOURCE: The Journal of Environmental Education, v. 35, no. 1, pp. 23-27, 2003.

ABSTRACT: Volunteers monitor watershed health in more than 700 programs in the US, involving over 400,000 local stakeholders. New Mexico Watershed Watch is a student-based watershed monitoring program sponsored by the state's Department of Game and

Fish which provides high school teachers and students with instruction on methods for water quality monitoring, riparian habitat evaluation and watershed planning. Schools monitor small watersheds, assessing watershed health and water quality with an interdisciplinary approach that identifies impacts of land use. Students learn scientifically credible field methodologies to create long term databases on watershed health for use by state and federal agencies. Maps of land use, land ownership, soil stability, topography and human impacts are used in an overlay format to identify priority problem areas. Watershed plans are formulated to improve water quality and restore degraded riparian and upland sites.

AUTHOR: Force, D. & Bills, N.

TITLE: Participation in the CRP: implications of the New York experience.

SOURCE: Journal of soil and water conservation [Ankeny, Iowa: Soil and Water Conservation Society], v. 44, no. 5, pp. 512-516, Sep-Oct 1989.

ABSTRACT: New York farmland owners were surveyed to gather information about the first six sign-ups for the Conservation Reserve Program (CRP). A high participation rate by nonfarmers provided evidence on the role tenure plays in the program participation decision. Logistic regression analysis indicated that, compared with farmer participants, nonfarmer participants tend to own smaller farms, enroll larger acreages, and live adjacent to their enrolled fields. Compared with U.S. Department of Agriculture-influenced but nonparticipating farmers, a second regression analysis indicated that participating farmers tend to own more large farms, be nondairy farmers, have nonfarm incomes, and use fewer soil conservation practices. Social norm and other attitudinal factors also were significant participation determinants. Efforts to target participation regionally based on the value of expected on-site and off-site benefits may be assisted by increasing program flexibility and by outreach efforts to specific landowner groups.

AUTHOR: Fortner, R. W. & Corney, J. R.

TITLE: Great lakes educational needs assessment: Teachers' priorities for topics, materials, and training.

SOURCE: Journal of Great Lakes Research, v. 28, no. 1, pp. 3-14, 2002.

ABSTRACT: Teachers have an opportunity to create awareness of the importance of the Great Lakes by incorporating lake examples of major science/social concepts into their curricula. A survey of 300 middle school science teachers in watershed counties of Great Lakes states and Ontario revealed topics that were highest priority and that teachers wanted to know more about: water quality, environmental responsibility, water uses and conservation, and toxic chemicals. Topics of lowest priority were those dealing with shipping, water diversion, human history, careers and hobbies, and aesthetics (art, music, and literature of the lakes). Reasons for not including low priority topics were primarily based on their not being a part of the assigned curriculum for the responding science teachers. Responses regarding topic priorities and knowledge did not differ significantly by state/province, gender, grade level taught, early vs. late response, or whether the teachers had participated in a Great Lakes education workshop, with the primary exception that teachers who had been in a workshop generally rated exotic species as more important and were teaching more about it. Teachers claim to get most of their Great Lakes information

from workshops and classes, with newspapers as the primary mass media source. They prefer to receive instructional materials in the form of classroom-ready activities and units, and when they seek additional education they prefer one-day or summer workshops for college credit. Providers of Great Lakes education resources should consider teachers preferences in designing materials and experiences, and consider infusion as a means of introducing non-science topics into science classes.

AUTHOR: Fortner, R. W. & Lahm, A. C.

TITLE: Research program outreach into the classroom: An estuarine research reserve initiative.

SOURCE: Journal of Environmental Education, v. 21, no. 4, pp. 7-12, 1990.

AUTHOR: Fortner, R. W. & Mayer, V. J.

TITLE: Repeated measures of students' marine and great lakes awareness.

SOURCE: Journal of Environmental Education, v. 23, no. 1, pp. 30-35, 1991.

ABSTRACT: A statewide test of fifth and ninth graders' knowledge about and attitudes toward the oceans and Great Lakes was administered in 1979, 1983, and 1987, offering longitudinal study of awareness change currently unparalleled in environmental education research. Over the years of the study, knowledge scores increased slightly except for humanities items. Earth science topics, however, showed the greatest deficiencies among the science items, and oceanic attitude declined over the period. Differences in knowledge scores by race, sex, and coastal proximity, all noted in earlier tests, were insignificant by 1987. The 1987 assessment also showed classrooms to be the most important source of student information, as opposed to movies and television for the 1979 test.

AUTHOR: Gamon, J., Roe, R., & Campbell, S. M.

TITLE: Evaluation of the use of water quality videotapes by county extension offices in Iowa.

SOURCE: Journal of Applied Communications [Gainesville, FL: Agricultural Communicators in Education], v. 78, no. 2, pp. 13-22, 1994.

ABSTRACT: All of the 100 county Extension offices in Iowa have a set of six water quality videotapes available for use by clientele. The state water quality Extension specialist designed the high quality tapes, each 20 minutes long, to be viewed at home by clients who had water questions. The question was: "Should video be used again as an educational delivery method?" Responses to a telephone survey of county office assistants indicated a wide variation in the use of video tapes, although over 75% liked the idea of information via tapes. The counties needed assistance with publicity and displays, something that area media specialists might provide.

AUTHOR: Gerakis, A

TITLE: Evaluating Adult Groundwater Education

SOURCE: Journal of Environmental Education, v. 30, no. 1, pp. 20-24, 1998.

ABSTRACT: The Michigan Association of Soil Conservation Districts and the Michigan Soil Conservation Service organized a series of 1-day groundwater education workshops throughout Michigan. The workshops were held primarily to educate soil conservation

personnel. The effect of the training on participant knowledge and attitude was measured with a quasi-experimental design. Three workshops were evaluated. Only 1 workshop was effective in increasing participants' knowledge of groundwater. All 3 workshops, however, were effective in increasing the pretested participants' knowledge of groundwater. The workshops did not change participants' attitudes toward groundwater conservation, but attitudes were already positive at the outset. The practical recommendation is that a pretest should be incorporated into adult groundwater training to effect immediate results.

AUTHOR: Giannotti, L. & Rozum, J.

TITLE: Nonpoint education for municipal officials (nemo): Successful Connecticut project used as model nationwide

SOURCE: Section 319 success stories III, the successful implementation of the clean water acts section 319 non point source pollution program. 16 April 2002. Retrieved from http://www.epa.gov/nps/Section319III/inform_ca.htm, 26 Jan 2005.

AUTHOR: Grudens-Schuck, Nancy

TITLE: A Qualitative Study of the Influence of Farm Leaders' Ideas on a Sustainable Agriculture Educational Program.

SOURCE: Proceedings of the 27th Annual National Agricultural Education Research Conference, pp. 351-365, Dec. 2000.

ABSTRACT: This paper considers issues related to farmers' control of program planning for non formal agricultural adult education. Discussion is based on an empirical study of a \$10 million Canadian sustainable agriculture education program that was initiated, created, and controlled by a coalition of farm organizations, supplanting a traditional role of government. The program, titled Ontario Environmental Farm Plan program, was funded by Canada Agriculture Green Plan federal funds from 1992 to 1997 and included a significant contribution of technical support from Ontario Ministry of Agriculture, Food and Rural Affairs. Theories of participatory extension education, with linkages to the land-grant concept of 'engagement,' provide a theoretical framework for consideration of issues in the case. The concept of engagement guides the formation of partnerships among extension, communities, industry, and government. In the area of sustainable agriculture, however, stakeholders may conflict, presenting challenges to the engagement process. Moreover, agricultural education researchers have produced little data to show effects of stakeholder involvement in program planning, putting the extension system at risk of desiring engagement without a knowledge base about potential impacts. The study was conducted over a 3-year period using cultural anthropology and participatory action research. Political and social aspirations of farmer-planners influenced five program elements: (a) staffing, (b) content, (c) instruction, (d) evaluation, and (e) composition of planning group. The staffing dimension featured non professional grassroots educators employed by a non government organization. Content emphasized multiple subject areas, including farmstead, wood lot, and petroleum storage, appropriate for a wide range of types of farms. Instruction featured participatory and experiential education which emphasized farmers' involvement in environmental assessment and farm planning. Instruction was designed to be compatible with a program policy of confidentiality. In addition to conventional auditing and monitoring, evaluation processes included innovative Peer Review Committees,

and collection of 'Barriers to Action' data intended to influence government policies and university research. The program planning group involved leadership of mainstream agriculture, government agricultural ministries (including extension), and hunting-oriented conservation groups. Less involved were leaders of organic and ecological farming associations, traditional supporters of sustainable agriculture education. Recommendations highlight the extent to which forms of non formal agricultural adult education favored by learners may be fruitfully understood as proposals for reconfiguring power relationship among farmers, organizations, and government.

AUTHOR: Harding, A. K. & Anadu, E. C.

TITLE: Consumer response to public notification

SOURCE: Journal of the American Water Works Association, v. 92, no. 8, pp. 32-41, Aug 2000.

ABSTRACT: What happens when consumers receive public notification that their water supply is at risk? Although several studies have investigated consumers' awareness of public notification, few researchers have focused on how consumers responded or whether their responses differed in emergencies versus ongoing water crises. A recent survey uncovered information that may help water suppliers improve the effectiveness of their public notification programs. Most respondents were aware of the public notification and boiled their water, drank bottled water, or both. Bottled water proved to be the most popular choice, even when a specific boil-water notice was issued. Of the sources used by respondents to obtain information about their water supply, the top three were the newspaper, mail, and flyers from the utility. Utilities will be encouraged by two findings in particular; mail from the utility was considered to be the most reliable information source, and most consumers were willing to pay more to improve water quality. Sooner or later, many water providers will face the necessity of issuing public notification regarding the quality of their supply. This study suggests that consumers are more likely to take desired risk-reduction measures (e.g., drinking boiled or bottled water) when the notice is from a credible source (such as the utility), provides sufficient explanation of the water quality problem, and offers explicit instructions about what course of action to take.

AUTHOR: Holsman, R. H. & Krueger, D.

TITLE: The long and short of groundwater education for Michigan farmers.

SOURCE: Journal of Extension, v. 40, no. 1, on-line access, Feb 2002. Available at: <http://www.joe.org/joe/2002february/a4.html>.

AUTHOR: Holsman, Robert H.

TITLE: What Works . . . : Documenting Standard Practices for Aquatic Resource Education

SOURCE: U.S. Fish and Wildlife Service -- Region 5. August 2001.

AUTHOR: House, M. & Fordham, M.

TITLE: Public perceptions of river corridors and attitudes towards river works

SOURCE: Landscape Research, v. 22, no. 1, pp. 25-44, March 1997.

