A PROCESS FOR DETERMINING APPROPRIATE IMPACT INDICATORS FOR WATERSHED PROJECTS

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Abstract

Watershed project evaluation, especially in urban-focused efforts, typically focuses on water quality improvements, habitat expansion or improvement, and a variety of other positive changes in the physical and biochemical realms. However, watershed projects are ultimately about influencing human behaviors and changing how people interact with the natural resources in the watershed. By including both physical and social indicators of change, a more holistic approach to watershed project evaluation can emerge. A Logic Model for Program Performance was used in group discussions by State Nonpoint Source Pollution (Section 319 Project) Coordinators from the Great Lakes Region to identify a set of common impact indicators for assessing Section 319 projects. These multi-state discussions confirmed the lack of focus on the behavioral and socio-economic components of water quality efforts. Results of these and ongoing discussions will establish a set of impacts that can be used both to develop state and regional reporting procedures and to create a training program for Section 319 project staff.

Introduction

Increased pressures from politicians and agency personnel through program reviews and audits, as well as the federal enactment of the Government Performance and Results Act (GPRA) in 1993, are examples of the ever-expanding focus on program results and impacts. As the demand for accountability in natural resources programming increases, so too will the need for thoughtful, well-planned program evaluations (Davenport, 2002).

Evaluation is a critical dimension of any watershed project. It is most often used in summative or conclusive ways to identify what was accomplished by a project after a specified period of time. But, evaluation can also be a formative element in program planning and implementation, to ensure that projects within those programs are meeting short- and long-term goals. Building evaluation skills and developing the confidence to use those skills is critical for watershed-based staff if they are to answer questions about the effectiveness and efficiency of their programs. While it may not be necessary for educators to become evaluation experts, they do need a fundamental understanding of methods and ethical standards if they are to make evaluation part of overall program design.

Evaluation is the systematic collection of information about the activities, characteristics, and outcomes of programs, personnel, and products, in order to reduce uncertainties, improve effectiveness, and make decisions with regard to what those programs or products are doing and affecting (Patton, 1982). While evaluation includes a look at program impacts, it is different from impact reporting, which focuses on specific program results that may only be important to program stakeholders (Patton, 1997; Bickman, 1985; and Cronbach, 1982) Evaluation measures a variety of outcome data against the program's intent (Bennett and Rockwell, 1995).

Approach

To improve how evaluation is used in watershed projects, six land grant universities in the Great Lakes region (i.e., Illinois, Indiana, Michigan, Minnesota, Ohio and Wisconsin) are working with state and regional coordinators from nonpoint source pollution projects (Section 319). This multi-state effort, which includes participation by the U.S. Environmental Protection Agency Region V office, has been initiated to identify consistent and reliable impact indicators and evaluation processes. A series of small group discussions and interactive training sessions on evaluation is currently being offered to state-level 319 coordinators. Those meetings and interactions will encourage cross-state problem solving and lead to the development of common success indicators for watershed projects.

Discussion

Typically, evaluation is not addressed until late in, or even at the end of, a project. This reactive evaluation is often merely a hunt for positive impacts, and has limited value in either describing the success of a program or in planning future efforts. A more planned, formative evaluation that is integrated into the project from the very beginning can track changes over time.

Formative evaluation (Scriven, 1967) examines issues such as audience needs, current knowledge gaps, prevalent behaviors, and information preferences. Because they are assessed prior to a project's start, these issues can be used to influence the design and implementation of the outreach efforts (King & Rollins, 1999; Lanyon, 1994; Mattocks & Steele, 1994). One barrier associated with formative evaluation approaches is deciding what to measure.

Water quality projects are by nature directed at protecting or improving physical water quality. Biophysical changes to the water are normally the measure of success (Davenport, 2002). While the ultimate goal of water quality projects may be to protect or enhance water quality, there are other impacts to assess, such as increased knowledge, improved skills or the adoption of improved management practices (Rogers, 1995). Research has shown certain management practices to be beneficial to water quality and farm profits, and the promotion of these practices by project staff is at the heart of most water quality outreach efforts. Therefore, both long-term indicators (i.e., physical changes to water quality) and more immediate impacts (i.e., changes in farm management and behavior) were assessed in this study to determine the level and type of evaluation support needed by and from state water quality coordinators.

