

Utilizing the **LOGIC MODEL** for Program Design and Evaluation

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Glossary of Important Outcome Measurement Terms

baseline - data about the condition or performance prior to the educational intervention

(i.e. statewide % of low-birth weight; number of vandalism reports; standardized test scores; school dropout rate; number of accidents involving teen drivers; recidivism rate; water quality)

benchmarks - performance data used either as a baseline against which to compare future performance or as a marker to assess progress towards a goal

(i.e., periodic behavior checklist ratings; amount of debt; academic grades)

evaluation - the systematic collection and analysis of information to determine the worth of a curriculum, program or activity

input - resources that go into a program to achieve its goals, outputs and outcomes (i.e., staff, volunteers, time, money, materials, equipment, technology, partners)

impact - the long-term outcomes of a program (i.e., social, economic, civic or environmental impact)

outcomes - end results or benefits the participants get from a program. Outcomes can be:

- intended or unintended
- positive or negative

Outcomes fall along a continuum from immediate to short-term to long-term. Long-term outcomes are called impact. Examples are listed below.

immediate outcomes - awareness created, knowledge gained, attitudes changed, skills developed, aspirations sparked

short-term outcomes - behavior changed, practice adopted, decisions made, policies changed or adopted, social action initiated

long-term outcomes - social, economic, civic, environmental impact

outcome indicators - the observable, measurable characteristics or changes that represent achievement of an outcome

(i.e., absenteeism, score on an attitude survey or completed homework assignment could all be indicators for developing a positive attitude towards school)

outcome target - numerical objective for a program's level of achievement (i.e., percent, number, quality rating)

outputs - activities, products, services, and participation that result from the inputs (i.e., **activities** such as workshops, camps, curriculum, publications, media event, web site, projects, test plots, field days, and the number, characteristics, and reactions of **participants**)

qualitative methodology - methods that examine, describe or interpret phenomena (i.e., observation, open-ended interviewing, and document review)

quantitative methodology - refers to an approach involving the use of numerical measurement and data analysis methodology (i.e., standardized, structured data collection including surveys, closed-ended interviews, tests and behavior checklists)

reliability - the extent to which measures from an instrument are consistent. Reliability is usually measured by a Cronbach Alpha. The closer an alpha is to 1.0, the more reliable the instrument

(i.e., an instrument with a .85 is more reliable than one with .65. No instrument can have a reliability of 1.00)

validity - the extent to which a measure from an instrument actually captures the concept being measured



Evaluation - What Is It?

Evaluation means different things to different people and takes place in different contexts. Although many definitions have been developed, the one most appropriate for use within the Extension context is:

"The systematic collection and analysis of information to determine the worth of a curriculum, program or activity." (Alkin 1990)

The word **systematic** means the evaluation must be planned as an integral part of the design or planning process. It is not just an "event" that occurs at the end.

Worth can be a measure of:

1. the quality or satisfaction level leading to program **improvement**, or
2. the effectiveness as a means to **demonstrate** the impact of the program or that the targeted outcomes have been achieved.

Both kinds of "worth" continue to be important for Extension professionals. However because of the increased accountability demands, this manual will focus primarily on measuring the impact of programs, otherwise called "outcome evaluation."

Why Measure Outcomes?

Basically, the answer to that question is **to see if programs really make a difference in the lives of the participants and communities.**

As you gather outcome data, it can be used in a variety of ways:

- To help improve programs and services.
- To be accountable in order to retain or increase funding.
- To gain valuable information to use in decision making and long range planning.
- To focus programs that can really make a difference for participants.
- To determine cost-effectiveness.

- To gain support from the community to aid in sustainability.
- To gain public and professional recognition as a quality program.
- To attract new participants
- To recruit and retain talented staff.
- To recruit and motivate volunteers.
- To take pride in accomplishment.

Remember an **outcome measurement** provides an ongoing means for educators and specialists to track the percent of participants that achieved the targeted outcomes, but it does not prove that the program, and the program alone, caused the outcomes. This is a key difference between outcome measurement and **program impact research**, which uses sophisticated statistical methods and random assignment of participants to either the program or to a control group.

Levels of Outcomes

Each program is unique and aimed at achieving a range of different outcomes. As you are developing your evaluation plan, it is important to define what you want to evaluate.

In some cases, you may only be interested in finding out how participants responded to your teaching style or how satisfied they were with a program. This is good information to help you improve the program next time.

