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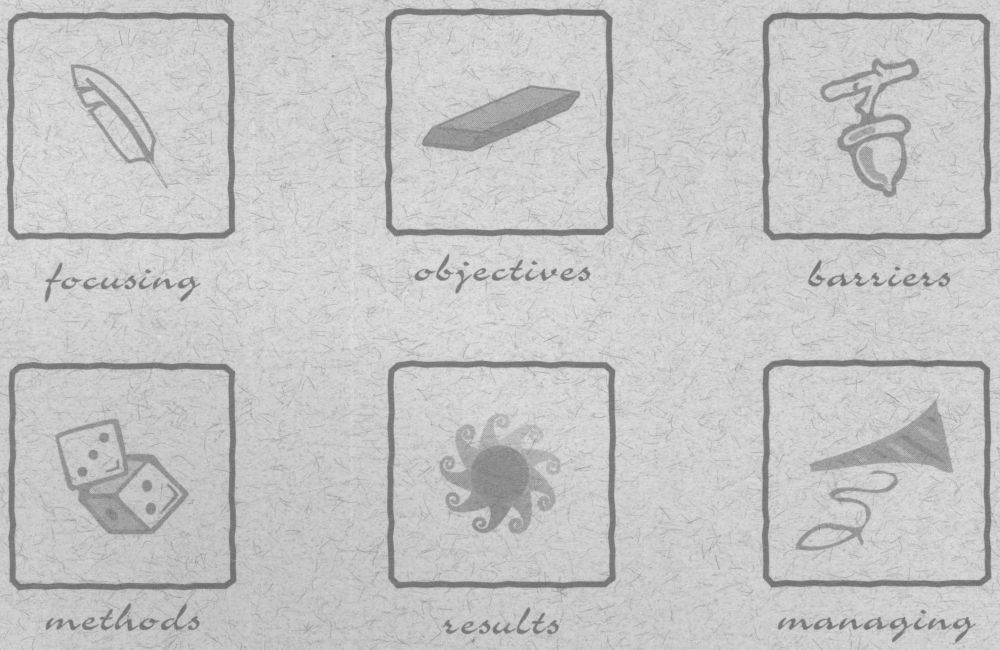

Water Quality Project Evaluation

A Handbook for Objectives-Based Evaluation of Water Quality Projects

THE OHIO STATE UNIVERSITY EXTENSION

Water Quality Project Evaluation: A Handbook for Objectives-Based Evaluation of Water Quality Projects

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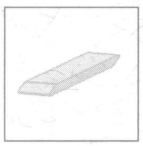

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INTRODUCTION

Evaluation is both an art and a science. While much of the practice of evaluation is based upon well-researched factors, many decisions about program activities can be made through an evaluation which is guided by common sense and practicality.

What's Contained in this Handbook

This Handbook is divided into six steps that encompass a process for planning an objectives-based evaluation. While the objectives-based approach is not the only approach for evaluating programs, it is appropriate for projects that use specific objectives to direct program activities.

Included on the first page of each step is an evaluation analogy. These evaluation descriptions are from past participants in the Ohio Water Quality Projects Evaluation Workshops. They are intended to offer you alternative ways of thinking about evaluation.

Step 1 contains information on how to focus your evaluation. You'll have the opportunity to determine the purpose of your evaluation, the stakeholders involved in your project, and practice writing the critical questions your evaluation must address.

Step 2 focuses on writing measurable objectives and the four pieces of information that a measurable objective should include. You'll practice writing and modifying your project objectives in terms of the A, B, C, D rule.

Step 3 identifies potential barriers to evaluation. You'll focus on anticipating and handling potential barriers to your evaluation project, plus you will identify and address these barriers as they relate to your project.

Step 4 provides an overview for different data collection methods. You'll also practice writing questions for your evaluation instrument. Checklists for writing questions and creating a questionnaire are included.

Step 5 includes a framework for organizing, analyzing, and interpreting data, and then reporting your results. An overview of data analysis methods for both quantitative and qualitative data is highlighted. You'll also practice identifying the various audiences in your project and the type of report results they should receive.

Step 6 discusses how to develop a management plan for your evaluation. Questions such as "how should the evaluation be organized?" and "who should lead the evaluation?" are addressed as well as what kinds of problems can be expected.

How this Handbook was Developed

Since 1990, over 150 projects have been initiated in Ohio to control nonpoint source pollution (NPS) in Ohio's water resources. According to input from nonpoint source specialists at the Ohio Environmental Protection Agency (OEPA), the Ohio Department of Natural Resources (ODNR), and other state and federal agencies, personnel involved in water quality projects have had difficulty demonstrating the impact of their projects. One of the factors affecting this problem is that personnel typically have limited expertise in conducting an evaluation.

In 1994, the Ohio EPA Nonpoint Source Program (Section 319 Grants) supported a pilot project called the "Water Quality Projects Evaluation Workshops." The Project focused on conducting evaluation training workshops for existing, new, and proposed water quality implementation and education projects in the state. The goal of these workshops was to increase the knowledge of personnel from 319 NPS implementation projects about conducting evaluations of their program's impact. The Project was piloted in 1994: five regional workshops were conducted and 87 local, state, and federal personnel received training in objectives-based evaluation. The Project continued in 1995-1996 with one workshop sponsored each year: a total of 43 people attended these workshops.

Based on results from the Project, the team leaders developed **Water Quality Project Evaluation: A Handbook for Objectives-Based Evaluation of Water Quality Projects** to help you in developing an evaluation plan that meets the needs of your project.

Who Should Use this Handbook

This Handbook is intended to be used by people working on water quality projects in government, non-profit organizations, and the private sector. You do not have to be an evaluation expert to plan a practical, reliable, and valid evaluation. The steps contained in the Handbook can be used to guide you through a process for planning a sound evaluation for program activities within your water quality project.

In addition, the information provided in the Handbook can be applied to many disciplines. Therefore, even if you are working in another field, you should still find that most of the information presented here is relevant to your evaluation needs.

STEP 1:

- **What will be evaluated?**
- **What is the purpose for this evaluation?**
- **Who will be affected by or involved in the evaluation?**
- **What are the critical questions the evaluation must address?**

Evaluation is like a bunch of feathers because it lifts you up to get a bird's eye view so you can see the whole picture.

Focusing Your Evaluation

The practice of evaluation involves the systematic collection of information about the activities, characteristics, and outcomes of programs, personnel, and products for use by specific people to reduce uncertainties, improve effectiveness and make decisions with regard to what those programs, personnel, or products are doing and affecting (Brinkerhoff, et al, 1983). Focusing your evaluation is the specification of *what* and *how* you are going to evaluate. The process demands that a number of variables be considered simultaneously.

Focusing is the beginning step in designing an evaluation. The time spent in focusing your evaluation should result in a better project design. Focusing involves progressive attempts, and perhaps numerous drafts and discussions. The answers to the following questions will help guide your evaluation design.

What will be evaluated?

In the space below, identify and describe the "object" to be evaluated for your project:

The information for Step 1 is based, in part, on: *Program Evaluation: A Practitioner's Guide for Trainers and Educators*, by R.O. Brinkerhoff, D.M. Brethower, T. Hluchyj, and J.R. Nowakowski, Kluwer-Nijnoff Publishers, Boston, 1983.

What is the purpose for this evaluation?

To determine the most appropriate evaluation strategy, clarify why this evaluation is taking place. For example, will this evaluation be used to solve a problem, provide on-going feedback to project personnel, or judge the success of the project? Will the evaluation be used as an accountability device to increase awareness, change behavior, or increase public relations? Will the evaluation focus on the improvement and development of an *on-going* activity (formative evaluation), or will it be used to determine whether a project met its goals at its completion (summative evaluation)? Knowing the reason for evaluating will help determine the strategy for generating specific evaluation questions.

Deciding on the purpose for an evaluation is probably the single most important decision initially made about the evaluation. You may find that different stakeholders have different reasons for wanting the same evaluation.

Here are several examples of reasons for evaluating:

- To rank order goals or needs
- To clarify roles or resolve conflicts related to the project design
- To locate problems that prevent the project from working
- To help project personnel make incremental improvements
- To assure the project is being implemented as planned
- To determine immediate outcomes or initial effects
- To improve the project for future implementation
- To determine whether the project is worth the resources it will/has consumed

Describe the purpose(s) for your evalution here:

Who will be affected by or involved in the evaluation?

Most evaluations have multiple groups that will be interested in the evaluation information. Identifying these "stakeholders" and what they want to know is important. Stakeholders are the people or organizations that may be affected or involved in the evaluation project. A stakeholder could be a homeowner in the area being evaluated, and the organizations that work with the local homeowners association. The information needs of stakeholders will provide the basis for the evaluation questions.

In the space below, list four stakeholders involved in your evaluation project. Then list what they want to know about your project.

Who (Stakeholders)	What do they want to know?
1) _____	_____
_____	_____
2) _____	_____
_____	_____
3) _____	_____
_____	_____
4) _____	_____
_____	_____

What are the critical questions the evaluation must address?

Evaluations are apt to suffer from too many questions rather than too few. Worse than too many questions are insignificant questions. Your role as the evaluator is to help the stakeholders identify the critical questions related to the purpose of the evaluation.