ABSTRACT: The Environment Agency has accepted the need for public participation in decisions concerning river management in keeping with Agenda 21 concerns for environmental policies that command a good measure of public support. In the past, public participation has often relied upon consultations involving formal meetings with interest groups and local politicians. Methods of public consultation are changing. In tapping public opinion the Environment Agency now relies less on public meetings and increasingly more on a direct approach and involvement of the public. Research at Middlesex University is part of the attempt to provide opportunities for the representation of views of the lay public to be considered within the management of rivers and river corridors. The research has used surveys of representative samples of members of the public, often at riverside sites. This paper reports on some of the research projects that have developed on these themes, and analyses the implications of their results for river management and the protection of nature conservation values.

AUTHOR: Howard, J. & McGregor, D.

TITLE: Reducing nutrient enrichment of waterways through public education: a tale of two cities

SOURCE: Environmental Conservation, v. 27, no. 4, pp. 351-358, Dec 2000.

ABSTRACT: Eutrophication of waterways, expressed as excess growth of cyanobacteria, is frequently caused by excessive inputs of phosphorus. Human activities are often the origin of such nutrient enrichment and so many governments have addressed the issue by implementing a range of technological, legislative and biological measures. By contrast, Australia has taken a different approach and also relied heavily on public education. This paper compares the success of two of these 'Phoswatch' public education programmes. One campaign occurred within the R Murray-Darling Basin in a country town called Albury-Wodonga. The other occurred within the Haw Hawkesbury-Nepean Basin in the western suburbs of Sydney. The campaigns were evaluated using a series of community surveys and by monitoring phosphorus loads at a sewage treatment plant. The Albury-Wodonga campaign was the most effective of the two campaigns with increases in the number of people reporting a range of behaviors and these resulted in a decrease in phosphorus loads entering the local treatment plant. The comparison suggests that clear simple messages, a diversity of media exposure, and some form of feedback are critical to programme success. It is concluded that campaigns such as Phoswatch can provide a long term, cost effective way of addressing eutrophication by focusing on the problem at source and creating community support for an integrated strategy. [References: 30]

AUTHOR: Howell, J. L. & Habron, G. B.

TITLE: Agricultural landowners' lack of preference for internet extension.

SOURCE: Journal of Extension, v. 42, no. 6, on-line access, 2004. Available at: <http://www.joe.org/joe/2004december/a7.shtml>.

AUTHOR: Iams, Donna R. & Marion, Mary H.

TITLE: Reactions to Alternative Delivery Methods

SOURCE: Journal of Extension, v 29, no. 2, on-line access, Summer 1991. Available at: <http://www.joe.org/joe/1991summer/a2.html>.

AUTHOR: Johnson, S. E. & Jacobs, H. M.

TITLE: Public education for growth management: lessons from Wisconsin's Farmland Preservation Program.

SOURCE: Journal of Soil and Water Conservation [Ankeny, IA: Soil and Water Conservation Society], v. 49, no. 4, pp. 333-338, July/Aug 1994.

ABSTRACT: The farmland preservation education initiative set up in Wisconsin is discussed. Successful education efforts in growth management depend upon several factors, including knowing the distinction between educating and advocacy.

AUTHOR: Karlen, D. L., Ditzler, C. A., & Andrews, S. S.

TITLE: Soil quality: why and how?

SOURCE: Geoderma, v. 114, no. 3-4, pp. 145-156, Jun 2003.

ABSTRACT: The soil quality concept evolved throughout the 1990s in response to increased global emphasis on sustainable land use and with a holistic focus emphasizing that sustainable soil management requires more than soil erosion control. The concept includes two areas of emphasis-education and assessment-both based soundly on principles of soil science. Soil quality test kits, farmer-based scorecards, visual assessment procedures, fact sheets, and video presentations were developed as educational materials because many people have no basis to recognize, understand or appreciate the complexity of soil resources. Assessment tools for indexing soil quality at various scales were pursued to show the multiple functions (e.g. nutrient and water cycling, filtering and buffering of contaminants, decomposition of crop residues and other organic matter sources, and recycling of essential plant nutrients) that soils provide as the foundation for sustainable land management. Worldwide research and technology transfer efforts have increased awareness that soil resources have both inherent characteristics determined by their basic soil formation factors and dynamic characteristics influenced by human decisions and management practices. Soil quality assessment and education are intended to provide a better understanding and awareness that soil resources are truly living bodies with biological, chemical, and physical properties and processes performing essential ecosystem services. (C) 2003 Elsevier Science B.V. All rights reserved. [References: 55]

AUTHOR: Kelly-Begazo, C.

TITLE: Florida yards & neighborhoods program: More than 1.2 million people reached

SOURCE: Section 319 success stories III, the successful implementation of the clean water acts section 319 non point source pollution program. 16 April 2002. Retrieved from http://www.epa.gov/nps/Section319III/inform_ca.htm, 26 Jan 2005.

AUTHOR: Knox, D., Jackson, G., & Nevers, E.

TITLE: Farm*A*Syst: a partnership program to protect water resources.

SOURCE: Clean water, clean environment, 21st century, team agriculture, working to protect water resources, conference proceedings, March 5-8, 1995, Kansas City, MO /. St. Joseph, MI: ASAE, v. 3, pp. 167-170, 1995.

AUTHOR: Kraft, S. E., Lant, C., & Gillman, K.

TITLE: WQIP: An assessment of its chances for acceptance by farmers

SOURCE: Journal of Soil and Water Conservation [Ankeny, Iowa: Soil and Water Conservation Society], vol. 51, no. 6, pp. 494-498, Dec 1996

ABSTRACT: During the debate surrounding the Food, Agriculture, Conservation, and Trade Act of 1990 and in the subsequent report of the conference committee, the Water Quality Incentives Program (WQIP) was held as the centerpiece of the 1990 farm bill's nonpoint source reduction mandate. Using data collected from surveys of 770 farmers with land critical for surface or groundwater quality located in ten diverse counties in the Cornbelt, results of logistic regression of factors influencing farmers' willingness to participate in the WQIP are presented. Farmer interest in the WQIP is limited and is significantly influenced by farmers' attitudes toward governmental involvement with wetland regulation, education, tenure status, contact with Natural Resources Conservation Service, and percentage of farm sales derived from specialty crops. The results raise doubts as to whether the WQIP can serve as the "centerpiece" of the USDA's nonpoint source pollution control efforts.

AUTHOR: Kromm, D. E. & White, S. E.

TITLE: Reliance on sources of information for water-saving practices by irrigators in the High Plains of the U.S.A.

SOURCE: Journal of Rural Studies, v. 7, no. 4, pp. 411-421, 1991.

ABSTRACT: Who do farmers trust? Irrigators in the High Plains are confronted with a wide range of information sources with respect to water-saving practices. From a survey of 709 irrigators in 10 countries the most widely accepted sources are identified, regional variability or information is examined, the role of irrigator characteristics on source selection is determined, and the level of association between adoption and source preference is analyzed. Differences in irrigators' reliance on specific sources are more associated with location than irrigator characteristics. Information sources viewed as important by many irrigators frequently influence adoption decisions less than sources having a wide range of preference among irrigators. Mass media and advisor-oriented sources are much more significantly linked to adoption than inter-personal sources such as friends and neighbors. The three sources that best discriminate adoption behavior are private agricultural consulting firms, university research stations, and trade magazines.

AUTHOR: Lanyon, L. E., Kiernan, N. E., & Stoltzfus, J. H.

TITLE: Evaluating barriers to participation by **fertilizer and agricultural chemical dealers** in a federal water quality project.

SOURCE: Journal of Natural Resources and Life Sciences Education [Madison, WI: American Society of Agronomy], v. 25 no. 2, pp. 160-165, Fall 1996.

ABSTRACT: The USDA Water Quality Initiative was designed to reduce nonpoint-source nutrient and pesticide contamination of local and regional waters. The Pequea-Mill Creek Hydrologic Unit Area Project in Pennsylvania was one of the projects. An objective of this project was to involve commercial vendors in the delivery of nutrient management and integrated crop management services (ICM). Changes in federal guidelines in 1992

authorized the participation of fertilizer and agricultural chemical dealers in federally funded crop management programs. In order for all commercial vendors to be approved by the USDA—Natural Resource Conservation Service, Cooperative Extension developed training and examination procedures to meet those requirements. Participation by dealers in the USDA—Farm Services Agency Water Quality Incentive Program-Integrated Crop Management (WQIP—ICM) practice activities was less than by private consultants. We hypothesized that barriers to participation in WQIP—ICM existed for the dealers. A process evaluation using focus groups of dealers and farmers attempted to identify those barriers. Dealers indicated they were reluctant to overcommit resources to an experimental program and feared client turnover if the program was not satisfactory. Additional barriers to dealer participation were farmer reluctance to participate in a government program that would affect their management decisions and the interest of farmers in maintaining the flexibility to select from a variety of management information sources. Future educational programs addressing the business management needs of dealers, promoting crop management certification programs for dealers, and stimulating alternative approaches to ensuring responsible pesticide and nutrient use by farmers could help reduce barriers.

AUTHOR: Leach, W. D. & Pelkey, N. W.

TITLE: Making watershed partnerships work: A review of the empirical literature

SOURCE: Journal of Water Resources Planning & Management [ASCE], v. 127, no. 6, pp. 378-385, Nov-Dec 2001.

ABSTRACT: Two main goals are achieved in this review of the empirical literature on factors affecting conflict resolution in watershed partnerships. The first is an assessment of two public policy theories relevant to partnership structure and function. The second is a set of practical suggestions for designing successful partnerships. The 37 available studies collectively identified 210 "lessons learned," which were grouped into 28 thematic categories. The most frequently recurring themes are the necessity of adequate funding (62% of the studies), effective leadership and management (59%), interpersonal trust (43%), and committed participants (43%). Exploratory factor analysis was used to search for patterns in the lessons. Four factors were identified, which together explain 95% of the variance in the 28 themes. The first two factors emphasize the importance of (1) balancing the partnership's resources with its scope of activities; and (2) employing a flexible and informal partnership structure. The third and fourth factors offer modest support for two theoretical perspectives on collaborative resource management—the alternate dispute resolution framework and the institutional analysis and development framework.

[References: 81]

AUTHOR: Lefko, S. A., Rice, M. E., & Pedigo, L. P.

TITLE: Producer perceptions and pest management practices in Iowa alfalfa.

SOURCE: Journal of Production Agriculture [Madison, WI: American Society of Agronomy], v. 12, no. 2, pp. 257-263, April/June 1999.