In other cases, you want to document the impact the program had on the participants or whether the program achieved the targeted outcomes. ***Don't expect to measure impact from a single workshop or behavior changes from a program with limited contact hours*** (i.e., 45-minute school enrichment program, 1 1/2-hour training).

The point is to tailor your evaluation to fit the program. ***Remember, not all Extension work needs to be formally evaluated. Be selective and think about what information is needed and how it will be used.*** If you are interested in outcome evaluation, here's a framework for thinking about different levels of outcomes.



Outcomes can be classified under three major levels: learning, action and impact.

The specific outcomes you can measure are as follows.

LEARNING LEVEL

Awareness Created
Knowledge Gained
Attitudes Changed
Skills Developed
Aspirations Sparked

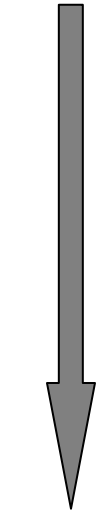
ACTION LEVEL

Behavior Changed
Practice Adopted
Decisions Made
Policies Changed or Adopted
Social Action Initiated

IMPACT LEVEL

Social Impact
Economic Impact
Civic Impact
Environmental Impact

Immediate



Long-Term

It is important to determine the level of outcome you desire to reach as you plan your program. Your evaluation should be an integral part of the program planning process and not an afterthought.

Remember, outcomes may be positive, negative, or neutral; intended or unintended.

Program Logic Model

One effective method for linking program design and evaluation is the program logic model. A program logic model is a picture of how your program works - the theory and assumptions underlying the program. This model provides a **roadmap for your program**, outlining how it is expected to work, what activities need to come before others, and how desired outcomes are achieved. In simple terms, it gives a visual picture of what inputs and outputs are needed to achieve the desired outcomes.

▶ INPUTS

What resources and contributions by Extension and others are needed to achieve our goals?

- people (staff, partners, volunteers)
- time
- money
- materials
- equipment
- technology

These inputs are converted into

▶ OUTPUTS

What activities do we need to conduct to ensure our goals are met?

- workshops
- meetings
- publications
- media events
- web site
- test plots
- field days
- projects

Who needs to participate, be involved or reached?

- characteristics (youth, parents, leaders, mothers on WIC, etc.)
- number
- their reactions

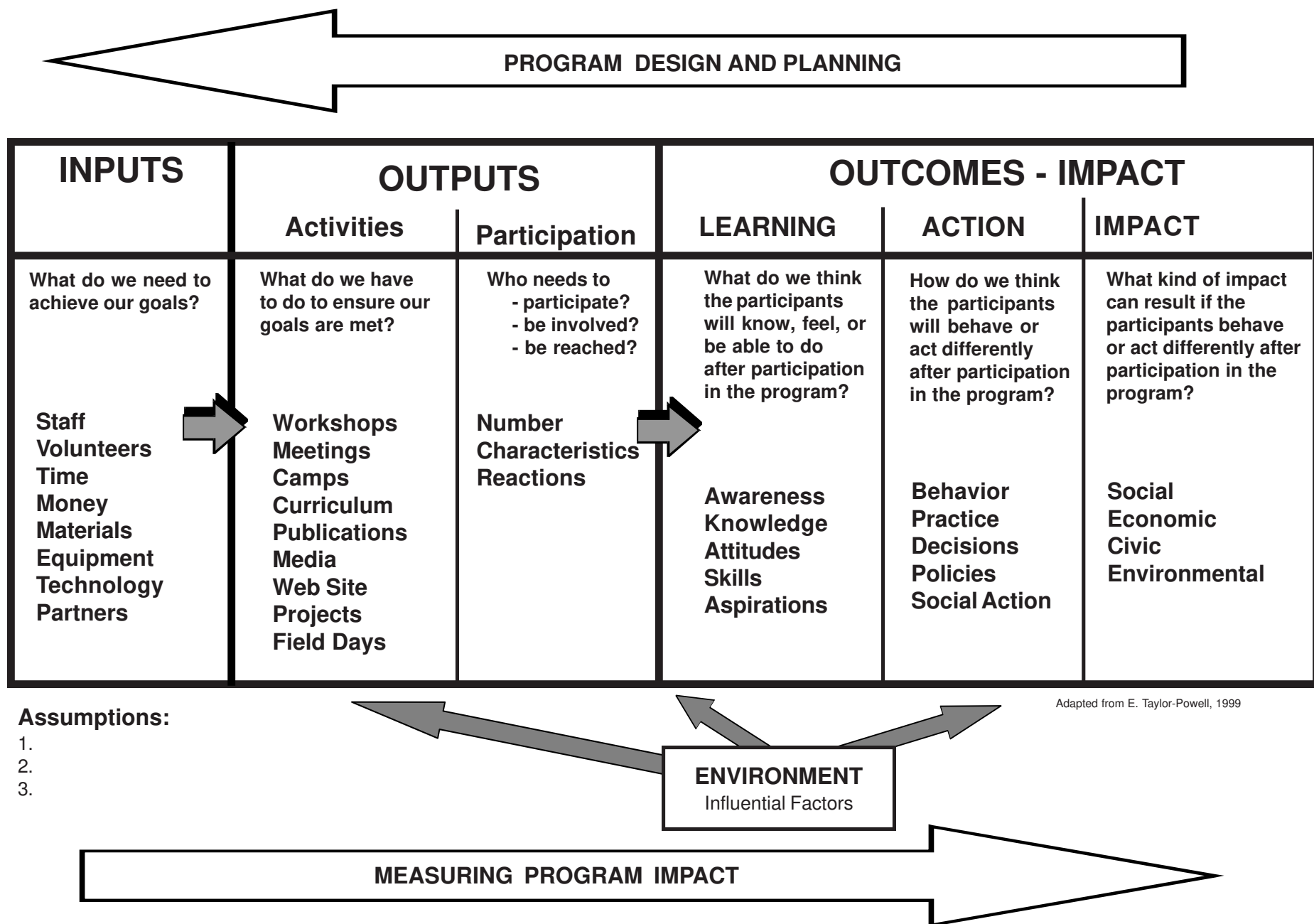
These outputs are intended to achieve certain