Evaluation questions are the basic building blocks for the evaluation. Figuring out the critical questions will help determine the type of information to collect and the best way to collect it.

If clear objectives have been written for the project, they should indicate or help identify the critical evaluation questions.

For example, a project objective states the following:

"Twenty farmers in the watershed will install a cost effective manure management system by December 1995."

Some critical evaluation questions might be:

- Are the manure management systems cost effective?
- How is cost effectiveness determined for each farm operation?
- How do farmers rate the cost effectiveness of these systems?
- How many sytems were installed?
- When were these systems installed?

Another example objective states:

"Landowners along the stream corridor will support the project by voluntarily installing 50-foot wide grass filter strips along the stream bank."

Possible critical questions could include:

- Were filter strips installed?
- What motivated landowners to install filter strips voluntarily?
- What percentage of the installed filter strips were 50 feet wide?

NOTES: Use this space to write notes on evaluating your project.

NOTES: Use this space to write notes on evaluating your project.

Now, write one of your project objectives here:

What are the critical questions your evaluation must address related to this objective?

STEP 2:

- ABCD Rule
- Bennett's Hierarchy

Measurable Objectives (The ABCD Rule)

Most projects have at the outset, a list or set of objectives which outlines what the project intends to accomplish. An objective is a concise statement describing the intent of a project.

Objectives can be judged by several different standards. For the purposes of our approach to evaluation, a "good" objective is one that is **measurable**.

A measurable objective should contain four pieces of information:

Objectives can be written at different levels of complexity. For example, some objectives may describe the basic inputs or resources to be expended in a project (i.e., dollars spent, number of people attending). More complex objectives may describe activities which require changes in attitude or practice on the part of the intended audience.

Evaluation is like an erasure because in evaluating your project you may find it necessary to revise your objectives.

A Audience

An objective should clearly describe the audiences for whom the project is targeted (i.e. people living in the watershed; landowners along the river; Jones County kindergarten children).

B Behavior

An objective should clearly describe what action is expected from the audience (i.e. participants will learn ...; the Soil and Water Conservation District will design ...; farmers will adopt ...).

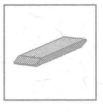
C Conditions

An objective should clearly describe the condition needed for the audience to carry out the desired behavior. Sometimes conditions are assumed, otherwise state them clearly in the objective (i.e. given that the following conditions exist....).

D Degree

An objective should clearly describe the degree or criteria for determining if this objective has been accomplished (i.e. 10% of participants will ....; 150 people will do .....).

Objectives that include all four of these components will be measurable because they clearly state what is to be accomplished and what standard to use in judging the degree of accomplishment.



The information on Bennett's Hierarchy has been adapted from *Workbook for Conducting Program Evaluation by County, District and State Extension Program Personnel,* B. Froke. North Central Regional Publication #114, 1980. Adapted by M. R. Spiegel and C. Leeds, Ohio Cooperative Extension Service, The Ohio State University, August 1992. The example objectives are from "Matching Program Objectives and Evaluation Techniques" (chart) adapted by M. Spiegel, Ohio Cooperative Extension Service, The Ohio State University, July 1992.

Bennett's Hierarchy

Points about Bennett's Hierarchy

☛ Almost every project has objectives that have been written at more than one level of the hierarchy. For example, if the objective is written at Level 4, then evaluation activities can be designed to also evaluate at Levels 1, 2, and 3, even though these lower level efforts may not be specified in the form of an objective.

☛ Evaluations often are designed to measure at more than one level of the hierarchy.

☛ Asking evaluation questions that measure at a level higher than what the activity was intended to accomplish would not make sense.

Our approach to evaluation uses **Bennett's Hierarchy** as a model to describe the various levels at which objectives can be written. Bennett's Hierarchy is a hierarchy for program evaluation developed by Claude F. Bennett (1974). It shows a "chain of events" assumed to characterize most programs in Extension education.

Bennett's Hierarchy has seven levels on a continuum of difficulty from **Inputs** (Level 1) to **End Results** (Level 7), as illustrated below.

1 **Inputs:** What type of personnel (i.e. paid staff; volunteers) and other resources are needed for the project? Example objective: Ninety agency personnel and volunteers will be trained to test wells.

2 **Activities:** What information and activities are needed to disseminate information (i.e. newspaper releases; video shown on local TV)? Example objective: Three hundred brochures and three television spots were developed to help make people aware of the watershed project.

3 **People Involvement:** Who has participated in the program; how often; from what communities; how were the people involved (what did they do for their involvement)? Example objective: Sixty people participated in the water management program.

4 **Reactions:** How did the program participants respond to the activities (i.e. positive; negative; indifferent)? Example objective: Eighty percent of those in attendance at the first streambank protection meeting will indicate that they think the project is worthwhile.

5 **KASA Change: (Knowledge, Attitude, Skills, Aspirations)**

Knowledge Change: What information, understanding and problem-solving abilities were gained by participants? Example objective: Eight people will improve their knowledge about streambank protection.

Attitude Change: How have participants' concerns changed regarding the ideas or practices presented? How have participants' receptiveness to the ideas of practices changed? Example objective: Fifty percent of the participants will change their attitude about filterstrips from indifferent to favorable.

Skill Change: What abilities have participants developed as a result of participating? Example objective: Thirty percent of those attending the residue management workshop will learn how to measure residue cover.

Aspiration Change: What goals have participants established as a result of participation? Example objective: Fifty percent of those in attendance will report that they plan to use the information from the land use workshop to become better stewards of the land.

6 **Practice Change:** What specific practices have participants changed as a result of their participation? Example objective: Ten program participants will implement for at least two years the new techniques for soil testing to make fertilizer recommendations.

7 **End Results:** How have the participants' personal and working lives changed as a result of participation? Example objective: The average annual nitrate concentration will decrease by 50 percent due to changes in farming practices.

☛ If you are interested in impact, i.e., what impact did the project have on participants' behavior, you will have to measure at Level 5 (KASA change) or above, assuming that you have conducted project activities at these levels.

☛ Evaluation information from the higher levels of the hierarchy is often more useful for making decisions about project effectiveness.

☛ Evaluation information from lower levels of the hierarchy may be important to people to whom you report who may not be familiar with the project.

Remember, clearly written measurable objectives are fundamental to successful evaluation because they specify the activity and the criteria that will be used in making judgments about the project.

Now, outline two of your project objectives here. Modify them if necessary. Then, describe the audience, behavior, condition, degree (A,B,C,D rule) for each objective. Refer to the explanations on Page 9 if needed.

Objective #1:

Audience:

Behavior:

Conditions:

Degree:

Objective #2:

Audience:

Behavior:

Conditions:

Degree:

STEP 3:

- Factors that may influence evaluation
- Implications for evaluation

Barriers to Evaluation

Anticipating and handling potential barriers to the success of your evaluation is an important component in the evaluation process. A number of factors may influence the direction and/or success of your evaluation. Listed below are categories of factors that may influence your evaluation. Each factor includes a list of possible implications for evaluation.

Evaluation is like an acorn because it must overcome adverse conditions to grow into a tree.

Organizational Politics:
Is there support for the evaluation? From whom?
Are there opponents? Who are they?
How secure is the project within the organization?

Project Leadership:
Who has control over the project (formally/informally)?
What goals do they have for the project's future?
How does evaluation fit their goals?
Was evaluation a component of the project originally?
Is the project leadership supportive of the evaluation?

Professional Influences:
Are professional groups interested? Who are they?
Are they supportive of an evaluation?
Are there union representatives or private consultants?

History:
How secure or stable is the project?
What has been the tradition or history of self-appraisal or evaluation?
Is the project stable enough to withstand evaluation?
Have evaluations been conducted before?
What information already exists?
What can be learned from past evaluations?

Organizational Setting:
Does the project fit into a larger organizational network?
Where does it fit?
Which decision makers can impact the project?
What kind of information could jeopardize the project?

The information for Step 3 is based, in part, on: *Program Evaluation: A Practitioner's Guide for Trainers and Educators,* by R.O. Brinkerhoff, D.M. Brethower, T. Hluchyj, and J.R. Nowakowski, Kluwer-Nijnoff Publishers, Boston, 1983, and *Educational Evaluation: Alternative Approaches and Practical Guidelines* by B.R. Worthen and J.R. Sanders, Longman Publishers, New York, 1987.

Economics:	Is fiscal support for the project and evaluation secure? Have funds been allocated for the evaluation? Will a written commitment be needed? Is this commitment possible?
Interpersonal Patterns:	How much interpersonal or interagency conflict is likely to occur as a result of the evaluation? Is your evaluation controversial to the staff? Could it be controversial to the target audience? Are apparent factions emerging as a result of discussion of the evaluation?
Legal Guidelines:	Will legal restrictions (rights of human subjects) limit collection of desired information? Will professional or institutional rulings affect the evaluation procedures? Will the project be affected by pending legislation?
Resources:	Are resources (human, financial, time, etc.) available to support the evaluation? How will future changes in resource allocations affect the project and the evaluation? Are the project personnel skilled at conducting an evaluation? Can evaluation support services be accessed by the project personnel? Is there enough time to properly conduct the evaluation? Will some part of the evaluation require facilities that are not readibly available?