In prior internal assessments of evaluation processes (Shepard, 2002) used by water quality program staff, only three (10 percent) of the states actually conducted a formative assessment strategy for their project. This involved documenting pre-project needs and audience characteristics specifically for USDA Water Quality program efforts pertaining to the Cooperative State Research Education and Extension Service (CSREES) Water Quality Initiative of the 1990s. When individual project coordinators were asked what information they intended to use to determine program impact, they mentioned a range of indicators, from biophysical environmental (e.g., sediment loading, biotic indexes, etc.) to behavioral (e.g., awareness, knowledge or adoption of practices). When a range of potential indicators was assessed for intended use, it was shown that many states intend to rely on such indicators without any true baseline from which change can be adequately assessed (Figure 1).

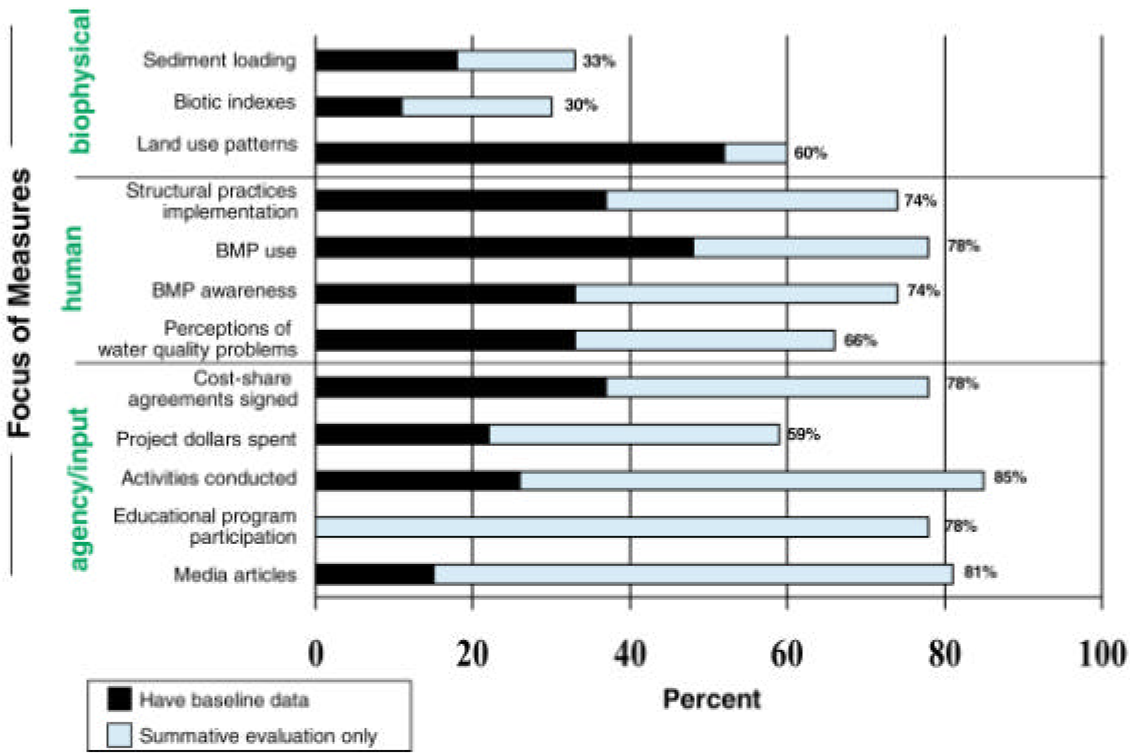

Figure 1. Evaluation Measures Used by CSREES Water Quality Coordinators.