▶ OUTCOMES

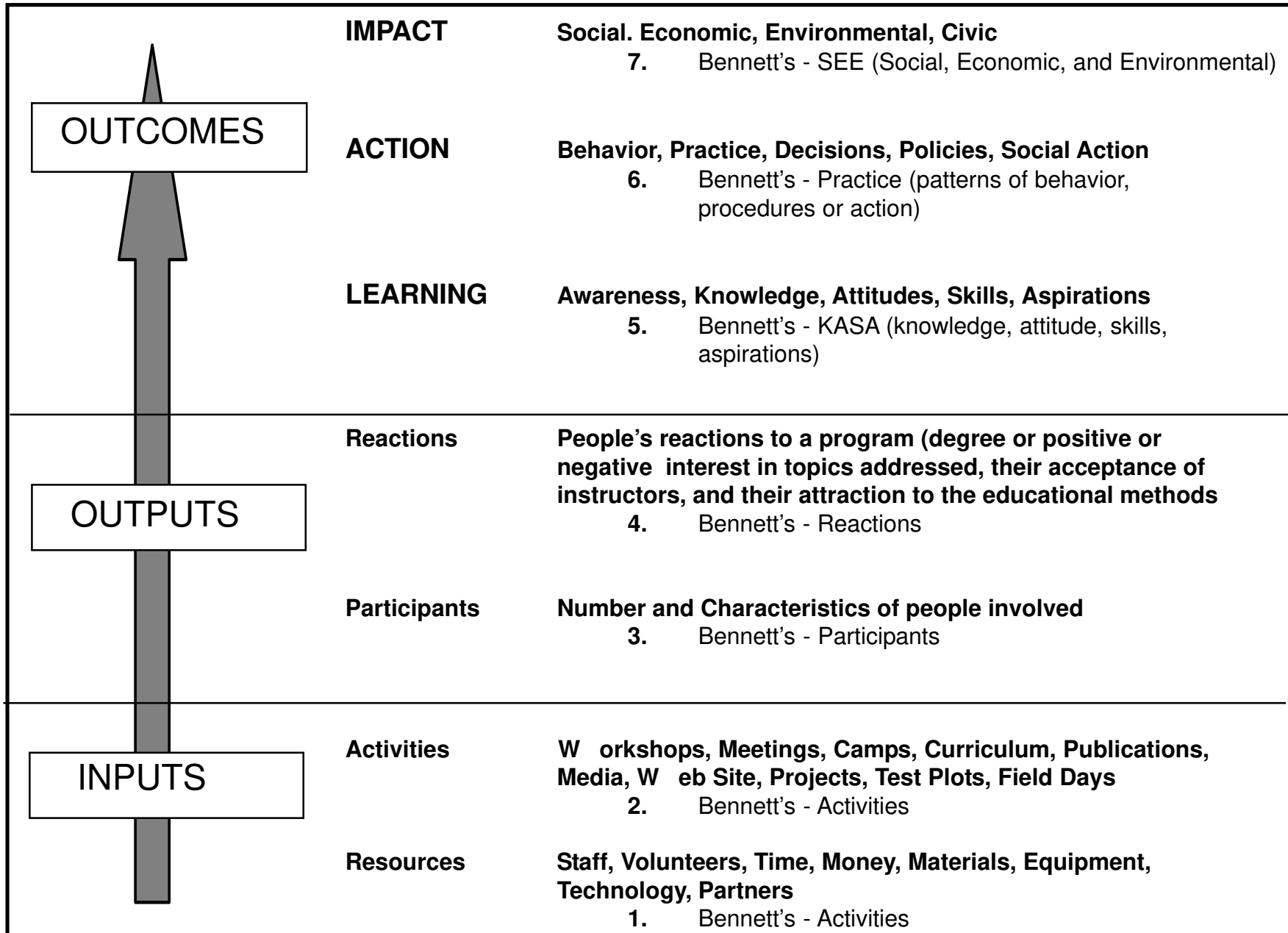
These are the changes that occur for children, youth, families, groups, communities, organizations, and systems. Outcomes range from immediate to long-range; from learning to action to social, economic, and environmental impact. These are listed in the first column of this page.