ABSTRACT: In June 1997, 1900 self-administered surveys were sent to Iowa alfalfa (*Medicago sativa* L.) producers. The sample was split into early adopter and general populations. Early adopters were those producers who purchased potato leafhopper

[*Empoasca fabae* (Harris)] resistant alfalfa seed during the first year it was available commercially. The general population was randomly selected and no producer was present in both populations. Producers were asked questions on pest perceptions, management practices, and perceptions of leafhopper-resistant alfalfa. Seven hundred forty-seven usable surveys were returned. Results showed that the early adopter population farmed larger production systems and produced more alfalfa per acre than the general population. Overall, producers from the early adopter population had greater fundamental knowledge of serious alfalfa pests than producers from the general population. The potato leafhopper was reported as the most important pest in both populations. Producers seemed confused between the injury symptoms of potato leafhopper and alfalfa weevil [*Hypera postica* (Gyllenhal)] injury, and it was apparent that leafhopper injury symptoms were often confused with drought stress. Positive relationships were found between the frequency of scouting, the frequency of insecticide use, and alfalfa yield. The majority of producers expected leafhoppers to avoid resistant alfalfa varieties, resulting in smaller pest infestations. Adoption of leafhopper-resistant alfalfa probably will be limited by producers' knowledge of previous yield loss from this pest. Results of this survey will be used to develop improved educational materials on insect pest management in alfalfa.

AUTHOR: Lieberoff, B.

TITLE: The salt creek wilderness: Illinois zoo offers interactive environmental learning experience

SOURCE: Section 319 success stories III, the successful implementation of the clean water acts section 319 non point source pollution program. 16 April 2002. Retrieved from http://www.epa.gov/nps/Section319III/inform_ca.htm, 26 Jan 2005.

AUTHOR: Line, D. E., McLaughlin, R. A., Osmond, D. L., Jennings, G. D., Harman, W. A., Lombardo, L. A., & Spooner, J.

TITLE: Nonpoint sources

SOURCE: Water Environment Research, v. 70, no. 4, pp. 895-912, Jun 1998.

ABSTRACT: Nonpoint source (NPS) pollution originates from diffuse land areas that intermittently contribute pollutants to surface and ground water. This article is a review of 1997 literature on several aspects of NPS pollution, including policy, economics, and management issues; effects and extent of pollutants in surface and ground water; pollution controls; and modeling and monitoring. Several publications addressed the broad topic of NPS pollution. Osmond, Line, et al. (1997) provided an overview of the Section 319 National Monitoring Program of the Clean Water Act. Under this program, selected watersheds around the country are monitored during a 6- to 10-year period to evaluate how implementation of best management practices (BMPs) leads to improved water quality. Proceedings from a national conference on NPS Pollution Information/Education Programs included papers on various education and outreach efforts aimed at adults and children for protecting water resources.

AUTHOR: Lovett, B.

TITLE: Stream monitoring network with Wyoming schools: Trained teams initiate, expand school monitoring programs.

SOURCE: Section 319 success stories III, the successful implementation of the clean water acts section 319 non point source pollution program. 16 April 2002. Retrieved from http://www.epa.gov/nps/Section319III/inform_ca.htm, 26 Jan 2005.

AUTHOR: Lowrie K. W. & Greenberg M.

TITLE: Promoting Ground Water Pollution Prevention in Small Businesses

SOURCE: Water Resources Bulletin, v. 33, no. 1, pp. 193-204, Feb 1997.

ABSTRACT: Although they have not been the focus of major regulations, small businesses can contribute pollutants to ground water through routine practices. Because strict regulation of millions of micro firms is not likely, water resource professionals face a challenge of how to reach small business operators with effective pollution prevention messages. The purpose of this study was to examine the factors that influence a small business operator to adopt measures that reduce potential ground water pollution. We looked at how information delivery, internal business characteristics, and external relationships are associated with voluntary preventive measures. Mail surveys from small businesses in New Jersey municipalities and interviews with business owners provided data about business characteristics and current pollution prevention activities. Findings suggested that businesses doing the most to prevent ground water pollution were generally more connected to external organizations and had more financial and technical resources. The study also discovered that small business owners fear government involvement in their affairs. The study concludes with recommendations to encourage more voluntary adoption of prevention measures by businesses. These center on separating assistance programs from enforcement and involving industry peer groups in an effort to make information available in a non-threatening manner. [References: 37]

AUTHOR: Marlowe, Mike, & Trathen, Woodrow.

TITLE: *The Adventures of Lead Commander: An Environmental Education Program to Prevent Lead Poisoning in Young Children.*

SOURCE: The Journal of Environmental Education, v. 28, no. 1, pp. 19-23, 1996.

ABSTRACT: This study examined the effectiveness of a family-based environmental education program in lowering young children's exposure to lead-lowering intervention was associated with changes in behavioral function. Thirty preschool-age children were divided up into treatment and comparison groups, with the treatment group given an environmental education program on preventing lead exposure. This prevention program included preschool materials/activities and parent/family materials/activities. Prior to treatment, and again 9 months later, both groups had hair analysis for lead levels and ratings of problem behavior. Posttest hair-lead levels and teacher and parent ratings of nonadaptive behavior were significantly lower for the treatment group than for the comparison group. Although limited by the modest sample size, the results suggest that lead exposure degrades behavior performance in young children and that family-based environmental education programs can reduce young children's exposure to lead.

AUTHOR: May, T. S.

TITLE: Elements of success in environmental education through practitioner eyes.

SOURCE: The Journal of Environmental Education, v. 31, no. 3, pp. 4-11. 2000.

ABSTRACT: Using the experiences and perspectives of practicing environmental educators, the author identified the elements that contributed most to effective environmental education. First, interviews were conducted with 18 experienced environmental educators from 11 states. Factors that appeared fundamental to the teachers' successes were assembled into an initial elements-of-success framework, consisting of 42 elements arranged in 3 categories: teaching conditions, teacher competencies, and teaching practices. The framework was then sent in survey form to environmental educators across the country. The survey yielded strong and consistent confirmation that environmental educators across the country believe the framework provides a valid and useful representation of the major elements that contribute to successful environmental education.

AUTHOR: McKenrick, L. L., Ii, K., Lawrence, B., Kaufmann, M., & Marshall, M.

TITLE: Helping the auto repair industry manage hazardous wastes: An education project in King County, Washington.

SOURCE: Journal of Environmental Health, v. 66, no. 4, pp. 9-14, 2003.

ABSTRACT: From January 1, 2000, to August 31, 2001, a team of environmental health specialists from Public Health-Seattle & King County, a partner in King County's Local Hazardous Waste Management Program, made educational visits to 981 automotive repair shops. The purpose was to give the auto repair industry technical assistance on hazardous waste management without using enforcement action. Through site inspections and interviews, the environmental health staff gathered information on the types and amounts of conditionally exempt small-quantity generator (CESQG) hazardous wastes and how they were handled. Proper methods of hazardous waste management; storage, and disposal were discussed with shop personnel. The environmental health staff measured the impact of these educational visits, by noting changes made between the initial and follow-up visits.

This report focuses on nine major waste streams identified in the auto repair industry. Of the 981 shops visited, 497 were already practicing proper hazardous waste management and disposal. The remaining 484 shops exhibited 741 discrepancies from proper practice. Environmental health staff visited these shops again within six months of the initial visit to assess changes in their practices. The educational visits and technical assistance produced a 76 percent correction of all the discrepancies noted.

AUTHOR: Mechenich, C. & Shaw, B. H.

TITLE: Chemical use practices and opinions about groundwater contamination in two unsewered subdivisions

SOURCE: Journal of Environmental Health, v. 56, no. 6, pp. 17-22, 1994

ABSTRACT: Residents of two subdivisions with private wells and septic systems in central Wisconsin were surveyed about use of various household and lawn chemicals and their opinions about causes and severity of groundwater pollution problems. The overall response rate in the survey was 78 percent. Of 139 homeowners surveyed, 109 reported fertilizing

their lawns an average of 1.8 times per year. Commonly used lawn and garden insecticides included diazinon, malathion and Sevin. Most commonly used household products were laundry detergent, toilet bowl cleaner, and tub and tile cleaners. Residents of both subdivisions were fairly accurate in describing the largest sources of groundwater contamination both in the county and in their own subdivisions. Their greatest concerns about groundwater quality were nitrate and pesticide contamination. Overall, 90 percent of participants were aware that individual homeowners may adversely affect groundwater quality, and 87 percent believed that education is the most effective solution to groundwater problems. Education needs for groundwater protection in these subdivisions include regular water testing, record keeping on well depth, the potential interrelationships of wells and septic systems in shallow groundwater systems, alternatives to hazardous household cleaning products, and modifications of lawn care practices.

AUTHOR: Mercer, Kevin.

TITLE: The "5 Things You Can Do for Your River" Campaign

SOURCE: Paper presented at the Third National Conference on Nonpoint Source Pollution Information & Education Programs, Chicago, IL, pp. 22-26, October 20-23, 2003.

ABSTRACT: "*5 Things You Can Do For Your River*" is the foundation program of the RiverSides Stewardship Alliance. *5 Things* anchors RiverSides' community-based Lot Level Pollution Prevention Strategy designed to enhance the value of municipal, non-government organization, and community nonpoint source pollution prevention efforts. One of RiverSides' primary principles, no net loss of permeability, remains an underlying principle recommended for planning and building code bylaws in municipalities throughout North America. RiverSides' program agenda focuses on establishing the lot level as the principle focus of public participation activities and the focus of public education and outreach strategies.

From 1996 through 1998, the *5 Things* campaign created a comprehensive social marketing package of practical, direct impact solutions drawn from a combination of civic and municipal programming not previously marketed or considered as "stormwater" or watershed-regeneration related. The goal was to raise the provide of nonpoint source pollution public participation through active "social change marketing" to homeowners in specific sewersheds draining to the Don River, a Lake Ontario tributary and major source river to Toronto Bay (site of a Great Lakes Water Quality Assessment Area of Concern and Remedial Action Plan). *5 Things* utilized a door-to-door social marketing canvass for 40,000 homes in five Don River neighborhoods (instead of direct education) in an effort to overcome the complexities of nonpoint source pollution awareness, which had retarded the timeline of achieving direct regeneration action.

After one year of operation, the Council of Great Lakes Governors and The Conservation Fund recognized *5 Things* as the Ontario Urban NPS Pollution Prevention Outreach and Education Success Story in 1997. In 1998, the National Capital Region of Ottawa-Carleton adopted the *5 Things* framework as the basis for its WaterLinks/CommunEAUté program to enhance the value of its surface water protection programming. Currently, the 3 Rivers Wet Weather Demonstration Program in Pittsburgh, Pennsylvania is applying a variation of the *5 Things* framework as the basis of its Nine Mile Run Watershed RainBarrel Initiative.

AUTHOR: Michelsen, A. M., McGuckin, J. T., & Stumpf, D.

TITLE: Nonprice water conservation programs as a demand management tool

SOURCE: Journal of the American Water Resources Association, v. 35, no. 3, pp, 593-602, Jun 1999.

