

10 Steps for Conducting Research on Your Farm or Ranch



Lesson 3 Worksheet Develop a Hypothesis or Research Objective

The full workbook is available online or to order in print at www.sare.org/research-workbook.

ASSIGNMENT

1. **For an experiment**, state your hypothesis. To give context, start by quickly summarizing the project.

Example: *I plan to test the effectiveness of a parasitic wasp in controlling a specific species of caterpillar causing damage in my market garden. As soon as I see a full hatch of caterpillars, I plan to install several large screen enclosures and introduce the wasps into some of them. My hypothesis is that the plants in enclosures containing the wasps will exhibit less damage from caterpillars than the plants without wasps. The wasps are my independent variable, and caterpillar damage to plants is my dependent variable.*

For observational research, state what you hope to demonstrate. To give context, start by quickly summarizing the project.

Example: *I want to do a better job of managing weeds. In order to do that, I need to learn about the timing of life stages of the weeds on my farm. To get this information, I'll walk transects on my farm every week throughout the growing season, recording weed species and growth stages. My objective is to construct a timeline of the growth stages of important weed species, which I hope will help inform my weed management decisions in the future. The dates I choose for scouting represent my "independent variable," and the data I record about weed growth are my "dependent variables."*

For an engineering project, start by quickly summarizing the project to give context. Then, describe in quantitative detail the criteria for success. If appropriate, contrast this with the situation you're facing without your solution available.

Example: *My objective is to develop a screen system to clean camelina seed, one that's capable of removing pennycress seed as well as hulls and chaff. I will consider my project a success if I can achieve output with at least 95% pure camelina seed from a sample that has at least 15% contamination by pennycress seed. With the currently available screen system, the best I have achieved is 76% purity. My "independent variable" would be the configuration of my screen system that I think can improve purity (e.g., the number of screens and mesh size), and my "dependent variable" is the level of purity that different configurations achieve.*

Continued

2. **For experimental research**, answer the following questions. Remember that doing so for engineering and observational projects isn't necessary, but can be helpful:

a. What is/are the independent variable(s)?

b. What is/are the dependent variable(s)?

ASSIGNMENT SELF-EVALUATION

1. Does your hypothesis or research objective meet all of these criteria?

- ☐ It is clear, specific and objective; it's not dependent on questionable assumptions
- ☐ It is based on a solid foundation of knowledge. There should be good reasons to think your project will produce useful results; you're moving beyond guesswork or results that you want to believe will happen.
- ☐ It fills a knowledge gap. You should be contributing new information, not just confirming existing knowledge.
- ☐ It is repeatable. If someone else were to repeat the project in the same way, under the same conditions, they should get the same results.
- ☐ It is testable using measurable, quantitative observations, not opinions, judgments or interpretations.

2. Look back at your work from the previous two lessons. If you meet your new research objective or support your hypothesis, will it provide an answer to your initial question (or the beginning of an answer), or represent a step toward a solution to your problem? Please explain.