Logic Model for Program Design and Evaluation



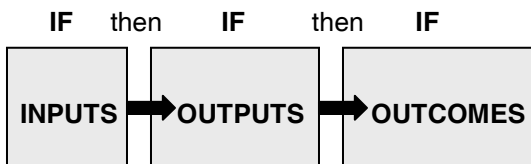
How Bennett's TOP Hierarchy Fits Into Logic Model



Adapted from Bennett & Rockwell TOP Hierarchy

How Does the Logic Model Work?

The logic model is really a sequence that shows the logical relationship between inputs, outputs, and outcomes.



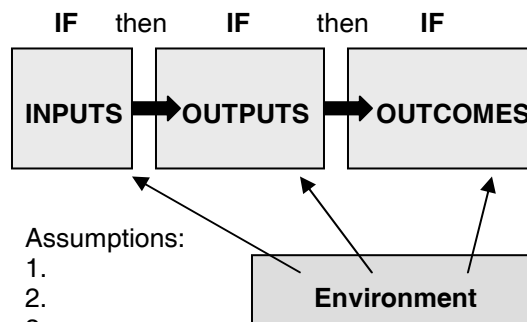
A logic model displays the chain of events that will effect changes and achieve your targeted outcomes. You might think about this as a **series of if-then relationships**. Here are some examples of this relationship.

If the "Have a Healthy Baby program" teaches about the importance of good nutrition and avoidance of smoking and drugs for a baby's health (*outputs*), **then** pregnant teens acquire the knowledge, change their attitude, and gain skills to eat more nutritiously (*immediate outcomes*). If pregnant teens know about and want to eat nutritiously, **then** they will eat nutritious meals (*short-term outcomes*). If they eat more nutritiously, **then** their baby will be born healthy (*longer-term outcomes*).

If teens receive SERIES training on giving effective presentations and teaching younger youth (*outputs*), then they will acquire the knowledge and skills to be a good instructor (*immediate outcomes*). If teens have the knowledge and are given the opportunity to practice teaching, **then** they will improve their communication and teaching skills and become effective instructors (*short-term outcomes*).

If the pesticide application training program teaches farmers how to apply the correct amount of pesticides per acre (*outputs*), **then** they will gain the knowledge and skills to use pesticides appropriately (*immediate outcomes*). If farmers apply pesticides appropriately, **then** pesticide runoff is reduced (*short-term outcomes*). If pesticide runoff is reduced, **then** the environment and ground water will not be polluted (*longer-term outcomes*).

Underlying each of these **if-then** relationships are a number of **assumptions**. Assumptions are the beliefs we have about the program and the way we think it will work; principles that are guiding the program. In addition, you need to consider the **environment** (context) in which this relationship is occurring.



Assumptions:

- 1.
- 2.
- 3.

In the first example, there are two major assumptions:

1. that good nutrition and avoidance of caffeine, alcohol, cigarettes, and drugs will produce a healthy baby.
2. that a teen mother's desire to have a healthy baby is stronger than the desire to eat junk food, drink caffeine or alcohol, smoke, or use drugs.

In the second example, there is one major assumption:

1. that SERIES training provides all the information and practice needed to be an effective instructor.

In the third example, there two major assumptions:

1. that over application of pesticides on a field increases the possibility of pesticide contamination of the ground water.
2. that pesticide runoff pollutes the ground water and the environment.