ABSTRACT: Water providers nationwide are implementing nonprice conservation measures such as education, public information, appliance retrofit and ordinances, with the expectation that these programs will reduce residential water demand. However, little empirical information exists on the effectiveness of nonprice conservation programs in reducing water demand. Previous econometric studies indicate these programs have had minimal impact. We examine the types and number of major nonprice conservation programs that have been implemented during an 11-year period in seven cities in the southwestern United States. A cross sectional, monthly time series residential water demand model, with parameters to control for variation in prices, temperature, precipitation and other factors, was used to empirically investigate the effectiveness of nonprice conservation programs in reducing water demand. We found significant reductions in use ranging between 1.1 percent and 4.0 percent per program. Because of the lack of information, we were unable to distinguish the effectiveness of individual or specific types of programs. Beyond finding that nonprice programs can be effective in reducing demand, questions regarding the efficiency and benefits to be achieved by conservation remain. As a step towards separating and evaluating the effects of individual programs, program benefits and efficiency, we recommend that utilities maintain more detailed and consistent information regarding the implementation of their nonprice programs. [References: 33]

AUTHOR: Miller, D. R. & Smith, M. F.

TITLE: Who participates and why? Factors affecting participation in a state issues-based program.

SOURCE: Journal of Extension, v. 29, no. 3, p. 12-14 (also, on-line access), Fall 1991. Available at: <http://www.joe.org/joe/1991fall/a3.html>.

AUTHOR: Milton, Barbara, & Cleveland, Eliza.

TITLE: Changing Perceptions of Nature, Self and Others: A Report on a Park/School Program.

SOURCE: Journal of Environmental Education, v. 26, no. 3, pp. 32-39, 1995.

ABSTRACT: The Park/School Program was developed by the Urban Resources Initiative at the Yale School of Forestry and Environmental Studies in cooperation with school teachers and urban park rangers. During the pilot project, graduate students in environmental studies conducted field studies in ecology with the 46 fifth graders to introduce them to natural resources and to develop social skills in a neighborhood park. The process of developing teamwork through cooperative games and group projects, of increasing understanding of urban ecosystems through outdoor investigations and indoor laboratory activities, and of applying the teamwork and understanding to teaching others instilled in the children a sense of ownership and internalization of their knowledge of the park. The program succeeded in its aims of increasing ecological knowledge and

improving the social skills of the students. Unanticipated outcomes included the changing perceptions of teachers and students toward each other, of the park, and students' perceptions of themselves. An overview of the pilot project, its potential of effecting change inside and outside the classroom, and recommendations for future programs and research are presented.

AUTHOR: Mueseler, Jeghan E., Terry, Robert, Jr., & Holcomb, Rodney

TITLE: Evaluation of a Workshop for Agricultural Entrepreneurs.

SOURCE: 21st Century Research for Agricultural Education, Proceedings of the 27th Annual National Agricultural Education Research Conference, San Diego, CA., v. 27, pp. 367-377, December 6, 2000.

ABSTRACT: The purpose of this study was to assess the impact of a series of short-term, small business workshops delivered at the Oklahoma Food and Agricultural Products Center by investigating the knowledge and attitudes of workshop participants. The objectives developed to accomplish the stated purpose were to: 1) Identify selected personal and professional characteristics of workshop participants; 2) Assess change in knowledge as a result of participation in the workshop; 3) Assess change in attitude as a result of participation in the workshop; 4) Determine what relationships, if any exist between the characteristics of workshop participants and their change in knowledge and/or attitude related to topics presented in the workshop. A census of the 35 workshop participants was taken. A pre-test, post-test design was used to gather the data. On the pre-test, information was gathered about the participants and their business interests. A test composed of items relating to the objectives of each workshop session was developed and given to the participants at the beginning and then again at the end of the workshop. A semantic differential used to assess the participants' attitudes related to starting a small business was also included on the pre-test and post-test instruments. Data from these two instruments were compared to determine the impact of the workshop on the participants' knowledge and attitudes related to the topics presented. From the findings, the researchers concluded that the typical individual attending the workshop was middle aged, male, and well educated. It was also concluded that the short-term small business training workshops did significantly increase the knowledge of individuals attending the workshop, however, it did not alter the overall attitude of an individual toward starting a small business.

AUTHOR: Mullan, P. B., Gardiner, J. C., Rosenman, K., Zhu, Z., & Swanson, M.

TITLE: Skin cancer prevention and detection practices in a Michigan farm population following an educational intervention.

SOURCE: The Journal of Rural Health, v. 12, no. 4 (supplement), pp. 311-320, 1996.

ABSTRACT: Farmers face an increased risk of skin cancer, presumed to be secondary to their increased occupational exposure to sunlight. This study examines skin cancer prevention and detection beliefs and practices among adult farmers in defined control and comparison farming communities in four contiguous counties of Michigan, before and after a community-based educational intervention. The educational intervention included mailing packets containing information on skin cancer risks and community sources for screening, disseminating articles in local newspapers on skin cancer prevention and control measures,

and providing information and screening at local county fairs and agricultural community fairs. The responses of 2,999 survey participants were analyzed to identify the interrelationships among their beliefs and their descriptions of their (primary preventive) self-care and professional medical care seeking (for detection and treatment) practices. Factors associated with the likelihood of skin cancer screening and with measures of knowledge and practices associated with medical care of skin cancer were examined. The intervention appeared to improve the practice of preventive behaviors and seeking medical care.

AUTHOR: Murray, H. & Butler, L. M.

TITLE: Whole farm case studies and focus groups: participatory strategies for agricultural research and education programs.

SOURCE: American Journal of Alternative Agriculture [Greenbelt, MD: Henry A. Wallace Institute for Alternative Agriculture], v. 9, no. 1/2, pp. 38-44, Winter/Spring 1994.

ABSTRACT: Research and extension personnel are beginning to look for new strategies to involve more farmers and the non-farm public in their programs. Two approaches we have used are whole farm case studies (WFCS) and focus groups. WFCS in Oregon and Washington led to several research and educational programming ideas that are currently being pursued in both states. A focus group to study water quality, nitrate leaching and farming practices in Skagit County, Washington is one outcome of the WFCS process. It is made up of 16 people, including farmers, university personnel, members of environmental groups, and government representatives. We review these two complementary participatory strategies for systems-oriented sustainable agriculture research and education programs. Both have been very useful for building problem-solving partnerships between the land-grant universities and agricultural and governmental constituents in our area. Noteworthy outcomes include: complementary applied on-farm and experiment station research; farming systems analysis; public education; new linkages with environmental and agricultural interest groups; additional grant funds to address identified priority issues; and interdisciplinary teams that cut across the biological and social sciences and include diverse citizen representation.

AUTHOR: Napier, T. L. & Bridges, T.

TITLE: Adoption of conservation production systems in two Ohio watersheds: A comparative study

SOURCE: Journal of Soil and Water Conservation [Ankeny, Iowa: Soil and Water Conservation Society], v. 57, no. 4, pp. 229-235, Jul-Aug 2002.

ABSTRACT: Data were collected from land owner-operators who were managing farms within the Darby Creek watershed and within a selected area in the upper Scioto River watershed in central Ohio during the late winter of 1998 and the summer of 1999. Information was collected to assess the types of agricultural production systems used by farmers within each watershed during the previous growing season. Information about agricultural production systems being used in each watershed was compared to determine if farming practices differed between the two watersheds. Study findings revealed that agricultural production systems employed by farmers within the upper Scioto River watershed were not significantly different from those being used within the Darby Creek watershed. This finding was inconsistent with

research expectations derived from the traditional diffusion model. Farmers within the Darby Creek watershed had been expected to report adoption of significantly more conservation production systems because they had been exposed to more extensive conservation programming designed to motivate them to adopt and to use conservation practices. Farmers within the upper Scioto River watershed had been exposed to relatively little conservation programming even though the two watersheds were located approximately 40 miles apart. Study findings strongly suggest that massive human and economic resources employed to motivate land owner-operators to adopt and use conservation production systems within the Darby Creek watershed were not successful in accomplishing that objective.

AUTHOR: Napier, T. L. & Johnson, E. J.

TITLE: Impacts of voluntary conservation initiatives in the Darby Creek watershed of Ohio

SOURCE: Journal of Soil and Water Conservation [Ankeny, Iowa: Soil and Water Conservation Society], v. 53, no. 1, pp. 78-84, 1998.

ABSTRACT: Land owner-operators in the Darby Creek watershed located in central Ohio were provided the opportunity to participate in a comprehensive soil and water conservation program sponsored by several public and private conservation organizations. Extensive human and economic resources were appropriated by the cooperating organizations to implement a conservation effort that emphasized information, education, and cost-sharing to motivate land owner-operators to adopt soil and water protection practices at the farm level. Data were collected in 1991 prior to the implementation of the conservation program and again in 1994 after conservation efforts had been in operation for approximately 3 years. Analysis of longitudinal data revealed that conservation efforts were not very successful in motivating land owner-operators to change production practices. While significant modifications in production practices were observed over time, the changes were not uniformly desirable from the perspective of soil and water conservation. The findings also revealed that land owner-operators within the study area become more polarized in terms of the types of farm production systems employed. Such findings suggest that it may become more difficult to motivate land owner-operators who have resisted using conservation production systems in the past to adopt conservation production systems in the future. Study findings bring into serious question the utility of continuing to implement soil and water conservation practices using traditional voluntary approaches such as those used in the Darby Creek watershed.

AUTHOR: Napier, T. L. & Johnson, E. J.

TITLE: Awareness of operation future among landowner-operators in the Darby Creek watershed of Ohio

SOURCE: Journal of Soil and Water Conservation [Ankeny, Iowa: Soil and Water Conservation Society], v. 53, no. 4, pp. 353-357, 1998.

ABSTRACT: Data were collected in 1994 from 245 farmers in the Darby Creek watershed in central Ohio to assess awareness of a local conservation organization, Operation Future, and to evaluate its effectiveness. Research findings revealed that a minority of farmers in the watershed were aware of the organization or its programs. Of those who indicated they were aware of the conservation group and its programs, a minority believed that the

organization was effective in motivating watershed farmers to adopt soil and water protection practices. Discriminant analysis revealed that the variables used to predict awareness of the conservation organization were not useful for predictive purposes. The implications of the study findings are discussed in the context of future conservation efforts in the watershed. The inadequacies of using local information-education organizations, such as those implemented in the Darby Creek watershed, for conservation purposes are examined.

AUTHOR: Napier, T. L., Robinson, J., & Tucker, M.

TITLE: Adoption of precision farming within three Midwest watersheds.

SOURCE: Journal of Soil and Water Conservation [Ankeny, Iowa: Soil and Water Conservation Society], v. 55, no. 2, pp. 135-141, 2000.