As you begin to develop your evaluation plan it is important to identify and address potential barriers as soon as possible. Listed below are a few points that may help you begin to identify and address these barriers to evaluation:

- To uncover serious barriers, try listing (or have colleagues list) reasons why the evaluation cannot be done. These reasons may alert you to potential problems that may not necessarily make the evaluation impossible, but may certainly need to be addressed as early as possible.

- Some barriers may not become apparent until the evaluation is underway. Barriers may become known when talking to key stakeholders, particularly those people that control resources critical for the evaluation (e.g., funding, personnel, and information). Have your stakeholders get involved in identifying barriers.

- Look for opportunities at the same time as you look for limitations. Do not be discouraged by the barriers you identify. Investigate how to design/conduct the evaluation in spite of the barriers. However, do not proceed with the evaluation if you know it is doomed.

- Carefully review prior evaluations of any aspect of the project. Talk to people who conducted previous evaluations. Their investigations may highlight some potential barriers to your evaluation.

Now write down some of the potential barriers to your evaluation. For each potential barrier that you identify, write a statement about how it may affect the direction of your evaluation. Then write a statement about the strategy you will use to overcome the barrier.

Barrier to Overcome	How it may affect my evaluation	Strategy to overcome barrier
Example: Lack of funding from the agency available for evaluation.	*Example:* May not be able to complete or conduct evaluation.	*Example:* Secure funding from another source; reallocate funds at agency for evaluation.

STEP 4:

- Overview
- Writing Questions
- Instrument Construction
- Validity and Reliability Testing
- Implementing Your Questionnaire

Evaluation is like a pair of dice because the outcome is all in the roll.

Methods of Data Collection

Data collection means gathering information to address those critical evaluation questions that you have identified earlier in the evaluation process. There are many methods available to gather information, and a wide variety of information sources. The most important issue related to data collection is selecting the most appropriate information or evidence to answer your questions. To plan data collection, you must think about the questions to be answered and the information sources available. Also, you must begin to think ahead about how the information could be organized, analyzed, interpreted and then reported to various audiences.

What kind of data should be collected?

The information you collect is the evidence you will have available to answer the evaluation questions. Poor evidence is information which cannot be trusted, is scant, or simply is not relevant to the questions asked. Good evidence is information that comes from reliable sources and through trustworthy methods that address important questions.

There are two general types of information: descriptive and judgmental.

Descriptive infomation can include the following examples:

- Characteristics of the project
- Reports of project accomplishments
- Current skill or knowledge levels of project personnel and the target audience
- Amount of participation by the target audience
- Rates of use of an agricultural chemical
- Rates of production of a specific crop
- Policies concerning cost share
- Rules regarding livestock waste application
- Types of participants
- Demographic data

Judgmental information can include the following examples:

- Opinions from experts or consultants
- Consumer preferences
- Target audience's beliefs and values
- Technical agency personnel's interpretation of laws
- Stakeholders perceived priorities
- Farmers interpretation of guidelines

The information in Section 4 is based, in part, on: *Program Evaluation: A Practitioner's Guide for Trainers and Educators*, by R.O. Brinkerhoff, D.M. Brethower, T. Hluchyj, and J.R. Nowakowski, Kluwer-Nijnoff Publishers, Boston, 1983; *EDGE Guide to Evaluation: Analyzing Qualitative Data*, prepared by T.M. Archer, Shelby County Extension, The Ohio State University, 1988; *EDGE Guide to Evaluation: Constructing a Questionnaire*, prepared by C. Leeds, Union County Extension, The Ohio State University, 1992.

What methods should be used to collect data?

There are multiple ways to collect information to answer most questions. The ideal situation would be to collect from more than one source and/or to collect more than one type of information. The selection of a method for collecting information must balance several concerns including: resources available, credibility, analysis and reporting resources, and the skill of the evaluator.

Examples of different data collection methods are given below.

Behavior Observation Checklist: a list of behaviors or actions among participants being observed. A tally is kept for each behavior or action observed.

Knowledge Tests: information about what a person already knows or has learned.

Opinion Surveys: an assessment of how a person or group feels about a particular issue.

Performance tests: testing the ability to perform or master a particular skill.

Delphi Technique: a method of survey research that requires surveying the same group of respondents repeatedly on the same issue in order to reach a consensus.

Q-sorts: a rank order procedure for sorting groups of objects. Participants sort cards that represent a particular topic into different piles that represent points along a continuum.

Self-Ratings: a method used by participants to rank their own performance, knowledge, or attitudes.

Questionnaire: a group of questions that people respond to verbally or in writing.

Time Series: measuring a single variable consistently over time, i.e. daily, weekly, monthly, annually.

Case Studies: experiences and characteristics of selected persons involved with a project.

Individual Interviews: individual's responses, opinions, and views.

Group Interviews: small groups' responses, opinions, and views.

Wear and Tear: measuring the apparent wear or accumulation on physical objects, such as a display or exhibit.

Physical Evidence: residues or other physical by-products are observed.

Panels, Hearings: opinions and ideas.

Records: information from records, files, or receipts.

Logs, Journals: a person's behavior and reactions recorded as a narrative.

Simulations: a person's behavior in simulated settings.

Advisory, Advocate Teams: ideas and viewpoints of selected persons.

Judicial Review: evidence about activities is weighed and assessed by a jury of professionals.

Below are some issues to remember when choosing a data collection method.

Availability: You may have information already available to you that can help answer some questions or guide the development of new guidelines. Review information in prior records, reports, and summaries.

Need for Training or Expert Assistance: Some information collection methods will require special skill on the part of the evaluator, or perhaps staff will need to be trained to assist with the evaluation.

Pilot Testing: You will need to test the information collection instrument or process you design, no matter the form or structure. You will need to plan time for this step and for any revisions that may result from this testing.

Interruption Potential: The more disruptive an evaluation is to the routine of the project, the more likely that it will be unreliable or possibly sabotaged by those who feel they have more important things to do.

The practical concerns that should be considered when selecting methods include:

Protocol Needs: In many situations, you need to obtain appropriate permission or clearance to collect information from people or other sources. You will have to allow time to work through the proper channels.

What information is already available?

How much money do you have to spend on data collection?

What procedures are feasible?

Do you have the staff and time to implement the data collection?

Reactivity: You do not want "how" you ask something to alter the response you will get. Reactivity may also be a concern if your presence during data collection may possibly alter the results. For example, if you as a supervisor are administering an opinion survey about a specific project, the responses your employees give may be influenced by their desire to please you as their supervisor, rather than based on their true feelings.

Bias: Bias means to be prejudiced in opinion or judgment. Bias can enter the evaluation process in a variety of ways. For example, if you use a self-selected sample (when a person decides to participate in a study, rather than being picked randomly by the researcher), how might these respondents be different from the people that chose not to participate?

Reliability: Will the evaluation process you have designed consistently measure what you want it to measure? If you use multiple interviews, settings, or observers, will they consistently measure the same thing each time? If you design an instrument, will people interpret your questions the same way each time?

Validity: Will the information collection methods you have designed produce information that measures what you say you are measuring? Be sure that the information you collect is relevant to the evaluation questions you are intending to answer.

How much information should you collect?

Sampling refers to selecting a portion of subjects in order to learn something about the entire population without having to measure the whole group. The portion taken is known as the sample. When you sample, you do so to learn something about a population without having to measure the whole group, which in many cases might be quite large.

There are two general types of sampling methods: random and purposive. Random methods are used to produce samples that are, to a given level of probable certainty, free of biasing forces. In a random sample, each individual in the population has an equal chance of being chosen for the sample. Purposive methods are used to produce a sample that will represent specific viewpoints or particular groups in the judgment of those selecting the sample. The purposive sample consists of individuals selected deliberately by the researcher.

Here are some questions to consider when deciding whether to sample:

- Should you use a sample of a population or a census (an entire population, such as all people living in the watershed)?
- Should you use a random or purposive sample?
- How large a sample size do you need?
- Is your sample likely to be biased?

In the space below, list several methods of collecting information that you plan to use:

_____

_____

_____

_____

_____

_____

_____

NOTES: Use this space to write notes on evaluating your project.

The following table tells you the number of people you must survey to accurately represent the views of the population under study.

For example, you may want to understand how all of the residents in a city feel about a particular issue. If the city population is 70,000 people, then the sample size will be 382 people (find the number 70,000 under the Population column: to the right is the sample size of 382). That's the number of people you'll have to include in order to make generalizations about the entire city population.