When you are developing your logic model, think about the **underlying assumptions**.

- Are they realistic and sound?
- What evidence do you have to support your assumptions?

You also need to think about the **environment** (the context and external conditions) in which the program exists and influences the success of the program.

Why Create a Logic Model?

There are several reasons why you may want to create a logic model before you begin implementing your program.

- It can be a tool to use with stakeholders to build consensus around what a program's inputs, outputs (activities and participation), and outcomes look like.
- It creates a sense of ownership among stakeholders.
- It helps bring detail to broad, fuzzy goals.
- It shows the "chain of events" that link inputs to results.
- It summarizes the key elements of your program and how it is intended to work.
- It clarifies the difference between activities and outcomes.
- It provides an easy way to monitor your program's progress and make needed changes.
- It helps focus the evaluation.
- It can be used to easily explain the program to others or funders.
- It can be used in funding proposals.

Benefits to Using a Logic Model

- Helps identify appropriate evaluation questions.
- Summarizes complex program to communicate with internal and external stakeholders.
- Builds underlying rationale and expectations.
- Identifies gaps in logic and uncertain assumptions.

Cautions

- ❑ The logic model represents a reality that is somewhat inaccurate:
 - programs are not linear
 - programs are dynamic interrelationships that rarely follow a sequential order
- ❑ Logic model focuses on expected outcomes, making it easy to miss unexpected outcomes.
- ❑ There is a challenge of causal attribution
 - many factors influence outcomes

(Taylor-Powell, 1999)

Deciding What Outcome(s) to Measure

Determining what outcome(s) to measure is not always an easy decision. There is no required number of outcomes for a program.

- The more immediate the outcome, the more influence a program generally has on its achievement. (United Way, 1996)
- Conversely, the farther the outcome occurs from the program, the less direct influence a program has over its achievement and the greater the likelihood that other, extraneous forces have intervened. (United Way, 1996)

It is important to determine what the goal of interest is for you and your stakeholders by asking the question, ***"What do you want to have happen as a result of this program, curriculum, or activity?"*** That then becomes your "targeted outcome(s)."

Checklist for Outcomes

An outcome should meet all three tests.

- ✓ Is it reasonable to believe the program can influence the outcome in a non-trivial way?
- ✓ Would measurement of this outcome help identify program successes and help point out shortcomings?
- ✓ Will the program's various stakeholders accept this as a valid outcome of the program?

Once you have examined each outcome to see if it meets the above tests, review your logic model using the checklist on the next page. Then you are ready to determine how you will measure your targeted outcomes.





Checklist for Your Program Logic Model and Outcomes

Does the Logic Model:

- ☐ **Include a listing of all inputs that will be needed for this program?**
(staff, volunteers, time, money, materials, equipment, technology, partners)
- ☐ **Include details of the activities listed?**
(duration, days per week, month, etc; number of sessions; contact hours; location, etc.)
- ☐ **Include a list of the characteristics and intended number of targeted participants?** (youth ages 8-12, pregnant teens, families on welfare, etc.)
- ☐ **Make sequential and logical connections between inputs (activities, participation), outputs, and outcomes?**
("If" and "then" statements are sequential and logical)

Do Targeted Outcome(s):

- ☐ **Help fulfill Extension's mission?**
- ☐ **Represent meaningful benefits or changes for participants?**
- ☐ **Seem reasonable as a result of program participants in a non-trivial way?**
- ☐ **Clearly define the intended scope of the program's influence?**
- ☐ **Help educators identify both points of success and problems the program can correct?**
- ☐ **Provide data that is likely to be effective in communicating benefits to stakeholders?**

If all of the above items are checked, then you are ready to specify the indicators for your outcomes and where and how you will collect the data.

Specifying the Indicators For Your Outcomes

Now that you have identified the outcomes of your program, it is time to determine how you will know if those outcomes have been achieved. This information is called the **outcome indicator**.

Specifying an outcome indicator requires deciding:

- the observable, measurable characteristics or change that will represent achievement of the outcome.
- the specific statistic(s) the program will calculate to summarize its level of achievement (i.e., number and percent attaining outcome).

(United Way, 1996)

Typically, one to three indicators should be identified for each outcome. Some outcomes are straightforward and require only one indicator. For example, an outcome of improvement of academic grades has just one indicator: comparison of two semesters of grades on a report card.

Outcome indicators must be observable and measurable. If a condition is not observable and measurable, it may relate to the outcome, but it is not useful as an indicator. Indicators must be unambiguous. Terms such as "substantial," "acceptable," and "adequate" should not be used.