Presentation Focus

This presentation will summarize results from the Section 319 Project Coordinators' group discussions about evaluation and the proposed training program (suggested in the Approach Section above). Results will offer ideas from state and regional project staff as to: 1) the purposes for evaluation, 2) suggested processes and methods, and 3) recommendations for strengthening watershed evaluations. As watershed-based efforts come under more scrutiny, watershed program administrators and funders need to know how to evaluate the success of these efforts. Results from this project are planned to be implemented in 319-funded and other watershed projects by 2004.

An Overview of Results

In fall 2002, an interactive process began with a small group discussion of State Nonpoint Source Pollution (Section 319 Project) Coordinators from Illinois, Michigan, Ohio, Indiana and Minnesota. That meeting on October 23-24 was subsequently followed with a series of email discussions among the state coordinator in order to share ideas about what can and should be the basis of project-level reporting and evaluation.

As a starting point for the exchange of ideas on reporting, the October meeting focused on using the Logic Model for Program Performance as a framework to identify the potential range of program and project impacts. Over the next several months, the ideas generated by that meeting will continue to be discussed and further refined with the intent of developing set of primary program and project-level impacts that can be tracked over time and reported through the existing regional network of Section 319 projects. Again, this paper is a progress report on the development of common indicators for Section 319 projects, and is meant to foster broader discussion through its presentation. The information and data presented here are preliminary and will continue to be refined as a training program is developed in 2003.

To guide the discussion pertaining to what is currently, and what can be, evaluated, the Logic Model for Program Evaluation was used (Figure 2). The Logic Model has been used in a number of disciplines to help identify three levels of programmatic impact referred to as: (1) input, (2) outputs and (3) outcomes.

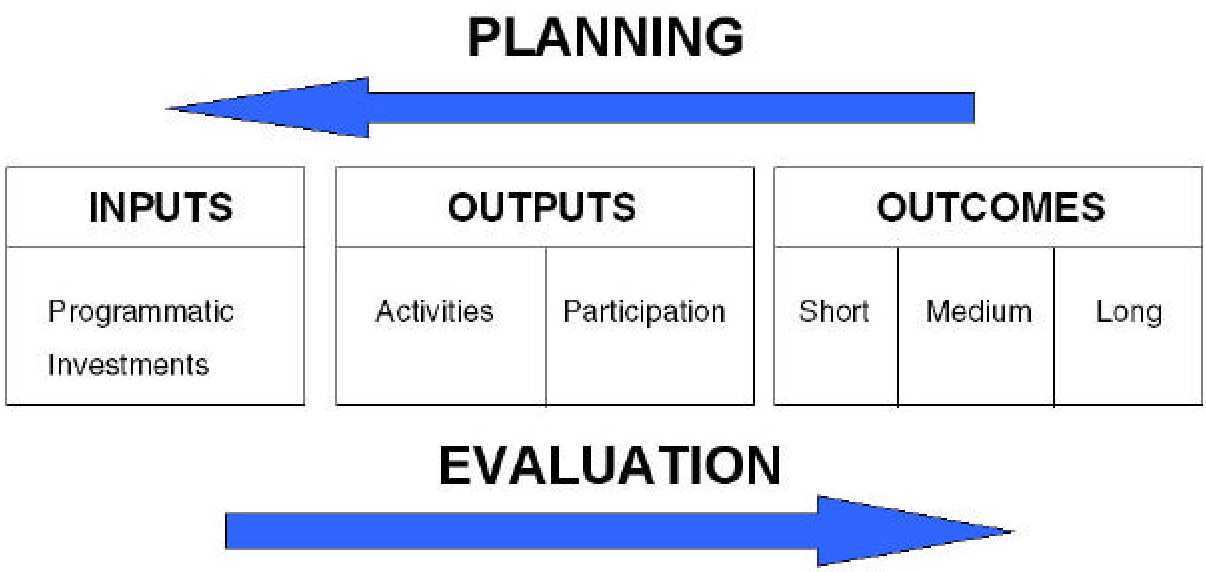

Figure 2. The Logic Model for Program Evaluation (Taylor-Powell, 1998).