A Sample Size Table for Proportions

Degree of Accuracy: +/-0.05 **Confidence Level: 95%**

Population	Sample	Population	Sample	Population	Sample
10	9	230	144	1400	301
15	14	240	147	1500	305
20	19	250	151	1600	309
25	23	260	155	1700	313
30	27	270	158	1800	316
35	32	280	162	1900	319
40	36	290	165	2000	322
45	40	300	168	2200	327
50	44	320	174	2400	331
55	48	340	180	2600	334
60	52	360	186	2800	337
65	55	380	191	3000	340
70	59	400	196	3500	346
75	62	420	200	4000	350
80	66	440	205	4500	354
85	69	460	209	5000	356
90	73	480	213	6000	361
95	76	500	217	7000	364
100	79	550	226	8000	366
110	85	600	234	9000	368
120	91	650	241	10,000	369
130	97	700	248	15,000	374
140	102	750	254	20,000	376
150	108	800	259	30,000	379
160	113	850	264	40,000	380
170	118	900	269	50,000	381
180	122	950	273	60,000	381
190	127	1000	277	70,000	382
200	131	1100	284	120,000	382
210	136	1200	291	160,000	383
220	140	1300	296	1,000,000	383

Table adapted from *Figuring Things Out: A Trainer's Guide to Needs and Task Analysis*, by R. Zemke and T. Kramlinger, Addison-Wesley Publishing, Reading, MA, 1986.

Writing Questions

This section focuses on what questions to ask and how to write them.

At some point you will probably need to design your own instrument. At minimum, you will have to modify an existing instrument.

In Step 1 you began the process of developing your questions, as you wrote several critical questions your evaluation needs to answer. Now you should start writing the specific questions that you will ask your target audience.

The importance of exact wording in each question is very significant. A great deal of research has studied the effects of question wording and style on responses. While writing good questions may seem to be more of an art than a science, some basic principles for writing questions can serve as a guide for developing a written instrument.

Below is a checklist you can use when forming your questions:

- ❑ Is this question necessary? How will it be useful? What will it tell you?
- ❑ Will you need to ask several related questions on a subject to be able to answer your critical question?
- ❑ Do respondents have the necessary information to answer the question?
- ❑ Will the words in each question be universally understood by your target audience?
- ❑ Are abbreviations used? Will everyone in your sample understand what they mean?
- ❑ Are unconventional phrases used? If so, are they really necessary? Can they be deleted?
- ❑ Is the question too vague? Does it get directly to the subject matter?
- ❑ Can the question be misunderstood? Does it contain unclear phrases?
- ❑ Is the question misleading because of unstated assumptions or unseen implications? Are your assumptions the same as the target audience?
- ❑ Have you assumed that the target audience has adequate knowledge to answer the question?
- ❑ Is the question too demanding? For example, does it ask too much on the part of the respondent in terms of mathematical calculations, or having to look up records?
- ❑ Is the question biased in a particular direction, without accompanying questions to balance the emphasis?
- ❑ Are you asking two questions at one time?
- ❑ Does the question have a double negative?
- ❑ Is the question wording likely to be objectionable to the target audience in any way?
- ❑ Are the answer choices mutually exclusive?
- ❑ Is the question technically accurate?
- ❑ Is an appropriate referent provided? For example: per year, per acre.

Practice Writing!

Write three questions you will ask in your evaluation. Then evaluate the questions using the checklist on the previous page and edit your questions as needed.

After this practice session, you should be able to write most of the questions for your evaluation. Once you have a set of questions written, you are ready to put them into some form of an instrument.

Instrument Construction

An instrument is the tangible form on which you elicit and record information. There are many types of instruments and in some cases, you may be the instrument. Instruments must be carefully chosen or designed. Sloppy or improper instruments can destroy an evaluation effort. Designing instruments is a complex process. An option is to find an instrument that already exists, and adapt it to your evaluation effort. While using an already designed instrument may save some development time, you need to make sure that its use is valid for your evaluation.

Creating a Questionnaire

Of all the data collection methods listed in Step 4, questionnaires are a widely used method of collecting information. They can be a cost-effective way to reach a large number of people or a geographically diverse group.

After writing the questions you want to ask, a few other items must be considered before creating your questionnaire.

General guidelines for questionnaire format, cover letter, and envelopes:

Once the questions are written, they must be organized into some type of structure. The format could be assembled as a booklet, or as single sheet of paper that is stapled together in the corner. The questionnaire should include the following key elements:

Cover Letter: A questionnaire should always be sent accompanied by a cover letter. The letter should include the title of the questionnaire, the purpose of the study, why and how the participant was selected to receive the questionnaire, and who is sponsoring the research. Also included should be the names of the project sponsor and contact person, and addresses and phone numbers for these persons. Remember to include a deadline for returning the questionnaire.

Questionnaire Introduction: State the pupose of the questionnaire, why it is being conducted, who is sponsoring the research/ the agency responsible for the questionnaire. In essence, a short recap of some of the information included in the cover letter.

Instructions: Give clear instructions on how to answer the questions. For example, will the answers be circled or will a check mark be used? Will the respondent be expected to fill in a blank? If there are open-ended questions, is the question written so that the respondent needs to answer with more than a "yes" or "no" response? Are there clearly written instructions that tell the respondent to skip to a particular section on a designated page?

Grouping Questions: Group questions with similiar topics together in a logical flow. Use a transition statement when moving to a new topic within the questionnaire. For example, state: "Next we would like to ask you several questions about the vegetative filter strips used on your land."

Demographic Questions: Place all demographic questions at the end of the questionnaire. Demographic questions include asking a person's age, gender, amount of formal education, ethnic group, etc. Ask only the demographic information you need to know for analyzing data.

Other Comments: Allow space on the questionnaire to ask respondents to share any other comments.

Thank You: Remember to thank the respondent for completing the questionnaire.

What to do with the questionnaire: At the end of the questionnaire, repeat the deadline for returning the completed instrument, and the name and address of the person it should be mailed to. Always include the "mail to" address in case the enclosed envelope is misplaced by the respondent.

NOTES: Use this space to write notes on evaluating your project.

Arranging Questions

The first rule in arranging questions is to put the most important question first. After reading the cover letter explaining the purpose of the survey, the first thing a respondent should find on the questionnaire is a question that relates directly to that purpose.

Here are some additional tips on ways to arrange questions so they are clear and easy to answer.

▶ Make each question fit on the same page. Never force respondents to turn a page in the middle of a question or flip pages back and forth to answer a question.

▶ Provide instructions on how to answer each question. Place directions in parentheses using lower case letters.

For example:

Since attending the workshop, which of the following management practices have you used? (circle each answer that applies).

▶ Arrange questions and the space for answers in a vertical flow. Put the answer choices underneath, instead of next to the questions. This way the respondent moves down the page rather than side to side.

For example:

Do you own a no-till drill?

1) Yes
2) No

▶ If using yes/no or other repeated answers, always keep answer categories in the same order from question to question.

For example:

1) Yes
2) No

Do <u>not</u> switch to:

1) No
2) Yes

▶ Use multiple columns to conserve space and make the question less repetitious.

For example:

How much of an effect did the watershed programs have on your farming operation? (circle the response that best represents your feelings; if you did not participate in the program circle DP.)

	No Considerable Effect			Some Effect		Did not Participate
Filter Strip Program	1	2	3	4	5	DP
Equipment Buy Down	1	2	3	4	5	DP
Conservation Tax Incentive	1	2	3	4	5	DP
Prescription Farming Educational Series	1	2	3	4	5	DP

▶ Group questions of similar subject matter together. Suppose you were constructing a questionnaire that asked questions about three topics such as vegetative filter strips, grass water ways, and conservation practices. You should organize the questions so that one section contains questions that relate specifically to vegetative filter strips; one section contains questions that relate specifically to grass water ways; and one section contains questions that relate specifically to conservation practices.

Designing the Front and Back Cover:

The front cover of your questionnaire is important because it is the first thing the respondent sees. The front cover should include:

- A simple concise title of the study.
- A graphic illustration.
- Your name and address and your role in the research study.
- Name and address of your sponsor.

The back cover should be kept simple. Use the back cover to ask for additional comments if there wasn't room for this within the questionnaire. You can also include a thank you and instructions for mailing the questionnaire on the back cover.

Use the following checklist when evaluating your questionnaire.

Checklist for Evaluating Your Questionnaire:

- ❑ A cover letter accompanies the questionnaire.
- ❑ Title of questionnaire will appeal to respondents.
- ❑ Questionnaire looks easy to complete.
- ❑ Print quality is clear and legible.
- ❑ Introduction is concise and relevant.
- ❑ Instructions are brief.
- ❑ Instructions are clear.
- ❑ Instructions are provided for each question or series of very similar questions.
- ❑ All questions are essential and relevant to the objective of the survey.
- ❑ Wording is at an appropriate literacy level for the survey population.
- ❑ Initial items are applicable to all members of the survey population.
- ❑ Initial items are non-threatening.
- ❑ Initial items are interesting.
- ❑ Items with similar content are grouped together.
- ❑ Adequate space is provided for respondents to write answers.
- ❑ Each question fits within the boundary of the page.
- ❑ All questions are arranged in a vertical flow.
- ❑ Demographic questions are at the end.
- ❑ A "thank you" is included at the end of the questionnaire.
- ❑ Instructions for mailing the questionnaire are included at the end.
- ❑ A self-addressed stamped envelope is included for each respondent.

NOTES: Use this space to write notes on evaluating your project.

The information on validity and reliability is based, in part, on: *Program Evaluation: A Practicioner's Guide for Trainers and Educators*, by R.O. Brinkerhoff, D.M. Brethower, T. Hluchyj, and J.R. Nowakowski, Kluwer-Nijnoff Publishers, Boston, 1983, and materials prepared by R.D. Nieto, Ohio State University Extension, and J.L. Henderson, Agricultural Education, The Ohio State University, April 1995.