ABSTRACT: Data were collected from 1,011 land owner-operators within three Midwest watersheds to assess the merits of a theoretical perspective developed to predict adoption of precision farming technologies at the farm-level. Data were collected from primary farm operators within watersheds in Ohio, Iowa, and Minnesota using a drop-off-pick-up-later technique. Respondents were asked to indicate the probability that they would adopt precision farming techniques within the next five years. Respondents were divided into two study groups for statistical purposes. Farmers who indicated that they would probably adopt precision farming techniques were combined into one group and those who indicated they would probably not adopt were combined into a second group. Discriminant analysis was used to test the merits of the theoretical model used to guide the study. Study findings revealed that the theoretical model was useful for predicting reported intentions concerning adoption of precision farming technologies within all of the watersheds examined.

AUTHOR: Napier, T. L. & Sommers, D. G.

TITLE: Farm production systems of Mennonite and non-Mennonite land owner-operators in Ohio.

SOURCE: Journal of Soil and Water Conservation [Ankeny, Iowa: Soil and Water Conservation Society], v. 51, no. 1, pp. 71-76, Jan/Feb 1996.

ABSTRACT: Data were collected in the spring and summer of 1991 from a systematic random sample of Mennonite and non-Mennonite land owner-operators in central Ohio to compare selected farm structure variables and tillage practices.

AUTHOR: Nelson, Dan R. & Trede, Larry D.

TITLE: Educational Needs of Beginning Farmers in Iowa as Perceived by Providers of Agricultural Education.

SOURCE: 21st Century Research for Agricultural Education, Proceedings of the 27th Annual National Agricultural Education Research Conference, San Diego, CA., v. 27, p. 322-337, December 6, 2000.

ABSTRACT: The main purpose of this study was to identify the educational needs of beginning farmers in Iowa as perceived by providers of agricultural education and to draw implications for planning future agricultural education programs. High school agricultural education instructors, non-land grant college agricultural instructors, Extension directors

and specialists, NRCS county conservationists and agribusiness professionals were surveyed. The ag teachers were somewhat younger on average than any of the other provider groups and had correspondingly less experience; moreover, experience as an ag teacher may tend to lead toward some of the other professions. The providers reported spending different amounts of time with beginning farmers. It appeared that beginning farmer education is not a specific priority but is incidental to the primary objectives for many of the providers. The respondents differed appreciably in their estimate of the future usefulness of educational providers but matched more closely in rating media alternatives. All of them placed the Internet high on the scale but gave low ratings to audio tapes and newspaper. They agreed that beginning farmer education should be taught using a variety of instructional methods, use input from farmers when developing programs, emphasize problem solving situations which involve primarily mental activity, emphasize production agriculture skill development and that beginning farmers need to consult a variety of information sources to make competent farming decisions. All three of the topics rated most important were in the business area, but several production skills were also rated highly. The providers reported using different educational delivery methods to present selected topics to beginning farmers. Ag teachers and college teachers consistently used meetings or classes most frequently, one-on-one less frequently, and mass media much less frequently. The other provider group reported a different pattern of delivery, consistently using one-on-one instruction much more frequently than the teachers. Extension reported using the three methods in a more generally balanced manner.

AUTHOR: Newton, B. J.

TITLE: Environmental Education and Outreach: Experiences of a Federal Agency

SOURCE: Bioscience, v. 51, no. 4, pp. 297-299, April 2001.

ABSTRACT: Conservation of natural resources is inextricably bound to public attitudes and opinions. Other articles in this issue of BioScience argue for greater involvement by the scientific community in public education and outreach. This one addresses the effectiveness of various outreach and education techniques, based on the experiences of the Natural Resources Conservation Service (NRCS), a US Department of Agriculture nonregulatory agency that is responsible for helping farmers, ranchers, and landowners conserve natural resources on private lands.

AUTHOR: Nowak, P., O'Keefe, G., Bennett, C., Anderson, S., & Trumbo, C.

TITLE: Communication and adoption evaluation of USDA water quality demonstration projects: evaluation report.

SOURCE: Washington, D.C.: Plant and Animal Science Production, Protection, and Processing, CSREES/USDA, [1997] iv, 43 p.: ill. (1 col.), col. map

AUTHOR: Obahayujie, Julius, & Hillison, John.

TITLE: Now Hear This!

SOURCE: Journal of Extension, v 26, no. 1, on-line access, Spring 1988. Available at: <http://www.joe.org/joe/1988spring/a6.html>.

AUTHOR: Padgitt, S. C.

TITLE: Farm practices and attitudes toward groundwater policies: a statewide survey (No. IFM 3).

SOURCE: The Extension [Ames, IA: IFM Iowa State University Extension], v. 3, 30 p., Oct 1989.

AUTHOR: Padgitt, S. C.

TITLE: Monitoring audience response to demonstration projects: baseline reports: Des Moines County (No. IFM 8).

SOURCE: Ames, IA: Iowa State University Extension, 29 p., Jun 1990.

AUTHOR: Petersen, C.

TITLE: Colorado water protection project: League of women voters guides extensive urban NPS campaign.

SOURCE: Section 319 success stories III, the successful implementation of the clean water acts section 319 non point source pollution program. 16 April 2002. Retrieved from http://www.epa.gov/nps/Section319III/inform_ca.htm, 26 Jan 2005.

AUTHOR: Petrzelka, P., Korsching, P. F., & Malia, J. E.

TITLE: Farmers' attitudes and behavior toward sustainable agriculture.

SOURCE: The Journal of Environmental Education, v. 28, no. 1, pp. 38-44, 1996.

ABSTRACT: Recent studies of ideologies of sustainable farmers and conventional farmers suggest that these two groups have differing beliefs, values, and attitudes on agriculture and rural life. Although awareness of these differing attitudes and values is an important step in moving toward educational programs and policies for a more sustainable agriculture, actual behavior may not be predictable from this knowledge. A mail survey of Iowa farmers with membership in Practical Farmers of Iowa, a sustainable agriculture organization, was used to examine the attitude-behavior relationship of these farmers and the role social influences play in this relationship. Attitude and social influence scales were developed, as well as a chemical input index that measures commitment to sustainable practices. The results indicate that, when controlling explanatory factors, the attitude-behavior relationship is moderate and the social influences examined do not facilitate this relationship. Implications for educational programs and policies of these findings are discussed.

AUTHOR: Petrzelka, P., Padgitt, S. C., Connelly, K., & Miller, R.

TITLE: Model farms demonstration project final report: A case study in promoting integrated crop management .

SOURCE: Ames, IA: Iowa State University Extension (No. Sociology Extension Report 95-3), 1995.

AUTHOR: Petrzelka, P., Padgitt, S. C., & Miller, R.

TITLE: Farming practices and attitudes in Iowa: 1988 to 1992 report on a statewide survey.

SOURCE: Ames, IA: Iowa State University Extension (No. Sociology Extension Report 94-5), 1994

AUTHOR: Pflugh, K. K., Shaw, J. A., Yacovelli, E., & Hagen, L. V.

TITLE: Community-based educational outreach to at-risk urban anglers.

SOURCE: Paper presented at the Second Marine and Estuarine Shallow Water Science and Management Conference, Atlantic City, New Jersey (1995, April 3-7).

ABSTRACT: In 1982, research conducted by the New Jersey Department of Environmental Protection (NJDEP) showed elevated levels of chemical contaminants in six species of fish and crabs in the Newark Bay Complex. Subsequently, advisories were adopted by the State of New Jersey to guide citizens on safe consumption practices. Traditionally, advisories have been issued primarily through the media complemented by brochures and flyers. As issues of environmental justice are raised, the State has become increasingly aware of the need to conduct more innovative education programs that will reach culturally diverse, economically depressed and non-English speaking populations.

This paper will describe the grassroots community-based education effort that was targeted primarily at: (1) communities who may be non-English-speaking, of low economic status, and whose cultural traditions may include consumption of species identified as contaminated; (2) urban anglers who may not be affiliated with professional and recreational organizations and whose primary source of protein may be contaminated fish; and (3) school age children interested in understanding the relationship between pollution, fish consumption and public health.

AUTHOR: Poe, G. L., van Es, H. M., VandenBerg, T. P., Bishop, R. C.

TITLE: Do participants in well water testing programs update their exposure and health risk perceptions?

SOURCE: Journal of Soil and Water Conservation [Ankeny, Iowa: Soil and Water Conservation Society], v. 53, no. 4, pp. 320-325, 1998.

ABSTRACT: Water quality tests of private wells are widely used in educational and extension programs across the country. Moreover, public information provision programs about environmental risks are emerging as a policy tool at all levels of government. It remains an open question, however, if these programs are informative in the sense that participants modify their exposure and health risk perceptions. Taking data from well testing studies conducted in Wisconsin and New York, this paper demonstrates that individuals do use water test results and associated information to systematically update their exposure and health risk perceptions. Evidence of such updating has not, to our knowledge, been demonstrated in previous water quality research, and provides an essential first step in assessing the cost effectiveness of public information provision rams about environmental risks. [References: 11]

AUTHOR: Pompelli, G., Morfaw, C., English, B. C., Bowling, R. G., Bullen, G. S., & Tegegne, F.

TITLE: Farm Operators' Preferences for Soil Conservation Service Information: Results from Three Tennessee Watersheds

SOURCE: Journal of Production Agriculture, v. 10, no. 3, pp. 472-476, Jul-Sep 1997.

ABSTRACT: Recent water quality legislation requires that the Soil Conservation Service (SCS) reach a more diverse range of farm operators, especially small farm operators. With few, if any, additional resources, the effectiveness of the SCS's efforts to communicate soil conservation information to new audiences is critical. Thus, a better understanding about farm operators' predispositions toward SCS information may help SCS personnel reach these new audiences more efficiently. This study examines the extent to which farm and farm operator characteristics can be used to predict farm operators' attitudes about the usefulness of soil conservation information supplied by the SCS. The results of this study indicate that farm operators contacted by SCS and extension personnel, who also participate in government commodity programs have an increased likelihood of considering SCS information useful. Although regional influences negatively affect the likelihood that farm operators will consider the SCS soil conservation information useful, farm size, gross sales, years of education, and other farm and farm operator characteristics were not found to be significant factors.

AUTHOR: Randhir, T.

TITLE: Interactive community decision modeling: Public involvement in watershed policy research

SOURCE: Kendy, E. Science Into Policy: Water in the Public Realm, proceedings, specialty conference, Bozeman, MT, sponsored by the American Water Resources Association, pp. 257-262. June 30-July 2, 1999 [Figures].