(United Way, 1996)

Be careful with **numerical targets** such as, "Youth will have at least a ten-point improvement in knowledge gain test scores." Your program may have little basis for picking numerical targets that may turn out to be unrealistic. It is better to say, "Youth will show a knowledge gain as a result of participation in the program." With indicators stated in this way, any increase indicates achievement of the outcome.

You collect data from individual participants. However, you do not report individual data. You combine the data into program-level

information. For example, while your targeted outcome for each youth may be improvement in science process skills, the program's achievement on this outcome is the aggregate accomplishment of all participants. You should **report both the number and the percentage of participants** that improved their science process skills.

EXAMPLES

Below are some examples of outcomes and their indicators.

Outcome: Teen mothers have healthy babies that live past the first critical 28 days.

Indicators:

- number and percent of babies born to program families whose birthweight was at or above normal weight (5 lbs. 8 oz.).
- number of days in hospital.
- babies are still living after the first 28 days.

Outcome: Youth will improve their science process skills.

Indicators:

- number and percent of students improved rating on science process behavior checklist.
- number and percent of students whose grades in science improved.

Outcome: Youth improve and practice their communication skills.

Indicators:

- number of youth whose frequency of behavior increased on the "Four-Fold Youth Development Communication Scale." (This scale measures such things as: awareness of own style, valuing other styles, practicing empathy in listening, adjusting own communication style, communication of essential information and interaction management).

Outcome: County environmental quality will be improved.

Indicators:

- number of farmers who implemented conservation practices.
- miles of conservation buffers installed.
- number of watershed contracts signed.



Data Sources

Not all data has to be collected from an evaluation instrument. Data can be collected from a variety of sources. Here's a listing of some possible sources.

Existing Records/Data

Information or records that already exist or can be obtained with minimal planning.

- program documents such as statistical reports, logs, enrollment reports, receipts
- existing databases such as census data, housing tracts, SIFT, Kids Count, school records, industry records, crime rates, police reports, ag statistics data, justice, social, and health agency records, employment records
- home or business records, such as home or farm financial record books
- county, program, or life histories

Case Study

- in-depth examination of a particular case (program, group of participants, single individual, site/location). Case studies use multiple sources of information and methods to provide as complete a picture as possible

Document Analysis

- use of content analysis and other techniques to analyze and summarize printed material and existing information

Diaries or Journal

- recording of events over time revealing the personal responses and reactions

Expert or Peer Review

- examination by a review committee, panel of experts, or peers

Group Assessment

- use of the group process to collect evaluation information

Interviews

- collecting information through talking and listening to people, either face-to-face or over the telephone

Log

- recording of chronological entries which are usually brief and factual

Observation

- collecting information through "seeing" and "listening." Observation may be structured using a criteria checklist or unstructured

Portfolio Reviews

- collection of materials, including samples of work that encompass the breadth and scope of the program/activity being evaluated

Photographs, Videos

- use of photographs or videos to capture visual changes as a result of a program

Product Assessment

- compare writings or work by participants over time (can use rubric to make a quantitative analysis)

Surveys

- collecting standardized information through structured questionnaires or generate quantitative data.
- surveys can be mailed, sent electronically, completed on-site, face-to-face, or on the telephone

Tests

- use of established standards to assess knowledge, skill, or performance. (i.e., pre/post-test, post/post-test)

Testimonials (anecdotal data)

- individual statements by people indicating personal responses and reactions (i.e., current 4-H'er stating the positive impact 4-H has had on their lives, an adult expressing gratitude for being able to get off welfare and get her first job)





Checklist for Outcome Indicators

☐**Is the outcome level identified?**

LEARNING - awareness, knowledge, attitudes, skills, aspirations

ACTION - behavior, practice, decisions, policies, social action

IMPACT - social, economic, civic, and environmental

☐**Does each outcome have at least one or more indicator?**☐**Does each outcome indicator provide evidence for a reasonable inference that the outcome has been achieved?**☐**Does each indicator measure a different aspect of the outcome?**☐**Is the indicator stated in specific terms so that you know what characteristic or change will be counted?**☐**Is the data source for each indicator identified?**

(i.e., pre/post test scores, behavior checklist, portfolio review, interview, existing documents)

Susan J. Barkman, Purdue University (2000)

What Demographic Data to Collect?

As you know by experience, not all participants achieve outcomes at the same level. You need to know what factors could influence a participant's achievement of the targeted outcomes. ***The demographics you collect could help you determine if these differences in achievement are related to a participant or to the program.*** By collecting this information you are able to break the data out based on the demographic characteristics and determine if it had an effect on achievement. This information is usually collected before the educational intervention.