Validity and Reliability Testing

Establishing the validity and reliability of the instrument is an important aspect of instrument development and testing. This should be done before the instrument is administered to the target population. Validity and reliability are the benchmark criteria for assessing the quality of the instrument.

What is validity?

Validity asks the question "Does the instrument measure what you want it to measure?" An instrument that is valid for a specific situation or audience may not be valid in a different situation or for a different audience.

How do you establish the validity of the instrument?

Establishing the validity of an instrument includes a review of the instrument by a panel of experts, and a field test. The general procedures are as follows:

- ☆ Clearly define what you want to measure (e.g., dollars spent, knowledge level, attitude, people involvement, behavior change).
- ☆ Locate or develop questions to include in the instrument. Search for existing instruments related to your evaluation focus and topic of interest. These may be useful as a guide in developing the new instrument.
- ☆ Develop a draft of the instrument in consultation with some of your primary stakeholders and colleagues.
- ☆ Select five to seven people to serve as a panel of experts. These people should be knowledgeable in the specific content area of the instrument. This group will review the instrument in terms of content, format, and audience appropriateness. It is very important that you inform the panel of the purpose of the instrument.
- ☆ Once the panel reviews the instrument and provides you with comments and suggestions for revision, revise the instrument using the panel's comments for guidance.
- ☆ Conduct a field test to establish the validity of the instrument in terms of suitability, utility, and clarity. Select eight to ten people to participate in a field test to review the instrument for clarity, content, wording, and length. These people should have characteristics similar to those of the target audience. For example, if you plan to have farmers as your target population, then field-test the questionnaire with a different group of farmers in an adjacent watershed.

☆ *more* →

☆ Once the field test results are received, address these comments as you revise the instrument.

☆ After the validity is established, the reliability of the instrument needs to be tested through a pilot group. The people in the pilot group should not be the same participants from your field-testing.

What is reliability?

Reliability asks the question: "Does the instrument consistently give the same results with the same group of people under the same condition?" Other words that are used synonymously with reliability are accuracy, dependability, consistency, and stability.

How do you establish the reliability of the instrument?

Pilot tests are used to establish reliability of the instrument in terms of accuracy and consistency. The general procedures are as follows:

- Select 15 to 20 people to participate in the pilot test. They will be asked to complete the entire instrument twice. These people should have characteristics similar to those of your target population.
- Administer the instrument to this group.
- Within seven to ten days, administer the same instrument to this same group.
- Compare the scores (referred to as a "paired score") for each question on the two sets of instruments. A high percentage of agreement between the paired scores indicates a reliable instrument. (Use 70% as an acceptable percentage level.)
- Questions within the instrument receiving low percentage agreement need to be revised or deleted.
- If major revision is required, the instrument's validity testing will need to be repeated.

NOTES: Use this space to write notes on evaluating your project.

Implementing Your Questionnaire

Now that you have developed your instrument, tested its validity and reliability, it is time to put your questionnaire to use. The following guide offers an outline to follow when implementing your questionnaire.

Mailing Lists: You will need to either develop your own mailing list for your target population, or use one that already exists. Make sure you carefully review the names and addresses for each respondent. It is possible that a person may appear more than once on a list due to slight changes in how they are entered.

For example:

Stephen T. Jones
121 Main Street
Pleasantville, OH 43324

Compared to:

Steve Jones
121 Main Street
Pleasantville, OH 43324

In the above example, notice that the first address used the person's proper first name and middle initial, and the second address uses the person's nickname with no middle initial. But since the address is the same, you can be assured that this is the same person. You'll need to decide which form of the first name to use. You can save postage and paper (and time) by making sure that each potential respondent is entered just once on your mailing list.

Coding: After you have developed and reviewed your mailing list, you need to make copies of your questionnaire for each participant. Then you should code each questionnaire with a number written clearly on the front page, top right corner of each copy. Then record each number next to a person's name from your mailing list, so that you know which person received what number questionnaire.

For example, a coding list would contain each person on your target list and his or her questionnaire number:

#1: Nancy Anderson
#2: Michael Ingles
#3: Stephen Jones
#4: Amanda Smith

The reason for coding each questionnaire is so that you'll be able to follow-up with the people who did not respond (non-respondents)to your questionnaire by your deadline. In addition, you'll want to refer to the coding number in your cover letter and assure your target population that the numbers will be used only to follow-up with non-respondents, that no one else has access to their numbers, and that all information will be kept confidential.

Mailing your questionnaire: There is some debate among researchers if there is really a great difference in how many people will respond to your questionnaire if you use stamps as opposed to metered mail; if you hand address each envelope versus using mailing labels. The reason behind this debate is that a hand-written, stamped envelope is more likely to catch a respondent's attention, and therefore be opened, than an envelope that looks like "junk mail." The decision is up to you. If you are mailing out a large number of questionnaires, then it may not be feasible, in terms of time, to hand address each envelope. Nor may it be practical to individually place a stamp on each envelope. But human nature tells us that people are more likely to open mail that appears more "personal." The decision is yours; maybe you can use a combination of these approaches and use mailing labels with stamped (not metered) envelopes. And don't forget to include a cover letter, and self-addressed stamped envelope for returning the questionnaire.

Non-respondents: The reason you went through the trouble of coding all the instruments is so that you can follow-up with those people that don't respond to your survey. The people that don't return their questionnaire within a reasonable timeframe (one week after your deadline) need to be sent a reminder notice. A first-reminder notice can be in the form of a postcard. If the postcard does not yield results, then another copy of the questionnaire (with the same code number for the respondent), with a reminder cover letter should be sent to each non-respondent.

For more information on the topics covered in Step 4, please refer to the Resources for Further Reading Section at the end of this Handbook.

STEP 5:

- Factors that may influence evaluation
- Implications for evaluation

Organizing, Analyzing, Interpreting, Summarizing, and Reporting Results

Once the instrument development and testing process is underway, it is time to start developing your plan to handle the information you will collect. This is an important process. At this point, you should develop the process that will organize, analyze, interpret, summarize, and report your results. This is also the point where you may need the help of a consultant. Each component for Step 5 is addressed below. The information in this step is intended to serve as a starting point and overview. For more detailed information, we suggest that you refer to the recommended resources at the end of this Handbook.

Evaluation is like a pinwheel because it revolves and your project should revolve around evaluation.

Organize

Before you being to collect the first piece of information, you must develop a system to organize your data. Proper organization and planning will help insure that the data will be kept secure and organized for the analysis.

Tips for organizing your evaluation data:

- Set up a protocol on how to receive and record the information as it comes in. For example, one person on the project team should be in charge of handling all incoming mail.
- Label all data immediately as you collect or receive it. For example, label cassette tapes with name of interviewee, interviewer, and any other pertinent information. If you are receiving questionnaires returned by mail, check them off, record the date received, code and number, and add any other information needed.
- As data are received, check to be sure that the participant has completed the entire instrument correctly, that interviewers have used the proper questioning route, etc. You do not want to discover after all data are collected that there are errors. If data are being transcribed or transferred in some way, check to be sure that this is done accurately throughout the process.

■ *more* →

Some of the information in Section 5 on analyzing qualitative data was adapted from the *EDGE Guide to Evaluation: Analyzing Qualitative Data*, prepared by T.M. Archer, Shelby County Extension, the Ohio State University, 1988, and *Qualitative Research for Education,* by R.C. Bogdan and S.K. Biklen, Allyn and Bacon Publishers, Needham Heights, MA, 1992. Information on reporting information was adapted from the *EDGE Guide to Evaluation: Communicating Evaluation Results*, by V.L. Douglas, College of Education, The Ohio State University, and R.A. Rennekamp, College of Agriculture, The Ohio State University, 1987.

- Back up all computer disks containing data.
- Set up a protocol for accessing the data including who has, or does not have access.
- Establish a secure place and way to store all data. If destroyed or lost, data cannot be replaced. If data are confidential they should be stored in a locked place so that only the staff member working with the data has access.
- Set up a system to track all data. This will be your system to check that data are not lost or overlooked as analysis and summarizing are completed.
- Develop a format for storing and organizing your data prior to the analysis. For example, you could use a spreadsheet program to enter the raw data.

Now, briefly list and describe the following:

1) Who will be responsible for the organization of your data?

_____

_____

2) How will your data be organized as they are received?

_____

_____

3) Where will data be stored?

_____

_____

4) Who will have access to the data?

_____

_____

Analyze

The first step in analyzing data is to determine what method of data analysis you will be using. If most of the information you collected contains numbers, then the data is quantitative data. If the information you collect consists of words, then the data is qualitative data.

With quantitative data the analysis does not begin until all data are collected. In contrast, most qualitative data analysis begins as data are collected. For example, when conducting interviews, the transcripts are analyzed as soon as possible in order to generate additional questions for follow-up interviews.

Quantitative Data Analysis

If most of the information you collected contains numerical (quantitative) data, then descriptive statistics can be used to characterize your data. Some of the more commonly used descriptive statistics are mean, mode, standard deviation, and frequency.

