Evaluation & Accountability Collaborative
Quick Tip Series for Extension Faculty Conducting Evaluations

How to Calculate Percentage Change

What is percentage change?

- Percentage change (or percent change) measures the difference in value using percentages.

How is percentage change used in Extension?

- Percent change is one means of demonstrating program impact or conveying the magnitude of a change. It shows the difference between the after vs. before values. Percentage change can be positive or negative. Numbers (frequency counts) are typically used in the formula but percentages can be as well.

How do you calculate percentage change?

- \( \frac{(\text{after value} - \text{before value})}{\text{before value}} \times 100 = \% \text{ change.} \)

Simply **subtract** the before value from the after value; then **divide** by the before value. **Multiply** the result by 100. Add a % sign and that is your percentage change.

Example 1 (using frequency counts):

Using state records, an FCS agent found that 25 teens were killed in vehicle related accidents in her county in 2008 compared to 17 in 2007. The percent change is \( \frac{(25 - 17)}{17} \times 100 = 47.1\% \). In writing about the relevance of a new teen driver safety educational program, the agent writes “there was a 47.1% increase in the number of teens killed in vehicle-related accidents in 2008 compared to 2007.”
**Example 2 (Unmatched Pre-Post Surveys):**

- Using pre-post surveys without matching ids, an AG/NR agent found that 37 of 115 program participants (32.2%) correctly answered a knowledge question about range management on the pretest. After the program, 78 of 102 participants (76.5%) answered the same question correctly. The percentage change in “percentage correct” is \((76.5 - 32.2) / 32.2 \times 100 = 137.6\%\).

Using frequencies with this example, the percentage change in the number of participants answering the question correctly is \(((78 - 37)/37 \times 100 = 110.8\%\). But since the number of participants responding to the pretest and posttest were somewhat different, using percentages in the formula provides a more precise measure of the after vs. before change in value.

Note that percent change is **NOT** the simple difference between the two percentages (i.e., \(76.5\% - 32.2\% = 44.3\%\)).

**Example 3 (Matched Pre-Post Surveys):**

- Let’s suppose that the agent in Example 2 used matched ids – and of the 115 pretests and 102 posttests, the agent was able to match a pre and post test for 98 of the participants. Further, for these 98 participants, 35 answered the question correctly on the pretest while 77 answered it correctly on the posttest. The percentage change is \(((76 - 35) / 76 \times 100 = 117.1\%\). If one has matching ids in a pre-post situation, it always makes more sense to use frequencies in the formula – using just those surveys with a match.

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