ABSTRACT: Public decision-making is complicated by the group process and the multiplicity of potential impacts. A continuing challenge to watershed planners is how to overcome the significant gap between scientific knowledge and its use in policy decisions. This knowledge gap is perpetuated by the lack of an effective interacting mechanism linking science to decision-makers. The Integrated Watershed Model is an interactive, community-based mechanism that integrates scientific principles into public decision making on watershed issues. An effective interactive mechanism involves a feedback channel and an education channel. Applied to Ware watershed in Massachusetts, model results indicate that spatial distribution of activities and natural resources and the nature of community preferences are critical in developing a transfer mechanism that incorporates scientific principles into public decision-making. Model inputs were developed and model results were analyzed through involvement of local community members during a series of participatory workshops. Another model was developed for the Blackstone watershed and accounted for economic, ecological, and water resources implications. This comprehensive watershed approach brings science into watershed decision-making. [References: 7]

AUTHOR: Ransley, Lynda

TITLE: The Outreach Continuum: Moving Participants from Information to Action.

SOURCE: Paper presented at the Third National Conference on Nonpoint Source Pollution Information & Education Programs, Chicago, IL, pp. 27-33, October 20-23, 2003.

ABSTRACT: Many outreach programs use similar strategies—information, education, and technical assistance—offered in hopes of encouraging individuals to implement Best Management Practices(BMPs) and become active water resource stewards. In evaluating our programs, it is relatively easy to measure “outgoing efforts” such as programs offered, numbers of participants, or materials distributed. But many of us really do not know if our programs and services are having the desired effect. By better assessing audience information and using it to customize and integrate our programs, we should be able to encourage (and track) individuals as they move through the “Outreach Continuum”—progressing from awareness to implementation.

As program managers, assessments like this can be useful in structuring programs and guiding resources investment whether in printed materials, Web site development, advertising campaigns, school programs, adult education, direct assistance, or incentives. With funding from the Washington State Department of Ecology Centennial Clean Water Fund, Snohomish County, Washington’s Surface Water Management Division (SWM) had the opportunity to assess one such approach.. Our goal was to achieve BMP implementation by targeted residents through the development, implementation, and evaluation of a full spectrum outreach strategy. Components of the Project included market data compilation, targeted audience development, program packaging, a wide spectrum of services, evaluation, and follow-up.

Recognizing the cumulative impact of individual actions, our ongoing goal is to motivate beneficial changes in personal behavior patterns and the thousands of everyday decisions made by streamside residents. Our success depends on detailed knowledge of our “public,” (e.g., their needs, motivational factors, barriers) as well as how our programs affect them. Information gained from this project has resulted in better service integration, a transferable method for program development, and a more focused approach to program evaluation.

AUTHOR: Rhodes, H. M., Leland, L. S., & Niven, B. E.

TITLE: Farmers, streams, information, and money: Does informing farmers about riparian management have any effect?

SOURCE: Environmental Management, v. 30, no. 5, pp. 665-677, Nov 2002.

ABSTRACT: We assessed relationships between the extent to which farmers reported exposure to relevant information and their attitudes towards, knowledge about, and degree of adoption of riparian management strategies. We also examined associations between knowledge of, or receipt of, financial assistance for riparian fencing/planting and intentions for and extent of adoption of this strategy. A mail survey of 718 pastoral farmers in Otago and Southland in New Zealand [294 surveys returned (41%)] yielded 279 usable questionnaires. Indices were developed to reflect range and frequency of information use and range of practices adopted. Attitudes were measured using Likert-type responses to 11 statements, and knowledge as a score on a ten-question true/false test. Positive relationships between information and the three main response variables (attitude, knowledge, and

adoption) were weak but significant and systematic. These associations remained significant when important demographic and farm characteristics were taken into account. Informed farmers were more likely to report intentions to carry out riparian fencing or planting within the next year. Farmers who were aware that funding was available were also more likely to state this intention, independent of information level. The reported extent to which waterways had been fenced to exclude stock was related to receipt of funding, but not to information level. Financial factors were the most influential barrier preventing adoption of permanent fencing. Our research shows a positive correlation between the receipt of information and funding and the adoption of specific riparian management measures. [References: 37]

AUTHOR: Ribaldo, M.O. & Horan, R.D.

TITLE: The role of education in nonpoint source pollution control policy.

SOURCE: Review of Agricultural Economics, [Ames, IA: American Agricultural Economics Associations], v. 21, no. 2, pp. 331-343, Fall/Winter 1999.

ABSTRACT: Education is often used to provide producers with information on how to operate more efficiently with current technologies or on profitable new technologies that generate less pollution. While such "win-win" solutions to water quality problems are attractive, we use a simple economic framework to show that education cannot be considered a strong tool for water quality protection. Its success depends on a number of factors related to profitability and altruism, and "win-win" solutions are not always guaranteed, even when they appear to exist. Evidence suggests that net returns are the chief concern of producers when they adopt alternative management practices.

AUTHOR: Ryan, J., Mathew, K., Anda, M., & Yuen, E.

TITLE: Introduction of water conservation education packages: the opportunities and constraints affecting their success

SOURCE: Water Science & Technology, v. 44, no. 6, pp. 135-140, 2001.

ABSTRACT: The Remote Area Developments Group in the Institute for Environmental Science at Murdoch University developed a video and booklet education package on water conservation. The package was developed after research, review of current efforts in water conservation, and consultation with communities showed that there was a need in this area. The package was distributed to all communities within Western Australia. Several different workshops were conducted with Indigenous Environmental Health Workers from around Western Australia in remote areas and in the Perth Metropolitan communities using the package. This paper will briefly describe the opportunities and constraints that exist for water conservation in remote Aboriginal communities in Western Australia as well as give an evaluation of the education package based on workshops, trials and survey instrument. This paper will explain the conclusions that have been drawn from the study: that a broad delivery style is the most advantageous style for remote communities, allowing the facilitator to assess the best style of delivery. [References: 16]

AUTHOR: Ryder, B. A. & Swoope, K. S. F.

TITLE: Learning about riparian rehabilitation: assessing natural resource and landscape architecture student teams.

SOURCE: Journal of Natural Resources and Life Sciences Education [Madison, WI: American Society of Agronomy], v. 26, no. 1, pp. 115-119, Fall 1997.

ABSTRACT: This case study began as a 6-wk class project between two disciplines that had fundamental differences in terminology, knowledge base, skills, and perceptions. Natural resource students (NR) and landscape architecture students (LA) were teamed up to learn about riparian restoration. The instructors attempted to teach students skills for being effective members of a team. They also taught them rudimentary survey skills. Students completed weekly surveys to assess perceptions of the project, skills acquired through the experience, and the knowledge gained. At the beginning of the project both LAs and Nrs felt they had similar individual abilities for working on team projects and had similar experiences with riparian restoration; however, the NRs felt significantly more knowledgeable about riparian ecology. By the end of the project, compared to the NRs, the LAs were significantly more positive about their ability to work as a member of a group. The LAs had caught up to the NRs in their knowledge of riparian ecology. The level of riparian restoration skills, similar for both groups at the beginning, had improved equally for both groups. Instructors felt that all of their course objectives had been met. Student team reports were well written and complete and their posters showed that they had integrated the information presented. Evaluations indicated that the students felt they had learned about the other's discipline. The student projects were awarded the 1994 Washington State Natural Resource Conservation Service award for volunteerism and provided impetus for a bioengineering grant awarded from the Washington State Department of Ecology.

AUTHOR: Salamon, S., Farnsworth, R. L., Bullock, D. G., & Yusuf, R

TITLE: Family factors affecting adoption of sustainable farming systems

SOURCE: Journal of Soil and Water Conservation [Ankeny, Iowa: Soil and Water Conservation Society], v. 52, no. 4, pp. 265-271, Aug 1997.

ABSTRACT: A paired comparison of 60 Illinois farm families was employed, 30 using sustainable systems and 30 using conventional systems, to determine factors affecting adoption of sustainable farming systems. The groups do not diverge significantly along dimensions typically accounting for farming contrasts, but are distinctive socially. Families using sustainable systems have traditions of environmentalism, systematically do on-farm experimentation, and are prudent about resources. Rather than making a paradigm shift to environmentally sensitive farming, families who adopt have a predisposition toward sustainable practices in all aspects of their lives. Adoption of sustainable systems is therefore as much for efficiency or financial motives as it is for environmental reasons. Families farming conventionally but sharing many characteristics identified with sustainable families, potentially are those best targeted for educational programs.

AUTHOR: Sandness, G.

TITLE: North Dakota eco-ed camps: Thousands of students have fun while learning.
SOURCE: Section 319 success stories III, the successful implementation of the clean water acts section 319 non point source pollution program. 16 April 2002. Retrieved from http://www.epa.gov/nps/Section319III/inform_ca.htm, 26 Jan 2005.

AUTHOR: Schwartz, J. J., Waterman, A. B., Lemley, A. T., Wagenet, L. P., Landre, P., & Allee, D. J.

TITLE: Homeowner perceptions and management of private water supplies and wastewater treatment systems
SOURCE: Journal of Soil and Water Conservation [Ankeny, Iowa: Soil and Water Conservation Society], v. 53, no. 4, pp. 315-319, 1998.
ABSTRACT: Approximately 3 million upstate New York residents rely on groundwater to supply their drinking water, and approximately 1.5 million households have on-site wastewater treatment systems (septic systems). Individual homeowners are responsible for maintaining their private water supplies and septic systems. This study surveyed 244 homeowners in three counties regarding their water quality practices and perceptions. Their drinking water was tested, and water supplies and septic systems were inspected. Positive coliform results ranged from 18 to 60%, with an average of 32% for all three counties. Nitrate results varied widely across the counties, yet only two samples had concentrations greater than the current federal drinking water standard of 10 mg/L NO sub(3) - N. Nearly 82% of respondents are satisfied with their water supply yet 31% of those satisfied have coliform in their drinking water. Nearly half the participants never tested their drinking water for contaminants, and more than one-third never pumped their septic tank. A general lack of homeowner knowledge suggests the need for increased educational programs targeted to the rural audience, as well as additional research to better understand what influences homeowner perceptions and management practices.

AUTHOR: Shaffer, R. M. & Meade, G. S.

TITLE: Evaluation of harvest planning training.
SOURCE: Forest Products Journal [Madison, WI: Forest Products Society], v. 47 no. 7/8, pp. 69-71, July/Aug 1997.
ABSTRACT: Interest in logger education and training related to best management practices (BMPs) has increased dramatically in recent years. Harvest planning is a critical part of forestry water quality BMPs. The BMP manuals of all the states recommend timber harvest planning, and several states require written timber harvest plans. The objective of this study was to evaluate the impact of harvest planning training and the preparation and use of written timber harvest plans on BMP compliance, landowner satisfaction, and weather-related downtime in the Virginia piedmont. Nine randomly selected loggers ("trained" group) completed 2 days of intensive harvest planning field training, then prepared and followed written timber harvest plans for the 29 tracts they harvested during the 8-month study period immediately following the training. The trained loggers outperformed a "control group" of loggers for mean BMP compliance (90% vs. 86%, respectively); mean landowner satisfaction (3.54 vs. 3.27); and mean weather-related

downtime (10% vs. 13%). Evaluation criteria scores for both groups were good, and the differences, though statistically significant, were relatively small, leading to conclusions that 1) loggers in the Virginia piedmont are generally doing a good job; 2) they are planning their operations, whether a written plan is required or not; and 3) harvest planning training and written timber harvest plans can marginally improve BMP compliance, landowner satisfaction, and weather-related downtime, even for loggers who are already performing well.