Definitions:

Mean: The average score of the sample.

Median: The score halfway between the high and low score.

Mode: The response given most often.

Standard Deviation: The distance from the mean in which 66% of the responses can be found.

Frequency: How often a particular response was given.

For example, consider the data set for the following question:

Question: On a scale of 1 to 5, where 1=poor and 5=excellent, how would you rate the overall quality of the workshop?

Answers from 10 respondents: 4; 5; 2; 4; 3; 4; 3; 3; 5; 4

The ***mean*** for this data set is 3.7 (the total 37 divided by 10 scores).

The ***median*** for this data set is 3.5 (this is the score halfway between the lowest score of 2 and the highest score of 5)

The ***mode*** for this data set is 4 (this is the score reported most often).

The ***standard deviation*** for this data set is .95 (in this data set a majority of the scores were close to the mean of 3.7). See note below.

The ***frequency*** for each response is as follows: 1: no responses
2: one response
3: three responses
4: four responses
5: two responses

Please note, for the sample data set above, a handheld calculator with a standard deviation feature was used to determine the standard deviation for this example. If you are working with larger data sets, computer programs such as SPSS or QuatroPro can be used to calculate descriptive statistics.

NOTES: Use this space to write notes on evaluating your project.

Qualitative Data Analysis

Bogdan and Biklen (1992) describe qualitative data analysis with the following definition:

Data analysis is the process of systematically searching and arranging the interview transcripts, field notes, and other materials that you accumulate to increase your own understanding of them, and to enable you to present what you have discovered to others. Analysis involves working with data, organizing them, breaking them into manageable units, synthesizing them, searching for patterns, discovering what is important and what is to be learned, and deciding what you will tell others.

If most of your data collection was done using individual interviews, focus group interviews, open-ended questions, or case studies, then your data will be in the form of words (qualitative data). Unlike being able to use a hand calculator or computer program to analyze your numerical data, the qualitative data of words need to be analyzed initially by reading and sorting through the data.

With qualitative data, the challenge is how to organize the information you have collected. How the data is ordered, categorized, and arranged is important because most qualitative data are words that must be intrepreted for content.

Researchers who specialize in qualitative analysis use a method called Content Analysis. This process will include carefully reading the information, and then identifying, coding, and categorizing the main themes, topics, and or patterns in the information. Coding is simply attaching some alpha-numeric symbol to phrases, sentences, or strings of words that follow a similar theme or pattern. This process allows you to then place these phrases of similar themes into a category for further analysis.

There are several strategies that can be employed to help with content analysis. One example from Bogdan and Biklen contains ten different coding categories as a method for sorting qualitative data. These categories are:

Setting/Context: these are data related to the evaluation setting.

Definition of the situation: these types of data tell how the people in the study define the setting, or define the topic; for example, what is their worldview about their work.

Perspectives held by subjects: the information focuses on ways of thinking, such as shared ideas held by the participants.

Subjects' ways of thinking about people and objects: this category is more detailed than the previous one; the codes include data that focus on people's understanding of each other, and of their world.

Processes: these data include codes and phrases that categorize sequences of events, and changes that occur over time.

Activities: codes include behaviors that occur on a regular basis.

Events: the information in this category of data is categorized in relation to specific activities in the evaluation setting, or in the lives of the people interviewed.

Strategy: these are the methods and techniques that people use to accomplish various tasks.

Relationships and social structures: this type of information focuses on friendships, adversaries, mentors, romances, enemies or other individual relationships.

Methods: data in this category are related to project or evaluation procedures, problems, successes, barriers, dilemmas, etc.

Using computer programs to help code qualitative data is yet another tool for coding and categorizing data. Computer programs for analyzing qualitative data, such as Ethnograph or NuDist, are available through most university bookstores. It's important to note that a computer program will not analyze the data, but rather reduces the amount of time in handling volumes of text.

What's important to understand from this discussion of quantitative and qualitative data analysis methods is that the analysis methods used will differ from one evaluation setting to another. There is no single prescription for conducting analysis that fits every situation. When conducting an evaluation you need to recognize this and base your data analysis methods on the nature of your data.

In the table below, describe the possible methods that may be used to analyze your evaluation data. The first two blocks serve as examples.

Type of Data	Data Analysis Method
1) Data from questionnaires that asked participants to rate their responses on a scale of 1 to 10.	I will determine the mean, standard deviation, and mode for each question.
2) Transcripts from interviews with five participants in the study.	After reading each transcript thoroughly, I will develop categories for each major theme, or topic, that emerges from the transcripts.
3)	
4)	
5)	
6)	

Interpret

After the data have been analyzed, it is time to interpret the results. Put simply, interpretation is the process of bringing meaning to the data. You may ask yourself, "what does it all mean?"

When interpreting the data you must sift through the mass of results and identify trends, commonalties and testimony that will help answer the critical evaluation questions that were generated in Step 1. If the evaluation is to be useful, the evaluator must interpret the information so that the stakeholders will understand the results and know how to use them.

Below is an exercise in data interpretation.

Emerald Lake users were asked to rate their familiarity with several programs on a scale of 1 to 5, with 1=not being familiar with the program, and 5=being very familiar with the program. The table below lists the programs and the average score each received.

Program	Average Score
Dredging	3.34
Conservation Reserve	2.09
Septic System Improvement	2.72
Citizens Lake Improvement	1.82
Emerald Lake Hydrologic Unit Area	1.44

How would you interpret these results? Think about the following when interpreting the information above:

What programs were the most familiar to Emerald Lake users?

What programs were the least familiar to Emerald Lake users?

What recommendations would you make based on these results?

Now, write down your interpretation of the results in the Emerald Lake Scenario:

Reporting Results

When conducting a project, we tend to spend most of our time planning an evaluation, developing a measurement instrument, and analyzing the data, but spend little time in disseminating the results of the evaluation to the appropriate audiences. Many people do not realize the importance of sharing the findings from the evaluation to individuals who have a stake or interest in the project.

Functions of Reporting Results

Information generated by the evaluation is often used for specific purposes. This information is used by people in different ways depending on their relationship to the program. The main functions of reporting include:

- Reporting serves as a basis for further program development and improvement.
- Reporting provides support for continuing or expanding the program.
- Reporting serves as a basis for public relations and promoting future programs.

The evaluation report may take several different forms, including: technical reports, professional meeting papers, popular press articles, news releases, public meetings, media appearances, staff workshops/ meetings, memos, or individual discussions. You'll want to consider how the data will be presented. What will be the layout? Will tables, graphs, and/or pictures be used?

Report Content

It's important to consider the audience for your report. For example, your project sponsor will probably require a comprehensive formal report that includes the project history, achievements of the project, evaluation findings, future considerations, and budget expenditures. People that donated equipment used in the project would probably be most interested in a report that focuses on how their donation was used and the number of people benefiting from their equipment.

NOTES: Use this space to write notes on evaluating your project.

Evaluation reports must clearly identify the purpose for which the evaluation was conducted. In general, a useful, general report outline includes:

- A description of the program (including program scope, purpose and emphases, methods, audience, etc.). A nice touch is to include pictures of project activities.
- A summary of program accomplishments, benefits, impact, and social consequences. Include pictures, charts, or tables.
- Implications of the results, how these results could be used, and recommendations for the project.

The following outline is an example of what is included in a formal written report of an evaluation project.

(1) Title Page: Includes the name of the evaluation project, the agency or organization conducting the evaluation, the funding source for the program and other sponsors, the project leader.

(2) Abstract: Provides an overview of the report's contents.

(3) Table of Contents: Lists where to find specific information in the document.

(4) Introduction: Includes the purpose of the report, an overview of the evaluation project, and how to put the report to best use.

(5) Background Information: Gives the reader a description of the project being evaluated.

(6) Evaluation Methodology: This section usually states the need for the project, identifies the groups involved in the project, lists the objectives of the evaluation, and describes the types of data collected and how data were used. Also included may be a description of the data collection techniques and the procedures used for data analysis.

(7) Results: The actual findings of the evaluation project are presented here. You should also include information on how the findings of the project can be used in future programs. Include recommendations that can be made based on the data generated by the research.

(8) Summary and Recommendations: Offers a conclusion to your report. Include an overview of the main highlights from the report in your summary. Also include recommendations for future projects and evaluation that may still be needed.

(9) Appendix: Appendices can be used to include information not presented in the main part of the report such as survey instruments used.

Your report may be organized differently depending on the requirements of your main sponsor, or primary stakeholders.

The following list reviews the things to consider when preparing an evaluation report:

- Is the report clear? Comprehensive? Concise?
- Does the evaluation report follow a logical sequence?
- Is the report complete?
- Are summary comments on conclusions justified and documented with evidence from the evaluation project?
- Are opportunities provided for feedback, discussion, and confirmation?
- Are human rights and privacy protected?
- Does the report maintain the integrity of the evaluation process?

Although you are still developing your evaluation plan, you should begin to consider the reporting process. In the chart below, complete as much as possible at this stage of your planning. As your project progresses, you may want to revise the chart with additional information. The first three blocks are examples of the types of reports you may want to prepare for your sponsors and other stakeholders.