For example, if you are looking at the improvement of leadership and communication skills in teen leaders, you might want to determine their past experience in those areas (i.e., have they been in the public speaking or demonstration contest? If so, how many times? Have they served as an officer of a 4-H club or other organization? etc.)

Here's a list of some types of demographic categories and some examples of data you could want to collect:

- **characteristics of participants**

age group	race/ethnicity
grade	educational level
sex	household income group
- **geographic location**

neighborhood	school
county	city
census tract	
- **delivery method**

club	school enrichment
television	home study course
group workshop	one-to-one consultation
hours of training	computer

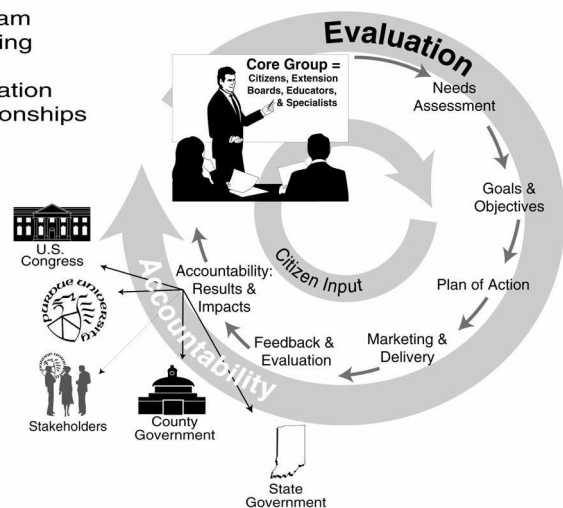
Your data should be grouped and analyzed by demographic categories to determine if demographics had an effect on the achievement level of the targeted outcome.

Relationship Between Evaluation and the POW

The evaluation process is an important part of the Plan of Work. Effective evaluation for each major Plan of Work objective should serve to determine program results and provide documentation necessary for demonstrating the impact of the program.

The diagram below shows how the core group - made up of citizens and Extension boards, educators and specialists work to develop programs that will help meet those needs and solve problems in the county. Citizens input and involvement is critical to the total program development process. The involvement of others in various stages of program development contributes to the likelihood that the program will be successful and have a positive impact. The Logic Model and Outcome Indicator worksheets are excellent tools to use with citizen groups as you plan your programs.

Program Planning and Evaluation Relationships



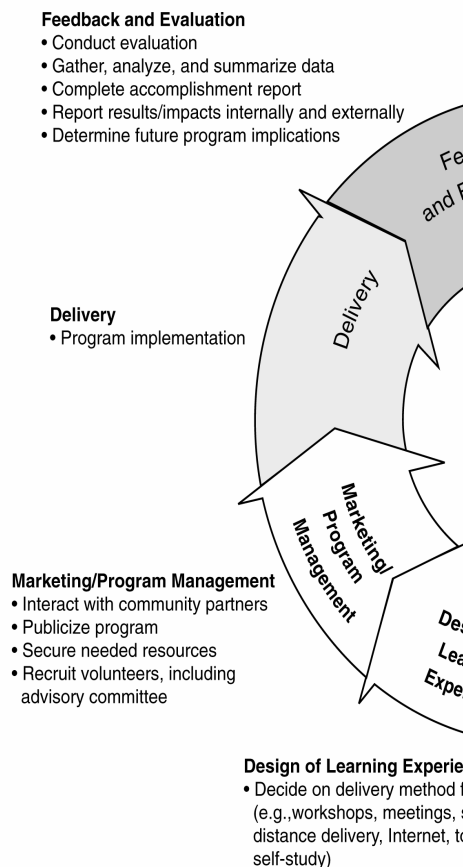
Evaluation of the program must be considered during every stage of the program development process, because it is the process used to assess the quality of what is happening. When educational goals and objectives are set, they identify what outcomes are expected, setting a standard for what is to be evaluated (measured).

Extension educators develop a plan of Action and proceed to market and deliver programs. Through feedback and evaluation, results and impacts are identified. These steps are all part of the Extension program Development Model.

Program evaluation is a crucial part of three aspects of Extension work.