AUTHOR: Shay, Kathy H.

TITLE: "Grow Green": How to Have a Healthy Landscape AND Healthy Kids, Dogs, Birds, and Water.

SOURCE: Paper presented at the Third National Conference on Nonpoint Source Pollution Information & Education Programs, Chicago, IL, pp. 65-70, October 20-23, 2003.

ABSTRACT: "Grow Green" is a water quality education program that provides homeowners and gardening retailers with environmentally sound solutions for landscaping problems. It is a science-based approach that is practical and accessible to the public. Grow Green is a partnership between the city of Austin's Watershed Protection Department and the Texas Cooperative Extension to protect water quality. It is, we believe, one of the first programs in the country to take such an extensive and proactive approach to earth-wise landscape management. With nursery staff identified as a primary source for landscaping advice, Grow Green developed partnerships with 49 nurseries and home improvement centers (nearly all of the local gardening outlets). In exchange for free materials and landscape training, the retailers provide the display space for 19 fact sheets targeting pest and disease management, turf care, general landscaping information, as well as a 44-page color guide to native and adapted plants. With limited staff, this "self-serve" distribution method offers easy access to earth-wise information at the point of purchase for landscape chemicals. Bimonthly fax alerts and video training provide sales staff with convenient, in-house training. Grow Green takes a positive approach to landscape management. Rather than emphasizing the dangers of chemicals, it identifies problems and gives practical solutions. It doesn't say to eliminate chemical use; rather, it encourages least-toxic options and proper application rates through integrated pest management techniques. Using the Washington Toxics Coalition's product toxicity rating system, fact sheets also rank locally-available products from least to most toxic. The rating covers not just water quality, but also human health and wildlife hazards to address varied citizen concerns. By listing diverse products, nurseries are not threatened with reduced sales. Instead, they can adapt their product purchases according to public demand. Grow Green staff also coordinate the Green Garden network, which consists of staff from six city departments who share expertise and work to avoid duplication of effort. The Stillhouse Spring Cleaning project, a Grow Green offshoot, targets 200 homeowners in a local springshed. Initially created to reduce the excessively high nitrate levels in the spring through education, it has become instead a grassroots research project. Soil tests of all the yards and a follow-up study were instrumental in showing the benefits of organic fertilizers and lowering statewide recommendations for fertilizer application rates by 75%.

AUTHOR: Shepard, R.

TITLE: Making our nonpoint source pollution education programs effective.

SOURCE: Journal of Extension, v. 37, no. 5, on-line access, Oct 1999. Available at: <http://www.joe.org/joe/1999october/a2.html>.

AUTHOR: Siemer, W. F. & Knuth, B. A.

TITLE: Effects of fishing education programs on antecedents of responsible environmental behavior.

SOURCE: Journal of Environmental Education, v. 32, no. 4, pp. 23-29, 2001.

ABSTRACT: The authors surveyed 619 participants in a national fishing education program (Hooked on Fishing-Not on Drugs) designed for youth in Grades 6-8. The survey of the youth assessed fishing and aquatic stewardship outcomes associated with different levels of program exposure (i.e., no program, programs without fishing, and programs with fishing). Youth who participated in programs that included experience-based fishing were more likely to report several desired fishing and stewardship outcomes. These data support the assumption that such programs are more likely to influence antecedents to environmentally responsible behavior than are programs without experience-based fishing.

AUTHOR: Sommers, D. G. & Napier, T. L.

TITLE: Comparison of Amish and non-Amish farmers: a diffusion/farm-structure perspective.

SOURCE: Rural Sociology [Bozeman, MT: Rural Sociological Society], v. 58, no. 1, pp. 130-145, Spring 1993.

ABSTRACT: Considerable attention has focused on farming practices and behavioral patterns that characterize Amish farmers from other agriculturalists. It has been suggested that Amish farmers are more concerned about the physical environment than non-Amish farmers because Amish employ fewer technology-intensive farming practices, though there is little empirical evidence to support such an assertion. To address this issue, data were collected from a sample of Amish and non-Amish owner-operators in Ohio to compare environmental attitudes and farming systems presently in use. Discriminant analysis was used to examine factors chosen to differentiate the two groups. Findings reveal that Amish respondents believed more strongly than other farmers that ground water pollution was an important environmental problem and that farmers should reduce chemical application rates to protect ground water resources. Other farmers exhibited greater willingness to participate in educational programs designed to reduce pesticide application rates. The two groups could not be differentiated by criteria used to make adoption decisions about farm technologies and farming practices; both used productivity and efficiency criteria when making adoption decisions.

AUTHOR: Stanley, J. W.

TITLE: The key to successful farmer participation in Florida's Rural Clean Water Program.

SOURCE: Proceedings: the National RCWP Symposium, 10 years of controlling agricultural nonpoint source pollution, the RCWP experience, Orlando, Florida [Washington, DC: U.S. Environmental Protection Agency], pp. 269-272, Sept 13-17, 1992.

ABSTRACT: The high percentage of farmer participation in Florida's Rural Clean Water Program resulted from several factors, many not controlled by direct contact with the participants. Different strategies were used to arouse interest. A farmers' meeting held to inform potential participants of the program and encourage them to contract had limited attendance. The media was used as well as local agency newsletters and small group meetings--again with limited results. The most successful strategy was one-on-one contact with potential participants. An external factor in the process was what the local regulatory agency called the "carrot and stick approach," the carrot being the Rural Clean Water Program and the stick, a regulatory program. In addition, in the 1960s, most of the dairies in the project area had sold land elsewhere at a profit and moved to Okeechobee. In the 1990s, these dairies would not gain the same financial rewards by moving away from regulation.

AUTHOR: Stepenuck, K.

TITLE: Water action volunteers: Wav and its partners make a difference in Wisconsin
SOURCE: Section 319 success stories III, the successful implementation of the clean water acts section 319 non point source pollution program. 16 April 2002. Retrieved from http://www.epa.gov/nps/Section319III/inform_ca.htm, 26 Jan 2005.

AUTHOR: Stride, F. A., Seed, E. C., & Thompson, J. A.

TITLE: Bay of Quinte remedial action plan: "partnerships for delisting".
SOURCE: Lake & Reservoir Management, v. 11, no. 2, p. 195, 1995.
ABSTRACT: Implementation of the Bay of Quinte Remedial Action Plan (RAP) began in September 1993 with the formal release of the Bay of Quinte RAP Stage 2 Report - Time to Act. Many important cleanup actions are planned, underway or complete. The actions include expansion of the Trenton secondary sewage treatment plant; decommissioning of the Prince Edward Heights trickling filter sewage treatment plant; improving agricultural practices through the Quinte RAP Rural Water Quality; capping diffuse contaminant inputs with a Stormwater Quality Program and an objective of No Net Increase; restoring the Belleville Marsh; enhancing operations at the Belleville and Batawa secondary sewage treatment plants; rebuilding sewers in Tweed and Deseronto; providing input to municipal Official Plans; and, broadening public outreach with programs such as Take a Little Lead Out and the Big Cleanup communications trailer. Within the Rap context, strong and viable partnerships between agencies, governments, industry and citizens are required. Partnerships, and thus success, depend on five key elements: ongoing communications and outreach, unique funding arrangements, technical understanding, innovative approaches and renewable public support. In this paper, the five elements will be discussed in relation to the Bay of Quinte RAP cleanup actions and partnerships.

AUTHOR: Talsma, V.

TITLE: The Rouge Education Project: Challenges of Implementation.
SOURCE: The Journal of Environmental Education, v. 32, no. 3, pp. 26-30, 2001.
ABSTRACT: The Rouge Education Project (REP) is a school-based environmental education program that uses water monitoring, telecommunications, and student actions to improve water quality. The author carried out a program evaluation to better understand

the challenges generated by such a program. She examined surveys, interviews, and focus groups to determine the level of participation, goals, objectives, value of support services, and changes in teaching and environmental awareness. The results indicated that the REP met its goals of increasing awareness and concern about the Rouge River and developing a supportive curriculum in science classrooms. This article illustrates the importance of inservice workshops and curriculum resources for successful program enactment.

AUTHOR: Trede, Larry D. & Miller, Kevin S.

TITLE: Assessing the Learning Styles of Iowa Farmers.

SOURCE: 21st Century Research for Agricultural Education, Proceedings of the 27th Annual National Agricultural Education Research Conference, San Diego, CA., v. 27, pp. 338-349, December 6, 2000.

ABSTRACT: Learning styles have been studied for many years; however, studies focusing on learning styles of farmers are very limited. Knowledge of learning styles is important and may be useful in the development and conduct of adult education programs. The purpose of this study was to establish baseline information regarding the distribution of learning styles among Iowa farmers. A secondary purpose was to establish for these same individuals their stated preferred learning mode for selected agricultural topics. A purposive sample (judgment sampling) was developed with assistance from the Iowa Farm Bureau Federation. A self-administered mail survey was distributed to 1100 members on county leadership committees. Three hundred and sixty four (33.1%) were returned and 289 (26.3%) were useable. Content validity was ensured by a panel of experts. A reliability analysis was completed on the useable responses for sections B and C of the survey instrument with the result of a Cronbach Alpha of .84 for each section. The learning style for each respondent was determined using the Kolb Learning Style Inventory (LSI). The Kolb LSI consists of 12 open-ended statements with four choices available to complete the statement. Each choice corresponds to one of four learning modes which are combined to determine an individual's learning style. The preferred learning style for the respondents was the Assimilator (49.1%). Other learning styles were: Accommodator (14.6%), Diverger (14.9%), and Converger (21.4%). Individuals with the Assimilator learning style prefer to grasp knowledge through abstract conceptualization (logic and analysis) and transform it by reflective observation (learning by watching others). The results of the study showed that active experimentation (learning by doing) seemed to be the preferred learning mode for agricultural topics related to physical farming resources (land, crops, livestock, machinery, and buildings) while abstract learning by observing others) were the preferred learning modes for more critical thinking activities such as markets and prices, whole farm planning, and financial management. The farmers were also asked to rate the effectiveness of 26 different learning activities. Rating high were the use of consultants or specialists, attending field days, tours, and demonstrations, attending a single or series of meetings on a specific topic, and studying and analyzing a problem on my own. The farmers rated university and community college credit classes, watching a television program, audio tapes, and reading a newspaper much lower in terms of their effectiveness. Although the results of this study may not be generalized to the entire population of Iowa farmers, the results can still provide valuable information to educational providers as they plan and deliver education to Iowa farmers.