Inputs are a category of program investment that includes staff time and dollars invested to conduct the program or project. Outputs refer to those actions that are immediately caused or supported by the initial inputs. Outputs include watershed activities and events. Outputs also can include the initial participation in such activities, like the number of farmers attending a demonstration or field day. Outcomes are those impacts that result from the activities and events of the project. Outcomes are commonly divided into short-, medium- and long-term impacts. Short-term outcomes could include changes in knowledge or the acquisition of specific skills introduced at a demonstration or field day. Medium-range outcomes would include the application of skills or behaviors such as the adoption of improved management practices that were demonstrated by the project. And long-term indicators are most often considered to be actual changes to the environment, such as biophysical improvements in water quality. The Logic Model has relevance to both program planning and program evaluation. If programs/projects begin by identifying the outcomes they are hoping to achieve (top arrow), they will plan the program/project from right to left. As the program/project is implemented, it actually unfolds from left to right (bottom arrow).

In discussions with states in USEPA Region V (during the October 23-24 meeting), the Logic Model was used to help identify the three categories of inputs as they pertain to the Section 319/watershed projects (Figure 3). States and EPA Regional Staff readily identified inputs and outputs, but short- and medium-range outcomes were more problematic.

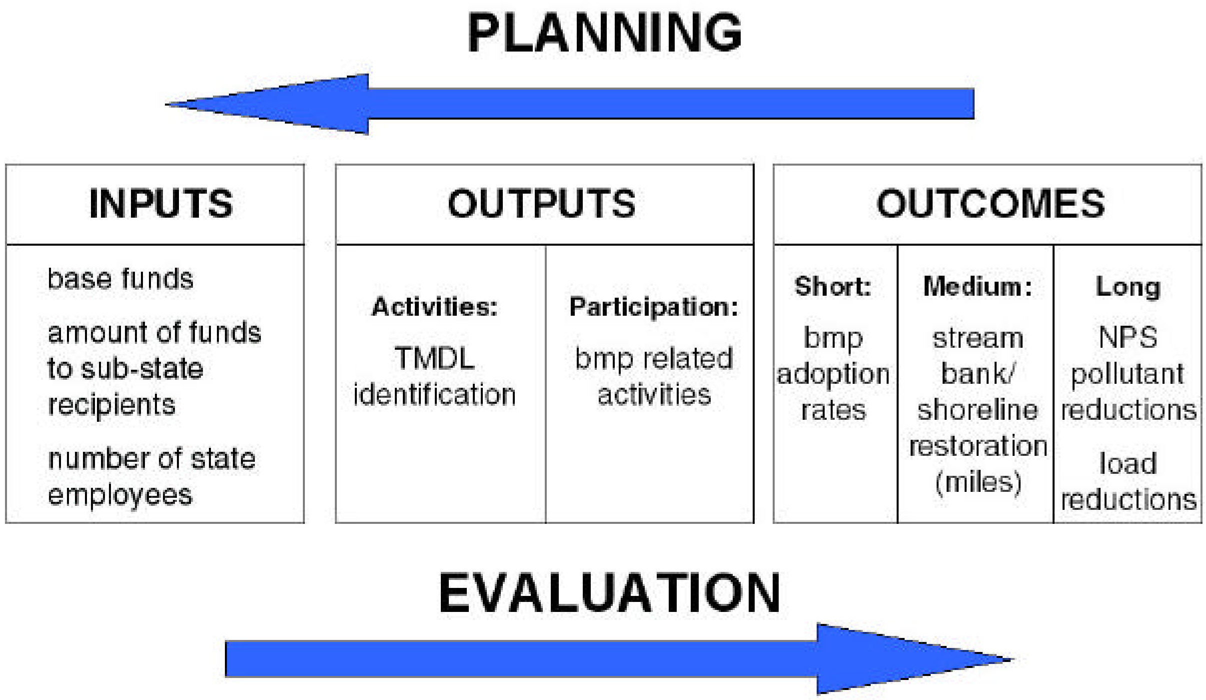

Figure 3. The Logic Model as Built by USEPA Region V Staff (adapted from Taylor-Powell, 1998).

