Practical Methods to Measure Outcomes

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Agenda

HOW TO...

Plan for Evaluation
- Develop Your Program Theory
- Protect Human Subjects
- Ensure Culturally Competent Evaluation

Focus your Evaluation
- Identify Your Program Outcomes and Measureable Indicators

Choose Evaluation Data Collection Methods
- Select Practical Options for Your Cooperative Extension Activities

Incorporate Qualitative Evaluation Data
- Analyze Qualitative Data
Desired Outcomes

Participants will gain…

• experience in defining your program theory
• understanding of why and when to get IRB approval for evaluation purposes
• experience in defining outcomes and measureable indicators
• understanding of options for evaluation data collection methods to measure program participant outcomes
Needs assessment:
What are the characteristics, needs, priorities of target population?
What are potential barriers/facilitators?
What is most appropriate to do?

Process evaluation:
How is program implemented?
Are activities delivered as intended?
Are participants being reached as intended?
What are participant reactions?

Outcome evaluation:
To what extent are desired changes occurring?
Who is benefiting / not benefiting? How?
Are there unintended outcomes?

Impact evaluation:
What are the net effects?
What are final consequences?
To what extent can changes be attributed to the program?
Basic Steps for Outcome Evaluation

1. Develop a program theory
2. Define the intended outcomes
3. Identify the indicators
4. Determine sources of information
5. Choose data collection methods
6. Analyze & interpret data
Program Theory

If this then that...

Real-life
Leigh Johnson, UCCE San Diego Coastal Resources Advisor, Emeritus
Program Theory

Logic Model: chain of connections showing what the program is to accomplish

<table>
<thead>
<tr>
<th>Issue</th>
<th>What we invest</th>
<th>What you do</th>
<th>What results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Situation:</td>
<td><strong>Inputs:</strong> Time,</td>
<td><strong>Methods:</strong> Outputs, Activities,</td>
<td><strong>Learning Outcomes:</strong></td>
</tr>
<tr>
<td>Background,</td>
<td>Volunteers, Research</td>
<td>Products, Participation</td>
<td>Knowledge, Attitude/Intent to</td>
</tr>
<tr>
<td>Rationale,</td>
<td>base</td>
<td></td>
<td>Change, Skill</td>
</tr>
<tr>
<td>Clientele Needs,</td>
<td></td>
<td></td>
<td><strong>Action Outcomes:</strong> Behavior,</td>
</tr>
<tr>
<td>Goals</td>
<td></td>
<td></td>
<td>Policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Condition Outcomes:</strong> Economic gain, Societal or Environmental improvement</td>
</tr>
</tbody>
</table>

Time
Developing Your Program Theory

Step 1

Individual exercise:
- Draft a logic model for one of your programs

Partner interviews:
- Share your logic model & describe & edit as needed
  - what’s going on in your program?
  - who participates?
  - how are people – the community – benefiting?
Protecting Human Subjects

• “A human subject is as a living individual about whom an investigator conducting research obtains (1) data through intervention or interaction with the individual; or (2) identifiable private information.”

• Institutional Review Board = IRB

• Core Principles: Respect, Beneficence, Justice
Do you need IRB approval?

- Do the human subjects represent a vulnerable population (e.g., youth, institutionalized individuals, or others whose participation may be considered involuntary)?
- Is it likely that participants’ identities and/or contact information can be linked to their responses?
- Will evaluation results be published (in peer-reviewed journals)?

Adapted from Ellen Taylor-Powell’s *Building Capacity in Evaluating Outcomes*
UCCE Example: Rice Storage Education Priorities
IRB Policies

- Principle Investigators must be academics with minimum of 50% appointment.
- Investigators and staff conducting research must complete the Collaborative Institutional Training Initiative (CITI) human subjects online training.
IRB Training Resources

- CITI online training programs: citiprogram.org
  - This is not the same as the USDA-required Responsible Conduct of Research (RCR) training—must do both to submit IRB application through UC Davis

- UC Davis Investigator Manual available: http://research.ucdavis.edu/wp-content/uploads/HRP-103-
Ensuring Culturally Competent Evaluation

Cultural Competence:
“a set of congruent behaviors, attitudes, and policies that come together in a system, agency, or among professionals and enables that system, agency, or those professionals to work effectively in cross-cultural situations.”