AUTHOR: Tsuji, Leonard J. S., & Nieboer, Evert

TITLE: A Comment on "The Adventures of Lead Commander: An Environmental Education Program to Prevent Lead Poisoning in Young Children".

SOURCE: *The Journal of Environmental Education*, v. 32, no. 2, pp. 15-17, 2001.

ABSTRACT: This article comments on a study designed to examine the effectiveness of the family-based, environmental education lead-poisoning program. *The Adventures of Lead Commander* (Marlowe & Trathen, 1996). Design and methodological weaknesses, such as the use of hair lead concentrations as a biomarker, call into question conclusions reached in the study. The effectiveness of the educational program cannot be ascertained from the data collected. It should be stressed, however, that environmental education projects such as *The Adventures of Lead Commander* are important in helping to educate the public and school children about lead poisoning and ways of minimizing exposure to this neurotoxin. Education and removal of lead sources are primary methods of reducing lead exposure.

AUTHOR: Tucker, M., & Napier, T. L.

TITLE: Determinants of perceived agricultural chemical risk in three watersheds in the Midwestern United States.

SOURCE: *Journal of Rural Studies*. [Oxford; New York: Pergamon], v. 17, no. 2, pp. 219-233, Apr 2001.

ABSTRACT: Recent epidemiologic research on the relationship between agricultural chemical use and human health has focused on possible risks to both farmers and nonfarm publics through such avenues as airborne chemical drift and contamination of drinking water. While agricultural chemical use has been defined as a public health issue, decisions about applying chemicals are made primarily by individual farmers who consider not only highly publicized health and environmental risks but also potentially severe economic risks of not using chemicals for production of food and fiber. The critical decision-making role played by farmers relative to agricultural chemical use creates a need for accurate information on their perceptions of various chemical-related hazards and the factors that may influence such judgments. Understanding farmers' perceptions toward agricultural chemical risk is essential to formulate effective risk-mitigation programs and policies and to target educational and technical assistance programs that encourage sound chemical practices at the farm level. This paper reports findings from a study of 1011 farm operators in three Midwestern watersheds in Ohio, Iowa, and Minnesota to assess their perceptions of risk associated with use of agricultural chemicals. A theoretical model developed from components of social learning, risk perception, and farm structure theories is used to identify predictors of agricultural chemical risk. Findings show that farmers in the three watersheds do not view agricultural chemical use as a serious health or environmental hazard. Regression findings provide partial support for the theoretical model. The statistical models explained from 30 to 37% of the variance in farmers' risk perceptions in the three study watersheds. Findings are discussed in the context of developing future education/information programs in the three watersheds.

AUTHOR: United States Environmental Protection Agency, Office of Water.

TITLE: Section 319 success stories III, the successful implementation of the clean water acts section 319 non point source pollution program.

SOURCE: [Washington, D.C.]: U.S. Environmental Protection Agency, Office of Water, [2002]

ABSTRACT: EPA Section 319 Success Stories, Vol. III. Contact Us Print Version EPA Home Programs Water Nonpoint Source Pollution CWA Section 319 Success Stories, Vol. III Section 319 Nonpoint Source Success Stories: Volume I Section 319 Nonpoint Source Success Stories: Volume II Introduction Information and Education Programs Innovative State Programs State Funding Programs Tribal Section 319 Projects States and Territories Alabama Alaska American.

AUTHOR: Varlamoff, S., Florkowski, W. J., Jordan, J. L., Latimer, J. & Braman, K.

TITLE: Georgia homeowner survey of landscape management practices.

SOURCE: HortTechnology [Alexandria, VA: American Society for Horticultural Science], v. 11, no. 2, pp. 326-331, Apr/June 2001.

ABSTRACT: A survey of Georgia homeowners provided insights about their use of fertilizers and pesticides. Knowledge of current homeowner practices is needed to develop a best management practices manual to be used by Master Gardeners to train the general public through the existing outreach programs. The objective of the training program is to reduce nutrient runoff and garden chemicals and improve the quality of surface water in urban watersheds. Results showed three of four homeowners did their own landscaping and, therefore, fully controlled the amount of applied chemicals and the area of application. Fertilizers were primarily applied to lawns, but a high percentage of homeowners also applied them to trees, shrubs, and flowers. Insecticides were applied by a larger percentage of homeowners than herbicides. Control of fire ants (*Solenopsis invicta*) was likely the reason behind the frequent use of insecticides. The desire for a weed free lawn was the plausible motivation behind the use of herbicides, which were used mostly on lawns. Fungicide use was infrequently reported by Georgia homeowners. The pattern of fertilizer and pesticide use suggests that the developed manual should emphasize techniques and cultural practices, which could lower the dependence on chemicals, while ultimately assuring the desired appearance of turf and ornamental plants.

AUTHOR: Voegel, Hal, & Wagner, Norbert.

TITLE: How do Forest Landowners Learn? A Study of Resource Agency/Landowner Interaction in Northern California.

SOURCE: Sacramento, CA: California Department of Forestry and Fire Protection, 65 p. October 1997.

AUTHOR: Wagenet, L. P., Pfeffer, M. J., Sutphin, H. D., & Stycos, J. M.

TITLE: Adult education and watershed knowledge in upstate New York

SOURCE: Journal of the American Water Resources Association, no. 3, pp. 609-622, Jun 1999.

ABSTRACT: Integrated watershed management encompasses complex physical and social issues that have impacts on environmental resources. A key aspect of this holistic effort is

public education. Most researchers and practitioners agree that an informed public is a crucial part of the environmental management process. Yet, educational programs that provide stakeholders with information about physical processes in watersheds are often unavailable. This paper assesses the effect of an education program for residents of the New York City watershed. Surveys evaluated certain knowledge levels and attitudes of participants and compared three groups: individuals who utilized the educational materials completely (full users), those who received the materials but did not use them completely (partial users), and watershed residents who did not receive the educational program (nonrecipients). Full users displayed a higher level of knowledge concerning specific watershed processes than did partial users and nonrecipients. In terms of applying that knowledge across linked concepts, however, we observed no significant differences between the three readership levels. Furthermore, partial users engaged in less evaluation of issues that related to the broader watershed context. The findings from this project have implications for educational and regulatory institutions and program development relating to watershed protection.

AUTHOR: Watson, R. K., Murphy, M. H., Kilfoyle, F. E., & Moore, S. M.

TITLE: An opportunistic field experiment in community water conservation

SOURCE: *Population & Environment*, v. 20, no. 6, pp. 545-560, July 1999.

ABSTRACT: This quasi-experimental, seven-year study evaluated the effectiveness of an educative versus a price structuring approach to the strategic management of domestic water consumption. The Knowledge, Attitudes, and Behavior scales of the Water Survey Questionnaire (Watson, Moore, McLachlan, Bradley & Murphy, 1988) measured the effects of the two strategies on water conservation. Two thousand six hundred parents, teachers, high, and elementary students in cross-sectional and longitudinal samples were measured in three data gathering rounds at the first, fourth, and seventh years. In the educative phase between the first and second rounds, water conservation increased. Although there was no significant change in behavior, some decline in positive attitudes and intentions occurred during the price structuring phase between the second and third rounds. The implications of these findings are discussed in relation to other studies. Findings on the stability of inter-group and inter-variable relationships and on the consistency of the measuring instrument across time are also presented and discussed. [References: 15]

AUTHOR: Wolf, A. T.

TITLE: Rural nonpoint source pollution control in Wisconsin: the limits of a voluntary program.

SOURCE: *Water Resources Bulletin*, v. 31, no. 6, pp. 1009-1022, Dec 1995.

ABSTRACT: This paper examines the relationship between best management practices, institutional needs, and improved water quality within the watersheds of Wisconsin's program for controlling rural nonpoint source pollution. The first section describes the federal requirements for state nonpoint source programs and the legislative and management methods the state of Wisconsin uses to put those requirements into practice. The emphasis of the paper, described in the second section, is the institutional difficulty in evaluating the success of a large, integrated water quality program. Measurements which

are investigated include (1) watershed water quality before and after implementation of BMPs; (2) program participation as measured by eligible vs. participating landowners, BMPs considered necessary vs. BMPs implemented, or dollars allocated to the NPS program vs. dollars expended; and (3) institutional goal coordination and management effectiveness. It is found that, despite the size and sophistication of Wisconsin's NPS program, there is little if any improvement in ambient water quality in these watersheds, probably because of a general lack of adequate participation in this voluntary program.

AUTHOR: Wood, Barbara Bonsall

TITLE: Stake's Countenance Model: Evaluating an Environmental Education Professional Development Course.

SOURCE: The Journal of Environmental Education, v. 32, no. 2, pp. 18-27, 2001.

ABSTRACT: The purpose of this study was to evaluate an environmental education professional development course using Stake's Countenance Model as the organizational framework. A complex analysis of 10 course features using 8 evaluation instruments focused on congruence between what was intended to occur and what was actually observed to occur before, during, and after instruction. The Stake model demonstrated its effectiveness by facilitating a thorough examination of both quantitative and qualitative data during all phases of course execution.

AUTHOR: Zint, M., Kraemer, A., Northway, H., & Lim, M.

TITLE: Evaluation of the Chesapeake Bay foundation's conservation education programs

SOURCE: Conservation Biology, v. 16, no. 3, pp. 641-649, 2002.

ABSTRACT: We conducted an evaluation of the Chesapeake Bay Foundation's conservation education programs to determine to what extent they promote participants' environmentally responsible behavior and reduce teachers' perceived barriers to teaching about the bay. We assessed outcomes of five youth- and two teacher-education programs through pre-, post-, and retention-tests and mail questionnaires from samples of current and past participants. Based on improvements in characteristics that promote environmentally responsible behavior, such as perceived knowledge of issues and actions, environmental sensitivity, and—particularly—intention to act, we concluded that the education programs increased some youths' and many teachers' environmentally responsible behavior. We also concluded that the teacher-education programs facilitated teaching about the bay by reducing teachers' constraints. As a result of our evaluation, the Chesapeake Bay Foundation implemented several changes that administrators of similar conservation education programs may also want to consider. These changes include focusing programs to target specific, suitable goals; coordinating programs to provide experiences that build on one another; and conducting periodic evaluations.

AUTHOR: Zipper, C.E.; Rockett, J.S.

TITLE: Locality-based programming: Virginia Tech's Powell River Project.

SOURCE: Journal of Extension, v. 35, no. 6, on-line access, Dec 1997. Available at: <http://www.joe.org/joe/1997december/a4.html>.