Results from this process have focused much attention on the lack of behavioral and socio-economic indicators in the short- and medium-outcome categories. This finding has not been totally unexpected, given the biophysical orientation of technically trained watershed staff and the emphasis placed on biological and chemical changes to water quality parameters. Few would disagree that water quality programs are primarily about changing or protecting water quality - the natural resource itself. However, concern over the extent of biophysical change that is possible, and the time it takes for those biophysical indicators to change, may be well beyond the political life of a watershed or water quality project. This means our staff and programmatic resources are often focused on five-to-ten year windows of time, while the biophysical indicators may take many more years to show change. Therefore, if biophysical changes in water resources do indeed take much longer than the life of a particular program, then social indicators of change (i.e., short- and medium-range indicators like practice adoption) may be more useful and obtainable as measures of success in the lifespan of the watershed project. Social indicators, in this context, are not considered exclusive, but rather are valuable complements to long-term biophysical outcomes. Watershed projects are about changing the way resources are managed and cared for. After all, human behavior and interactions with the resource may in fact be the true focus of many environmental protection programs, and social science indicators should be given more attention and not merely written off as "soft" or too difficult to measure adequately.

Future Implications

During winter 2002-03, email and conference calls will be used to further complete the Logic Model(s) for each of the Region V states. The goal of this process is to (1) better define a set of impact indicators that can be built in to state and regional reporting procedures; and (2) identify a training and professional development program for Section 319 projects that will help build local/watershed capacity that will support and conduct program evaluation. At this time it is premature to identify the exact curriculum and format for this training and professional development, however, those concepts are expected to be developed by February 2003.

References

Bennett, C. and K. Rockwell, 1995. Targeting Outcomes of Programs (TOP), an Integrated Approach to Planning and Evaluation. (A program planning guide prepared for USDA employees.) Washington, D.C.: Cooperative State Research, Education and Extension Service.

Bickman, L., 1985. Improving Established Statewide Programs: A Component Theory of Evaluation. Evaluation Review, 9(2),189-208.

Cronbach, L.J., 1982. Designing Evaluation of Educational and Social Programs. San Francisco: Jossey-Bass.

Davenport, T.E., 2002. The Watershed Project Management Guide. Lewis Publishers: New York.

King, R. and T. Rollins, 1999. An Evaluation of Agricultural Innovation: Justification for Participatory Assistance. Journal of Extension, 37(4).

Lanyon, L.E., 1994. Participatory Assistance: An Alternative to Transfer of Technology for Promoting Change on Farms. American Journal of Alternative Agriculture, 9(3), 136-142.

Mattocks, D. and R. Steele, 1994. NGO-Government Paradigms in Agricultural Development: A Relationship of Competition or Collaboration? Journal of International Agriculture and Extension Education, 1(1), 54-61.

Patton, M., 1997. Utilization-focused Evaluation. Thousand Oaks, California: Sage. p.20 and p.200.

Patton, M., 1982. Practical Evaluation. Sage: Newbury Park, California.

Rogers, E.M., 1995. The Diffusion of Innovations. (4^{th} ed.). Free Press: New York, NY.

Scriven, M., 1967. The Methodology of Evaluation. In Tyler, R.W., Gagne, R.M. and M. Scriven (Eds.), Perspectives of Curriculum Evaluation (pp. 39-83). Rand McNally: Chicago, Illinois.

Shepard, R., 2002. Evaluating Extension-based Water Resource Outreach Programs: Are We Meeting the Challenge? Journal of Extension, 40(1). Accessible at [http://www.joe.org/joe/2002february/a3.html].

Taylor-Powell, E., 1998. The Logic Model: A Program Performance Framework. Cooperative State Research Education and Extension Service and University of Wisconsin-Extension: Madison, Wisconsin. Accessible at [http://www.uwex.edu/ces/pdande/].

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