

Conducting on-farm Trials

Excellent research occurs on farm as growers' trial new products, technologies, research findings and extension recommendations on their properties.

On farm trials are an important source of information as they are:

- Practical – occur in real life situations
- Specific – often address specific topics or questions and,
- Involve direct participation from those who will most benefit from the research findings (the growers)

Conducting on farm trials can involve a considerable amount of time and effort so in order to maximise the benefit of this type of research, it is important that some basic principles of conducting research are followed.

What is the question?

Defining the initial research questions is the most critical aspect of conducting on-farm research. Good on farm research questions are as specific as possible.

- Specify the object of research, what is the thing you are trying to study? (E.g. ideal planting window, effect of foliar N application on yield etc.)
- Specify the boundaries of research. What are the time and space limitations of the question? (e.g. a specific variety, plant, soil type, paddock, farm, region or catchment over one season, two seasons etc)
- Focus on a single issue; don't try to answer too many questions at once.
- Investigate what is already known about the issue and what other relevant research may have occurred. Talk to other farmers, agronomists or technical experts to see what other trials may have been conducted.

How are you going to measure it?

A successful trial involves gathering good data. Firstly, you should consider how you are going to measure the results of the trial. E.g. this may be in yield (bales/ha) or WUE (bales/meg). If measuring yield, consider how you will measure this:

Picker Scales - these are more time consuming than other methods but are good for small areas and are accurate if calibrated properly

Yield monitors – easy to do and reasonably accurate if well calibrated. Good for showing a relative difference between plots, even if the actual yield number is not accurate.

Module weights – simple to do and accurate but requires larger plot sizes (you must be able to pick enough cotton from each replicate to make a full size module)

Consider what in-crop monitoring may be required to provide data for your trial. Depending on the question, data could include plant height, internode length, leaf sampling, insect counts, boll weights etc. Make a plan of

what measurements should be obtained and when to avoid missing key measurements at key growth stages or following treatments during the season.

What trial design should you use?

The appropriate trial design will depend on the question being asked and the resources of the grower. The most common trial designs are:

- Control plot or nil strip.

Also referred to as a demonstration trial. This method is very simple and involves leaving an untreated strip or nil plot in the field to compare against the treated area. To increase the level of confidence in the results, this can be repeated across more than one field.

- Replicated trials.

One or more treatments are repeated across a field with a control or nil strip. The more replicates the better, however at least 3 is generally required. In order to statistically analyse the results, the layout of the replicates must be random to avoid bias, with the control or nil strip forming one of the replicates. 4 replicates are recommended for statistical analysis.

Other things to consider in trial design:

The trial should be in a representative area of the field, avoiding tail drains and field edges.

Buffer strips should be placed between replicates to avoid one replicate influencing another. E.g. spray drift can move across replicates, or water subbing across treatments in an irrigation trial. The width of each of the replicates will be primarily determined by the machinery being used and if a treatment is being applied, by what method. Aerial applications of treatments (e.g. insecticides) will require a buffer between replicates of 100m.

What else do you need to consider?

Keeping good records of the trial is critical. Record all significant events, such as when the trial was planted and when treatments were applied. Photographs are particularly useful. Consider and record any variables that may influence treatment results – e.g. differences in insect pressure, weed density, application conditions between treatments and weather conditions. These records will be very useful if trying to account for unexpected differences in treatments at the end of a trial. Most importantly remember to peg out your trial at the start of the season. It is also a good idea to record the row numbers of each replicate, in case trial pegs go missing, and keep a copy of a trial 'map'. It can be very disappointing to put a lot of effort into setting up a trial, only to discover halfway during the season that the pegs are gone and you are no longer sure which replicate is which!

Your regional extension officer is able to assist with trial design, trial monitoring and analysis of the results so if you are considering your own on-farm research, please give me a call.