[Cowles (2005)]
Ensuring Culturally Competent Evaluation
Cultural Considerations Group Discussion

1. How might participant characteristics affect your evaluation?
   - Language
   - Age
   - Abilities: mental, physical, social
   - Male-female interactions, communication styles, family relationships, decision-making styles
   - Attitudes to conflict
   - Concept of time
   - Approaches to knowing and ways of knowing

2. How might you make the following data collection methods more culturally sensitive?
   - Written questionnaire
   - Mailed survey
   - Observations
   - Interviews

Borrowed from Building Capacity in Evaluating Outcomes, Univ. of WI - Extension
Focusing Your Outcomes Evaluation
What do you want to know?

Social-economic-environmental impacts

- **Actions**: Changes in behaviors and practices, policy/decision making
- **Learning**: Changes in knowledge, attitudes, skills, aspirations
- **Reactions**: Degree of satisfaction with program; level of interest; feelings toward activities, educational methods
- **Participation**: Number and characteristics of people reached; frequency and intensity of contact

Source: Bennett and Rockwell, 1995, Targeting Outcomes of Programs
Define Intended Outcomes that are...

**REASONABLE**
- connected in a logical way to your program activities?

**REALISTIC**
- achievable given the situation and resources/inputs

**IMPORTANT**
- represent an important change that is valued by participants and key stakeholders
Outcome Indicators

If the outcome is achieved, how will you know it?

What will it look like?

What is the evidence?

Criteria:
- Tangible
- Specific
- Useful
- Practical
- Culturally responsive
- Adequate
Logic model with **Indicators**

**Activities**
- Program implemented
  - Number of workshops held
  - Quality of workshops
- Targeted growers
  - Number and percent of growers attending Extension activities
- Growers learn
  - Number and percent who increase knowledge of...

**Outcomes**
- Farmers adopt new techniques
  - Number and percent who now practice research-based techniques
- Farm profitability increases
  - Number and percent reporting increased profits; amount of increase
Sustainable Food Systems

*Intended Outcome:* Enhanced food system capacity, including new/improved plants, animals, technologies and management systems.

**Outcome Indicators:**
- # of new/improved plant releases
- # of improved animal genetics
- # of producers who report adoption of recommended practices (those that increase yields, efficiency, and economic return, reduce inputs, and conserve resources)
SFS Economic Impact

**Intended Outcome:** UC ANR programs serving growers and ranchers have contributed to their realizing lower production costs and/or higher return on investment.

**Outcome Indicator:** “Pistachio owner/operators, with orchards covering 50,000 acres, have begun to utilize mechanical pruning instead of labor-based cultural practices, which reduce their management costs from $200 per acre to about $50.”
Intended Outcome: Increased use of research-based IPM practices.

Outcome Indicators:

- # of program participants that gained the skill to identify natural enemies
- # of program participants that increased use of reduced-risk pesticides
- # agencies that incorporate science-based information into city wide policy
**Sustainable Natural Ecosystems**

*Intended Outcome:* Farmers increase native bee populations on agricultural land.

**Outcome Indicator:**

“There are 18 newly established acres of native bee habitat on the treatment farms. While more study is required, it appears these habitats are working to increase native bee populations on treatment farms, and may be supporting increased populations of native bees.”
Intended Outcome: Participants in UC ANR programs adopt research-based recommended practices for water conservation.

Outcome Indicator:
# “professional irrigation associations and landscape irrigation leaders adopted use of the new simplified landscape irrigation demand estimation procedure I taught and are now more effectively managing and conserving water in landscapes.”
**Group Discussion**

*Intended Outcome:* Growers have expanded economic opportunities.

*What are some possible outcome indicators?*
Focusing Your Outcomes Evaluation Exercise:

**Step 2 Define Intended Outcomes & Step 3 Identify Indicators**

1. **On your own**
   - Write intended program outcome(s)
   - Identify measurable indicator(s)

2. **Partner interview**
   - What do you (and stakeholders) want to know about your program, and how you will know?

3. **Group sharing**
Practical Methods for Evaluation Data Collection to Measure Program Benefit to Participants
Your sources of evaluation information

Most often your program participants!

