

# 5 tips for designing on-farm field trials

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By: Brad Carlson, Extension educator

With planting season right around the corner, many farmers are looking at designing on-farm trials in some of their fields. Here are a few pointers to help ensure that you are able to answer the questions you are trying to evaluate:

## 1. Choose a uniform site

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Avoid fields that have areas of poor drainage, or sandy spots. Also, make sure that the field received consistent management in the recent past. Some things that could cause problems include: old field boundaries, uneven manure applications or partial residue removal (like baling corn stalks from only half of the field). Variability in the soil that you cannot see can cause yield variability, so controlling what you can see is critical.

## 2. Use replication and randomization

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Simply splitting a field, or comparing one field to another, cannot provide reliable answers to

agronomic questions. Even with no differences in management, you will find a higher yield in one field versus another, and similarly with one half of a field versus the other. You need to replicate your treatments at least three times, but preferably four, in order to avoid the natural variability in a field that cannot be controlled. Similarly, randomization is important to avoid patterns (like soil type or drainage) that can bias yield. Randomization can be as simple as flipping a coin or drawing slips of paper from your cap.

### 3. Account for application equipment

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While you can measure yield to whatever the width of your combine head is, you need to keep in mind that a fertilizer spreader or sprayer will have a different width and therefore dictate how big your treatment strips or areas are. In order to avoid edge effect of the treatment, make sure your study strips have twice the number of rows as your harvest width.

### 4. Control variables

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If you are going to answer a question, you need to ensure that the treatment variable being tested is the only variable that changes. Changing crop hybrid/variety, spot treatment of weeds or insects, or variable nitrogen rates can bias the study's results. Failure to control these variables will make it difficult to determine whether you found yield differences because of your treatment or because of some other factor that changed.

### 5. Oversee quality control

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Nearly everyone with experience conducting on-farm trials has a story of something that happened on a site that ruined the trial. Even though you think you are on the same page as your input providers, or others conducting field operations, it is often best to be there in person (and preferably riding along) when treatments are being applied. Better yet, apply the treatments yourself.

While harvest is a long ways off, those setting-up on-farm trials should at least be thinking about these things. When harvest time comes, you want to make sure your yield monitor is calibrated. Plan to harvest your field all at once to ensure there are no differences in grain moisture or combine speed that could complicate data analysis. Avoid edge effects by evaluating rows from the center of your treatment. If you set up treatments in blocks, you want to be sure to eliminate

data from the front and back edges to eliminate any errors in travel offset on the yield monitor. Finally, be sure to use proper statistical analysis to ensure you are not simply finding random variability in the field.

Conducting on-farm trials is not as simple as it might seem, but it is very doable for most farmers provided you take the time to do it right. As always, remember that University of Minnesota Extension staff is willing to assist you with design and data analysis advice.

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