- the program planning process
- the overall professional relationship and accountability of Extension to congress, and state and county governments, and
- feedback to stakeholders

Extension Program Development Model



Developed for use by Purdue University Cooperative Extension Service
Adapted from Penn State Cooperative Extension Model, June 1998

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Useful Evaluation Web Sites

<http://www.four-h.purdue.edu/fourfold>

Four-Fold Youth Development Web Site
Instruments and on-line data analysis,
research abstracts and program activities

<http://www.uwex.edu/ces/pdande>

University of Wisconsin Program
Development and Evaluation Web Site

<http://www.cyfernet.org/>

CYFERNet - Children, Youth & Families
Educational Research Network

<http://www.ca.uky.edu/agpsd/soregion.htm>

Southern Region Extension Evaluation
Collaborative

<http://www.mapnp.org/library/evaluatin/questnrs.htm>

Basics of developing questionnaires

<http://www.fantaproject.org/publications/sampling.htm>

Sampling guide

<http://survey.sesrc.wsu.edu/dillman/>

Surveys on the internet



Worksheets and Checklists

- Logic Model Worksheet #1
- Checklists for Your Program Logic Model and Outcomes
- Outcome Indicator Worksheet #2
- Checklist for Outcome Indicators



**WORD versions of the worksheets and checklists can be download
from the Four-Fold Youth Development web site**

www.four-h.purdue.edu/fourfold



Logic Model Worksheet #1

Name of program _____

INPUTS	OUTPUTS		OUTCOMES - IMPACT		
	Activities	Participation	LEARNING	ACTION	IMPACT
<p>What do we need to achieve our goals?</p> 	<p>What do we have to do to ensure our goals are met?</p>	<p>Who needs to</p> <ul style="list-style-type: none"> - participate? - be involved? - be reached? 	<p>What do we think the participants will know, feel, or be able to do after participation in the program?</p>	<p>How do we think the participants will behave or act differently after participation in the program?</p>	<p>What kind of impact can result if the participants behave or act differently after participation in the program?</p>

Adapted from E. Taylor-Powell, 1999



Checklist for Your Program Logic Model and Outcomes

Does the Logic Model:

- ☐ **Include a listing of all inputs that will be needed for this program?**
(staff, volunteers, time, money, materials, equipment, technology, partners)
- ☐ **Include details of the activities listed?**
(duration, days per week, month, etc; number of sessions; contact hours; location, etc.)
- ☐ **Include a list of the characteristics and intended number of targeted participants?** (youth ages 8-12, pregnant teens, families on welfare, etc.)
- ☐ **Make sequential and logical connections between inputs (activities, participation), outputs, and outcomes?**
("If" and "then" statements are sequential and logical)

Does Targeted Outcome(s):

- ☐ **Help fulfill Extension's mission?**
- ☐ **Represent meaningful benefits or changes for participants?**
- ☐ **Seem reasonable as cause and effect on program participants in a non-trivial way?**
- ☐ **Clearly define the intended scope of the program's influence?**
- ☐ **Help educators identify both points of success and problems the program can correct?**
- ☐ **Provide data that is likely to be effective in communicating benefits to stakeholders?**

If all of the above items are checked, then you are ready to specify the indicators for your outcomes and where and how you will collect the data.

Susan J. Barkman, Purdue University (2000)

Outcome Indicator Worksheet #2

Name of program - _____

OUTCOMES	INDICATOR(S) (1 or more per outcome)	DATA SOURCE
Outcome Level		
Outcome Level		
Outcome Level		



Checklist for Outcomes Indicators

☐**Is the outcome level identified?**

LEARNING - awareness, knowledge, attitudes, skills, aspirations

ACTION - behavior, practice, decisions, policies, social action

IMPACT - social, economic, civic, and environmental

☐**Does each outcome have at least one or more indicator?**☐**Does each outcome indicator provide evidence for a reasonable inference that the outcome has been achieved?**☐**Does each indicator measure a different aspect of the outcome?**☐**Is the indicator stated in specific terms so that you know what characteristic or change will be counted?**☐**Is the data source for each indicator identified?**

(i.e., pre/post test scores, behavior checklist, portfolio review, interview, existing documents)

Susan J. Barkman, Purdue University (2000)

SAMPLE LOGIC MODEL WORKSHEETS AND OUTCOME DATA

Space Station Indiana Logic Model Worksheet 1

Space Station Indiana Model Worksheet 2

Space Station Indiana Impact Report

County Jr. Leader Program Logic Model Worksheet 1

County Jr. Leader Program Logic Model Worksheet 2

SAMPLE EVALUATIO INSTRUMENTS

Four-Fold Youth D



SAMPLE EVALUTION INSTRUMENTS

Private Pesticide Applicator – Record Keeping

Private Pesticide Applicator – Drift