Individuals, Groups, or Agencies Needing the Information	Type of Report	When to Report
Funding sponsor	Interim written report	Half-way through the project
Extension agents	Oral report at monthly meeting	At quarter-point in project
Project Volunteers	Project Newsletter	Bi-monthly

STEP 6:

- Who Should Lead the Evaluation?
- How Should Evaluation Tasks be Organized or Scheduled?
- How Should Evaluation Responsibilities be Formalized?
- How Much Should the Evaluation Cost?
- What Kinds of Problems can be Expected?
- Management Considerations

Developing the Evaluation Management Plan

Just as you developed a management plan for your water quality project, you should develop a management plan for your evaluation. The management plan is not a legal contract, it is not the evaluation design, nor does it determine the evaluation purpose and questions. Instead, these items help guide the implementation of the plan. There are several ways to develop a management plan, and for each method there are key questions that must be addressed to enhance the successful completion of your evaluation. These questions are:

- Who should lead the evaluation?
- How should evaluation tasks be organized and scheduled?
- How should evaluation responsibilities be formalized?
- How much should the evaluation cost?
- What kinds of problems can be expected and what plans are in place to address these problems?

Each of these questions are addressed below.

Evaluation is like a noisemaker because it trumpets the results of a successful project.

Who Should Lead The Evaluation?

Whether your project decides on one person or a team, a part-time consultant or a full-time manager/evaluator, you will want to obtain the best possible leadership for the evaluation, and remain within the allotted project budget. The decisions about whether to use project staff versus an external evaluator, an individual person versus a team, a part-time versus full-time person, or an amateur versus a professional, can be difficult to answer.

Deciding who will be responsible for drafting, monitoring, and supervising the formalized evaluation management plan is very important. One person should have this responsibility, and if this person is not the evaluation leader, he or she should work closely with the evaluation leader.

The information in Section 6 is based, in part, on: *Program Evaluation: A Practitioner's Guide for Trainers and Educators* by R.O. Brinkerhoff, D.M. Brethower, T. Hluchyj, and J.R. Nowakowski. Kluwer-Nijnoff Publishers, Boston, 1983; *How to Focus an Evaluation* by B.M. Stecher and W.A. Davis, Sage Publications, Newbury Park, CA, 1987; and personal project management notes of L.C. Brown.

The responsibilities of this person, or team, may be quite demanding. Depending upon the evaluation design, the evaluation leader(s) or team may need to be responsible for:

- Conceptualizing the evaluation
- Designing the evaluation
- Constructing instruments
- Collecting data
- Analyzing data
- Devising methods to code, store and access data
- Negotiating with audiences
- Preparing contracts
- Writing reports
- Delivering reports
- Interpreting and making recommendations
- Managing and interacting with personnel

Of course there may be other tasks that may become the responsibility of the leader(s) or team, and that is why you need to determine the evaluation questions and evaluation purpose, with input from the stakeholders, early in the process.

In the space below, list some of the skills that you think the evaluation leader for your project should have:

_____

_____

_____

_____

_____

_____

_____

How Should Evaluation Tasks Be Organized and Scheduled?

When the project team, the evaluation leader, and the major stakeholders meet and ask "What must be done, when and by whom?" the evaluation management plan begins to take shape. The breakdown of tasks and activities emerges, and these should be put into some logical organizational structure.

The evaluation management plan provides a structure that helps the evaluation leader chart activities. It provides a system for tracking progress. There are many formal and informal structures that can be used for the purposes of the plan. At a minumum, a management plan should include the following elements:

- The evaluation design and a general plan specifying what is to be done.
- Specific activities that must be accomplished.
- When each activity needs to be conducted and completed.
- Who will be responsible for each activity.
- How each activity will be accomplished.
- What resources are available to conduct each activity.
- What resources are available to conduct the evaluation.
- Updates on design changes to revise and/or refine the evaluation management plan as time passes.
- Contingency plans for addressing problems that may arise.

Once the evaluation plan is developed, but before it is implemented, the evaluation leader should develop some mechanism to track progress. For many projects, this is usually accomplished by developing a timeline, and tracking the progress of all elements of the timeline. The timeline will usually include all major tasks and activities, who is responsible, the duration of time the task is to be completed, and a deadline for an outcome, or product.

There is no one structure for a timeline. Below is a simple example structure that may be applicable to your project evaluation activities.

Timeline for Jones Creek Project Evaluation

Activity	Person Responsible	Month/Week Jul 1 2 3 4 Aug 1 2 3 4 Sep 1 2 3 4 Oct 1 2 3 4 Nov 1 2 3 4	Outcome/ Product Deadline
Objective 4 1) Develop evaluation questions with stake-holders	Larry		July 8
2) Identify data collection method, design instrumentation, develop data analysis plan	Christy		July 30
3) Test the instrument and revise	Christy		Aug 15
4) Implement the evaluation instrument, collect data, including followup	Rob		Sept 15
5) Receive, check, organize, code com-pleted instruments	Larry/Rob		Sept 30
6) Analyze data	Christy		Oct 30
7) Interpret and summarize data	Christy/Larry/Rob		Nov 15
8) Report the results to sponsor	Christy/Larry/Rob		Nov 15

How Should Evaluation Responsibilities Be Formalized?

Your project team, with input from your project's major stakeholders, will likely decide who will be responsible for the evaluation. Likewise, this group will probably make the decision about what type of contract or agreement, formal or informal, will need to be considered. Below are several issues that may need to be considered in the development of an agreement with members of the project team, or consultants who will help conduct portions of the evaluation.

- Purpose of the evaluation
- Major evaluation questions
- Methods to collect information
- Procedures that will be used to analyze the information
- Deadlines for outcomes or products
- When and how the results will be reported
- Bias concerns
- Client services
- Timeline
- Revisions
- Meta-evaluation (an evaluation of all previous project evaluations, and using the results of the meta-evaluation to make recommendations)
- Budget

How Much Should The Evaluation Cost?

The budget is the plan for obtaining and using resources to conduct all parts of the evaluation. Going through the process of developing a budget gives you another opportunity to review the evaluation design.

The major categories that should be included in an evaluation budget include:

- Personnel (wages, salaries and fringe benefits, etc.)
- Consultant fees
- Materials and supplies
- Travel and per diem
- Data handling, processing, analyzing, reporting
- Computers (software, hardware, service)
- Reproduction services, printing, duplicating, shipping (postage)
- Publication services, printing
- Conferences, meetings, other reporting avenues
- Contingencies (an event that may occur but that is not intended; a possibility).
- Overhead (office space, utilities, phone, fax, computers, copy machine)

NOTES: Use this space to write notes on evaluating your project.

Important evaluation tasks that may require detailed thought and attention in order to develop cost estimates include:

- Salary for the evaluation leader
- Type of information to be collected
- Amount of information needed
- Method of information collection
- Location of the information sources
- Timeline
- Cost of personnel involved in collecting, analyzing, and reporting

A general rule of thumb is that the evaluation budget should be about ten percent of the project's overall budget. However, this value should be considered only as a starting point.

For all projects, there is a need for accountability. Tips for promoting fiscal accountability within the management plan include the following points:

- Maintain accurate financial records with public access, as appropriate.
- Document comparison shopping or contract bidding for goods and services.
- Document changes in the design or environment which brings about budgetary adjustments.
- Account for dollars spent on evaluation objectives and tasks.
- Systematically review the budget in light of evaluation progress.
- Report fiscal information in interim and final reports for public record, for the project sponsor, and the stakeholders.

What kinds of problems can be expected?

Murphy's Law states that if something can go wrong, it will. So, plan on problems and develop contingency plans to work around or through these problems. A valuable way to be able to detect a problem is to thoroughly monitor your progress (good use of your timetable). The earlier you detect a problem, the better able you will be to resolve the problem and continue towards a successful evaluation.

Evaluation literature and experience indicates that certain problems may have a great likelihood of occurring during the evaluation. For instance, problems may occur with the overall evaluation focus; the evaluation design; data collection; data analysis; the reporting strategy, etc. The following chart emphasizes some of the areas of concern for several important elements of an evaluation. For each element, a few common problems are listed along with possible solution strategies. Studying the information in the chart may help you detect and successfully address these and other problems as they occur.