Other sources may include:

- Existing data
  - Program records, sales records, etc.
  - Pictures, charts, maps, pictorial records

- Others/Non-participants
  - Key informants
  - Funders
  - Collaborators
  - Etc.
Extension Evaluation Data Collection Methods

• Document review
• Observation
• Interview
• Group assessment
• Survey

OTHERS:
• Case study
• Diaries, journals
• Expert or peer review
• Portfolio review

MIXED METHODS:
• Convergent
• Exploratory
Content analysis of existing information

Use it for:

- Behavior change
- Quantitative data
- Qualitative data
Use it for:
- Behavior change
- Quantitative data
- Qualitative data

Content analysis of existing information

- Sales records or use records
- Little to no participant burden
- If possible, get pre and post data for comparison
UC IPM & MG example:
“The four local Orchard Supply Hardware stores have a “quick tip” card holder kiosk at the end of each pesticide aisle and “shelf talkers” identifying less-toxic products. OSH reported a 12 percent increase in the sale of less-toxic products compared to the more-toxic alternatives.”
Using submitted use records to evaluate IPM adoption and water quality outcomes for a decade of training city and county landscape professionals.
Use it for:

- Skills gained
- Behavior change
- Qualitative data
- Quantitative data, if systematically collected
Observation

Seeing & listening!

- You likely already do it!
- Less to no participant burden
- When there is physical evidence that can be readily seen
- When written or other data collection procedures seems unnecessary
- Pre/Post approach for comparison

Use it for:
- Skills gained
- Behavior change
- Qualitative data
- Quantitative data, if systematically collected
Field Notes

- Least structured way
- You can commit observations to memory and make notes later
- Carefully record date, location, relevant information
- Leave a wide margin for analysis later
- Consider creating a simple database to pull out participant outcomes to later report
Use of spotted wing drosophila traps
Observation Checklist

• Tool to document what you’ve seen & heard for later evaluation write-up
• Clip board in the field or later in the truck
• Organizes data collection for quantification
### Observation sheet for Winter Feeding and Extended Grazing

**Observer:** __________________________ **Date:** _________________________

**Audience:** __________________________ **Location:** ______________________

Did you observe the following practices during the on-site farm visit?

<table>
<thead>
<tr>
<th>Extended Grazing</th>
<th>YES</th>
<th>NO</th>
<th>EXPLAIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stockpiled pasture for extending fall grazing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grazing or baling of crop residues</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using annual crops for summer or extended fall grazing (type of crop)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limit-fed grain supplementation (when, how much?)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Are you interested in using an observation checklist to measure outcomes?

A. Yes
B. Unsure
C. No
D. I already do this
E. Not applicable

![Bar chart showing the percentage responses:]
- Yes: 17%
- Unsure: 17%
- No: 33%
- I already do this: 33%
- Not applicable: 0%
Photograph/Video

- Present powerful visuals to illustrate behavior change or adoption
- Can be documented by volunteers, participants, YOU!
- Can be analyzed using matrices/rubrics (e.g. youth photo journals)
Observation

Participants document outcomes using #healthyselfie
Interviews

Talking and listening to people

Use it for:

- Self-reported knowledge, attitude, behavior changes
- When surveys inappropriate
- Qualitative data
- Some quantitative data
Interviews

Talking and listening to people

Use it for:
- Self-reported knowledge, attitude, behavior changes
- When surveys inappropriate
- Qualitative data
- Some quantitative data

- Range from free-flowing, semi-structured, tightly structured
- Helpful to create an interview protocol for consistency
- Can also ask about impact, unintended outcomes, as well as process evaluation questions (ideas for improvement or barriers to implementation)
50% adoption (over time) of new nitrogen guidelines discovered through informal interviews with growers

- Some adopted the practice early on, many more during the dry winters (and subsequent nitrogen burn from pre-plant fertilizer).

- Informal interviews in fields with pointed questions about nitrogen use and total acreage.
Interviews

California Naturalist Program

Formal interviews

- Collect consistent data overtime; using the same questions
- IRB
Group Assessment

Uses group processes such as focus groups & forums

Use it for:

- Self-reported knowledge, attitude, behavior change
- Qualitative data
- Some quantitative data
Group Assessment

Use it for:

- Self-reported knowledge, attitude, behavior change
- Qualitative data
- Some quantitative data

Uses group processes such as focus groups & forums

- Group processes foster trust and relationship-building in addition to the activity’s goals
- Costly (time/personnel) to analyze
- Piggy back off existing meetings
- 4-10 people for in person
- Can also ask about impact, unintended outcomes, as well as process evaluation questions (ideas for improvement or barriers to implementation)
TOPIC: Current Usage

Opening Question

- Please tell us your name, who you work for, the general area and crops in which you work, how long you have been a PCA, and how long you have been interacting with the UC IPM program.

Transition Question

- How did you learn about the UC IPM program and the information it offers?

Key Questions

- Which UC IPM products do you use? How do you use them? How often?
- Prompts for facilitator only – specifically do they use the following: sections of the PMGs on water toxicity information; air quality information, natural enemies/bees chart, pesticide recommendations table, year round program information, manuals, degree day models, etc.
  - Probes: What value do you find in these products? What has been particularly helpful? What has been particularly frustrating?
Group Assessment

- Appreciative Inquiry
- Intended and unintended outcomes
- Participatory
- Visual
- Qualitative analysis
Survey

Collecting standardized information through structured questionnaires

Use it for:

- Knowledge change
- Self-reported knowledge, attitude, behavior change
- Qualitative data
- Quantitative data
Survey

Collecting standardized information through structured questionnaires

Use it for:
- Knowledge change
- Self-reported knowledge, attitude, behavior change
- Qualitative data
- Quantitative data

- Fast and cheap
- Typically used for participant reaction, but potential for much more!
- Consider using for in person and online Extension activities
- People are over surveyed consider adding an incentive or use clickers for better engagement
- Qualtrics!
- Always test your survey (cognitive interviews)
Survey

Incentives?!
Survey

Pre/Post

- Survey participants at the beginning and end of activity
- Objectively measures learning gain (limited)
- Comparison data allows for attribution of learning gain to the Extension activity
- Can use clickers
Survey

The snail pictured above is a: *

- White garden snail
- Brown (European) garden snail
- Decollate snail
- Amber snail
- I don't know
Survey

Post with Retrospective-Pre

- Survey participants at end of activity only
- Measure self-reported learning gains AND changes in skills, attitudes, intent to adopt, etc.
- Comparison data allows for attribution of gains to the Extension activity
- Respondent bias
On-site (or shortly after) survey with retrospective questions

<table>
<thead>
<tr>
<th>Practice</th>
<th>Abs Before</th>
<th>Abs After</th>
<th>#VALUE!</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID pests</td>
<td>29.00%</td>
<td>63.00%</td>
<td>34%</td>
</tr>
<tr>
<td>Treat emerging</td>
<td>25.00%</td>
<td>54.00%</td>
<td>29%</td>
</tr>
<tr>
<td>Treat common</td>
<td>27.00%</td>
<td>57.00%</td>
<td>30%</td>
</tr>
<tr>
<td>Manage wood</td>
<td>32.00%</td>
<td>75.00%</td>
<td>43%</td>
</tr>
<tr>
<td>Share to co-workers</td>
<td>37.00%</td>
<td>85.00%</td>
<td>48%</td>
</tr>
<tr>
<td>Share to public</td>
<td>40.00%</td>
<td>78.00%</td>
<td>38%</td>
</tr>
</tbody>
</table>
Implementing the Grape Powdery Mildew Index in Foothill Vineyards

2. Prior to this presentation, had you visited the UCIPM powdery mildew page with the Amador and El Dorado stations? (Yes/No)

3. Since this presentation, will you visit the UCIPM powdery mildew page with the Amador and El Dorado stations? (Yes/No/Maybe)

RESULTS:
2013: Electronic ANR survey sent after workshop via email. 24/104 responded (23%). 83% of respondents said they would visit the UCIPM powdery mildew webpage SINCE my presentation, up from 29% who said they had visited PRIOR to my presentation.

2014: Paper survey given at workshop. 20/90 responded (22%). 90% of respondents said they would visit the UCIPM powdery mildew webpage SINCE this presentation; up from 50% of respondents who said they had visited the page PRIOR to my presentation.
Quantifying Potential Impact Using Cost Study Data

Conversations with vineyard managers revealed they are looking at the PMI index—some are using it and think they saved a spray. We showed in trials that we saved one spray using the index during that particular season.

If one applied spray costs $82/acre (cost study referenced), one fewer spray on 8,000 acres, estimated winegrape acreage in the MCP, = $ 656,000 saved!
Survey

Follow-Up

- Highly recommended practice
- Can measure self-reported behavior change
- 3-6 months, but it depends!
- Mail, online, phone
- Can identify barriers to participant implementation
- Standalone or combine with a pre/post or post/retro-pre survey
Online educational materials evaluated with follow-up survey

Downloadable at no cost, but asked for name, email, employer, city, and state to gather evaluation information

Did you increase your knowledge on the use of pesticide handling best management practices to protect water quality?

- 75% (9/12) Yes
- 17% (2/12) No
- 8% (1/12) Did not answer
Follow-up survey sent as part of Extension product
Follow-up survey: Watershed University 3-5 years later
Survey

Post, Retrospective Pre, and Follow Up

**BEHAVIORS:** Identify natural enemies, use reduced-risk pesticides

**SCALE:** Not at all, Slightly, Somewhat, Absolutely, Not applicable

**QUESTIONS**

- AFTER the training, do you intend to do the following practices?
- BEFORE the training, did you do the following practices?
- [Several months later]: Do you do the following practices?
Survey

Post, Retrospective Pre, and Follow Up

- Compare pre responses with more conservative follow up responses
- Consider lumping positive and negative for data visualization:

Positive and significant changes (p<0.01) occurred between retrospective pre-, post-, and follow-up training survey responses regarding the questionnaire items in the chart below:
Analyzing pre/post/follow up data:

- Numerical data: T-tests, etc.
- Everything else: Change scores

Assume a rank to each response category (not at all=1, slightly=2, somewhat=3, absolutely =4). Subtract the follow up response and the pre response for each participant to see if individuals progress from a lower level or a higher level. You can report the number of individuals who progress for each question.
Example in the works: Measuring success to increase pesticide application understanding and adoption of good spraying practices within management structures.

- Retrospective pre-post survey after trainings
- Follow-up survey at the end of the season (non-paired for feasibility)
2017 California Naturalist Course Scorecard

Mt. Diablo Region

Plan to Volunteer

100%

(n=11)

Self-Confidence:
Change in the % of respondents that strongly agree they are capable of making a positive impact on the environment from pre to post course

36.3% pre

81.8% post

Evaluation tools:
- Retrospective survey
- Interviews with select groups
- Focus group with instructors
- VMS to record hours, activities, 2° contacts, acres

Overall Satisfaction: (satisfied + very satisfied)
82%

Instructor Performance:
(very good + excellent)
73%

(VG=45.45%; E=27.27%; n=11)

General Stats:
- Number of Courses & Participants: 33
- Graduation Rate: 94% (31/33)
- Evaluation Response Rate: 33% (11/33)
- Course History: 2017 (first course)
Data Collection Plan Exercise

Step 4 Determine Sources of Information

Step 5 Choose Methods

1. Complete your data collection plan:
   - Write down what methods you think would work well for you and your clientele.

2. Partner interview:
   - Why did you chose this evaluation method(s)?
   - What questions/concerns do you have that others may be able to help with?
What evaluation method are you most interested in using?

A. Observation
B. Interview
C. Survey
D. Group assessment
E. Document review
F. Mixed methods
Qualitative Data

Why ask open-ended questions in surveys, interviews, and focus groups?

- To explore respondents’ thoughts and opinions
- To collect more context or detailed information on successes, challenges, barriers, etc.
- When you don’t know what close-ended response categories to use
Practical Approach to Analyzing Qualitative Data

1. Organize data all in one place
2. Read through open-ended answers & identify emergent themes
3. Develop codes to categorize data
4. Apply codes to each response
5. Count repetitions of codes & highlight representative responses for code
6. Interpret results (more than description) -- with colleagues!
Group Exercise

1. Review end-of-session/workshop evaluation data example
2. Practice developing themes/codes
3. Apply themes/codes
Qualitative Analysis

“Gold Standard” = same steps but working with a team

1. Decide on how to code each line or quote.
   - Pre-existing list vs. emergent list (commonly used); or combo
2. First and a second team member “code/index” each line of data. Apply the categories to every single line of data.
3. Compare each person’s coding to ensure that you coded in the same way. Discuss discrepancies. Finalize list of codes.
4. Additional team members repeat steps 2 & 3.
5. Review and summarize the data that falls under each code.
6. Interpret.

➢ The more people, the more “validated” your coding.
Some things to remember...

• There is no one right method for collecting evaluation data
• Each has a purpose, advantages and challenges
• Consider purpose, participants, and resources available when selecting your method
• The goal is to obtain trustworthy, authentic and credible evidence
• Often a mix of methods is preferred
Evaluation Methods
Group Reflection

Given what you discussed in small groups, is there something you might change or do differently in your approach to measuring outcomes?
Extension Evaluation Resources

- New Evaluation CE Specialist COMING SOON!
- ANR CE Program Evaluation Resources http://ucanr.edu/sites/CEprogramevaluation/
- Toolkit for Assessing IPM Outcomes & Impacts http://ipmimpact.ucanr.edu/
- Collecting Evaluation Data: An Overview of Sources and Methods http://learningstore.uwex.edu/assets/pdfs/g3658-4.pdf
“Measure what you value and others will value what you measure.”

-- John Bare,
The Arthur M. Blank Family Foundation