Evaluation Element	Area of Concern	Some Problems to Anticipate	Solution Strategy
Evaluation Focus	**1. Purpose**	• Purpose of research becomes unconvincing • Additional purpose emerges	• Revise or add purpose or cancel the evaluation.
	2. Evaluation Questions	• Questions become invalid • More questions need to be added • Questions need to be refined	• Refine, add, delete evaluation questions and check congruence with evaluation purpose.
	3. Audiences/ Stakeholders	• Audience changes • Important stakeholders were overlooked • Audiences react negatively to evaluation	• Add stakeholders initially overlooked • Provide debriefing, open discussions, public information
Designing the Evaluation	**1. Evaluation Approach**	• Existing evaluation technique forced on project • No personnel to run selected evaluation approach	• Provide alternative evaluation designs • Change design or bring in a consultant
	2. Design Issues	• Inability to address all relevant design issues • Design issues change • Design will not provide valid information	• Select and justify issues to address • Monitor design issues and refine to meet needs • Cancel evaluation design or change it
Collecting Information	**1. Information Sources**	• Existing sources are not tapped • Desired information not available • Limited information available	• Carefully review what already exists and attempt to use • Use multiple or alternative information sources
	2. Procedures	• Appropriate procedures limited • Procedures impractical • Procedures not trustworthy according to audiences	• Review alternative with experts • Simplify if too costly • Use procedures that are credible to audiences
	3. Information scope	• Too much information available • Too little information available • Much of the information is not reliable	• Sample using relevant criteria • Use multiple information sources (people, documents, tests)

Evaluation Element	Area of Concern	Some Problems to Anticipate	Solution Strategy
Analysis Plan	**1. Returned Data**	• Data unreliable, missing, messy • Data cannot be synthesized	• Monitor evaluation design to prevent data problems • Design so that categories are determined in advance
	2. Data Worth	• Data will not answer evaluation questions • Data are not believable	• Establish credible and appropriate evidence in advance
	3. Analysis Procedure	• Difficulty understanding data and what they indicate	• Try different methods of analysis • Use graphs and visual aids to help with understanding • Justify appropriateness of analysis
	4. Interpretation	• Disagreement exists about what information "means"	• Interpret information from several different viewpoints • Provide audience alternative perspectives in report
Reporting Strategy	**1. Report Purpose**	• Different audiences want different information • One report would not be applicable to everyone • Information is too technical	• Plan for and provide multiple reports in different formats • Provide lay-person definitions and summaries
	2. Audiences	• New audience becomes interested • Audiences confused about how to use report	• Include new audiences in written or oral report schedule • Tell audiences specifically how to use report for their needs
	3. Content	• Disagreement about what should be in report • Client wants to delete material	• Outline proposed area to be included at outset, guarantee balance
	4. Delivery	• Audiences want reports at different times	• Specify schedule in advance and follow it. Provide on-going communication and updates

Management Considerations

Based on the materials that were covered in the previous Steps, briefly list and describe any evaluation element or considerations for your project objectives that relate to the management of the evaluation. You may need to go back to Steps 1 and 2 to review your objectives. Include the areas of concern for each objective, problems to anticipate, and possible solution strategies. Also, refer to the information in the previous chart to assist you with this task.

Objective 1:

Area of Concern: _____

Potential Problem: _____

_____

Solution Strategy: _____

_____

Objective 2:

Area of Concern: _____

Potential Problem: _____

_____

Solution Strategy: _____

_____

Objective 3:

Area of Concern: _____

Potential Problem: _____

_____

Solution Strategy: _____

_____

Now, write down who will be responsible for each of the elements or considerations listed above. Specify by name and job title, if possible.

1._____

2._____

3._____

NOTES: Use this space to write notes on evaluating your project.

Conclusion:

Water Quality Project Evaluation: A Handbook for Objectives-Based Evaluation of Water Quality Projects is based on a pilot project that focused on conducting evaluation training workshops for existing, new, and proposed water quality implementation and education projects in Ohio. This Handbook emphasized a step-by-step process for planning an objectives-based evaluation. We hope that this resource has proved helpful to you in developing an evaluation plan that meets the needs of your project.

Please continue your education in planning and conducting an evaluation of water quality projects, or evaluation of other programs, by referring to the resources listed below.

For Further Reading:

General Educational Research and Evaluation

Ary, D., Jacobs, L., and Razavish, A. (1995). Introduction to research in education (4th ed.). New York: Holt, Rinehart, and Winston.

Brinkerhoff, R.O., Brethower, D.M., Hluchyj, T., Nowakowski, J.R. (1983). Program evaluation: A practioner's guide for trainers and educators. Boston, MA: Kluwer-Nijnoff Publishing.

Creswell, J.R. (1994). Research design: Qualitative and quantitative approaches. Thousand Oaks, CA: Sage Publications.

Kerlinger, F.N. (1987). Foundations of behavioral research. (3rd ed.). New York: Holt, Rinehart, and Winston.

Vogt, W.P (1993). Dictionary of statistics and methodolgy: A nontechnical guide for the social sciences. Thousand Oaks, CA: Sage Publications.

Survey Research Methods

Fink, A. (1995). How to analyze survey data. Thousand Oaks, CA: Sage Publications.

Fink, A. (1995). How to ask survey questions. Thousand Oaks, CA: Sage Publications.

Fink, A. (1995). The survey handbook. Thousand Oaks, CA: Sage Publications.

Rea, L.M. and Parker, R.A. (1992). Designing and conducting survey research: A comprehensive guide. San Francisco, CA: Jossey-Bass.

Salant, P, and Dillman, D.A. (1994). How to conduct your own survey. New York: John Wiley & Sons, Inc.

Stouthamer-Loeber, M. and Bok Van Kammen, W. (1995). Data collection and management: A practical guide. Thousand Oaks, CA: Sage Publications.

Telephone Surveys

Dillman, D.A. (1978). Mail and telephone surveys: The total design method. New York: John Wiley and Sons.

Frey, J.H. and Oishi, S.M. (1995). How to conduct interviews by telephone and in person. Thousand Oaks, CA: Sage Publications.

Groves, R.H. (ed.) (1989). Telephone survey methodology. New York: John Wiley and Sons.

Lavrakas, P.J. (1993). Telephone survey methods: Sampling, selection, and supervision. (2nd ed.). Thousand Oaks, CA: Sage Publications.

Mail Questionnaires

Berdie, D.R. (1986). Questionnaires: Design and use. (2nd ed.). Metuchen, N.J.: Scarecrow Press.

Bourque, L.B. and Fielder, E.P. (1995). How to conduct self administered and mail surveys. Thousand Oaks, CA: Sage Publications.

Dillman, D.A. (1978). Mail and telephone surveys: The total design method. New York: John Wiley and Sons.

Mangione, T.W. (1995). Mail surveys. Thousand Oaks, CA: Sage Publications.

Sampling

Fink, A. (1995). How to sample in surveys. Thousand Oaks, CA: Sage Publications.

Henry, G.T. (1990). Practical sampling. Thousand Oaks, CA: Sage Publications.

Reliability and Validity

Litwin, M.S. (1995). How to measure survey reliability and validity. Thousand Oaks, CA: Sage Publications.

Morris, L.L., Fitz-Gibbon, C.T., and Lindheim, E. (1987). How to measure performance and use tests. Thousand Oaks, CA: Sage Publications.

Traub, R.E. (1994). Reliability for the social sciences: Theory and application. Thousand Oaks, CA: Sage Publications.

Attitudinal Measures

Fishbein, M. (ed.) (1967). Readings in attitude theory and measurement. New York: John Wiley and Sons.

Henerson, M.E., Morris, L.L. and Fitz-Gibbon, C.T. (1987). How to measure attitudes. Thousand Oaks, CA: Sage Publications.

Mueller, D.J. (1986). Measuring social attitudes: A handbook for researchers and practitioners. New York: Teachers College Press.

Face-to-Face Interviews

Fowler, F.J., and Mangione, T.W. (1989). Standardized survey interviewing. Newbury Park, CA: Sage Publications.

McLaughlin, P. (1990). How to interview: The art of making questions. North Vancouver, B.C.: International Self Counsel Press.

Rubin, H.J. and Rubin, I.S. (1995). Qualitative interviewing. Thousand Oaks, CA: Sage Publications.

Focus Group Interviews

Aubel, J. (1994) Guidelines for studies using the group interview technique. Geneva: International Labor Office

Greenbaum, T.L. (1993). The handbook for focus group research. New York: Maxwell MacMillan International.

Stewart, D.W. and Shamdasani, P.N. (1990). Focus gourps: Theory and Practice. Thousand Oaks, CA: Sage Publications.

Templeton, J.F. (1994). The focus group: A strategic guide to organizing, conducting, and analyzing the focus group interview. Chicago, IL: Probus Publications.

Delphi Techniques

Linstone, H.A. and Turoff, M. (1975). The Delphi method: Techniques and applications. Reading, MA: Addison Wesley Publishing.

Weaver, W.T. (1971). The Delphi forecasting method. Phi Delta Kappan, 52 (5), 267-273.

Observational Research

Jorgensen, D.L. (1989). Participant observation: A methodology for human studies. Thousand Oaks, CA: Sage Publications.

Wheelan, S.A. (1979). Do you see what I see?: An introduction to systematic observational methods. Philadelphia, PA: Center for the Study of Psychoeducational Process.

Qualitative Research

Bogdan, R.C. and Biklen, S.K. (1992). Qualitative research for education: An introduction to theory and methods (2nd ed.). Needham Heights, MA: Allyn and Bacon.

Denzin, N.K. and Lincoln, Y.S. (eds.) (1994). Handbook of qualitative research. Thousand Oaks, CA: Sage Publications.

Glesne, C. and Peshkin, A. (1992). Becoming qualitative researchers: An introduction. White Plains, NY: Longman Publishing.

Patton, M.Q. (1990). Qualitative evaluation and research methods (2nd ed.). Thousand Oaks, CA: Sage Publications.

Morse, J.M. (ed.) (1993). Critical issues in qualitative research methods. Thousand Oaks, CA: Sage Publications.

Summary Notes:

Contacts for help with my evaluation: