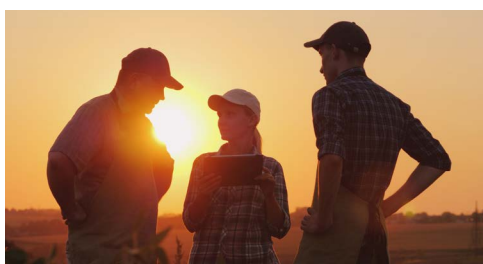




# ON-FARM TRIALS: FIVE PRINCIPLES FOR SUCCESS

[www.adas.co.uk](http://www.adas.co.uk)



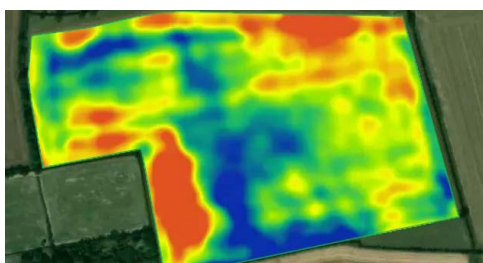
## 1. COLLABORATION

Run similar trials on multiple farms; share ideas and results.



## 2. SIMPLE TREATMENTS

Ideally, compare just one test treatment against a 'farm standard' control.



## 3. UNDERLYING VARIATION

Consider soil variation before applying treatments to ensure the trial is fair.



## 4. REPLICATION

Repeat treatments where possible to have greater confidence in the results.



## 5. ASSESSMENTS

Plan at the outset how yield and other treatment effects will be assessed.

To learn more, contact [agronomics@adas.co.uk](mailto:agronomics@adas.co.uk) or visit the Agronomics page on the ADAS website [www.adas.co.uk/services/agronomics](http://www.adas.co.uk/services/agronomics). On this webpage, you can also download our comprehensive 'ADAS guide to farmer crop trials'.

These guidelines have been developed by ADAS as part of the Innovate UK funded Farm PEP project, which also involves AICC, BGS, Innovative Farmers and Map of Ag.

# 1. COLLABORATION

Before starting, check whether your question already has a good answer. Search for independent trial results, AHDB reports, etc, and look the topic up on **www.farmpep.net**.

If you decide to run a trial, look for like minded farmers/advisers who are interested in the same question. If a similar trial is run at multiple sites and the results are shared, you will learn far more than by doing it alone. Try discussing with

- neighbours
- agronomist
- other attendees at meetings (e.g. AHDB Monitor Farms or ADAS Farming Associations)
- other users on FarmPEP.net.

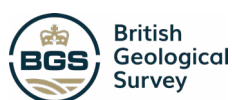
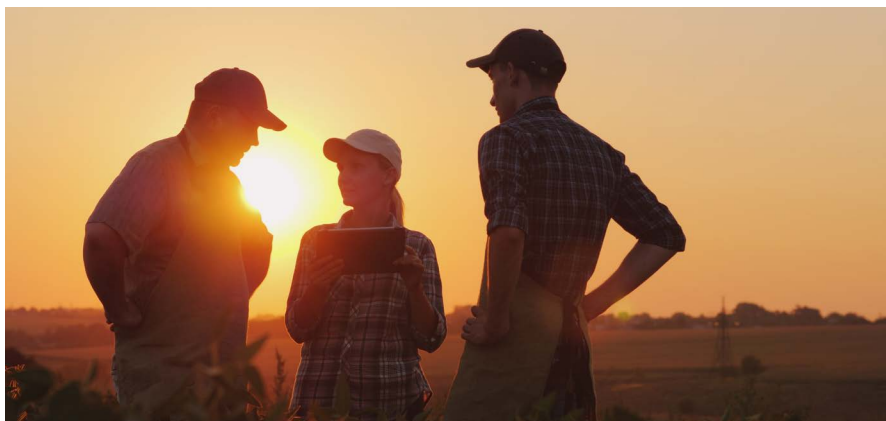
If you want to test a particular product, try contacting the manufacturer or distributor to see if they will support your trial – some will supply a product for free in return for results and/or pay for yield map analysis at the end of the trial.

## CASE STUDY: AICC Crop Nutrition Club

A group of seven AICC agronomists collaborated on a series of nutrition trials. The group met at Cereals 2021 and agreed that nitrogen was a key focus.

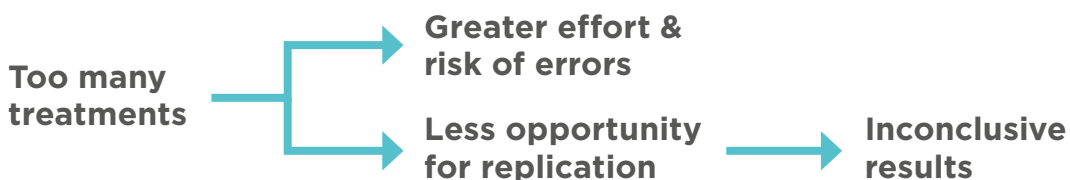
The group worked with their client farmers to establish a total of 11 on-farm trials in spring 2022. They kept in touch via WhatsApp through the cropping season and met online in winter 2022 to discuss the trial results.

All valued the experience and results, which are now available on FarmPEP.net for the benefit of the wider industry.



## 2. SIMPLE TREATMENTS

Ideally, just **compare one new product or approach** that you are considering against your current standard (the 'control' treatment). Having more treatments in your trial reduces your capacity to replicate them, so may lead to inconclusive results.



Try **bold ideas** for the test treatment – unless there is a reasonable chance of yield effects of at least 0.5 t/ha, you may not be able to detect the difference.

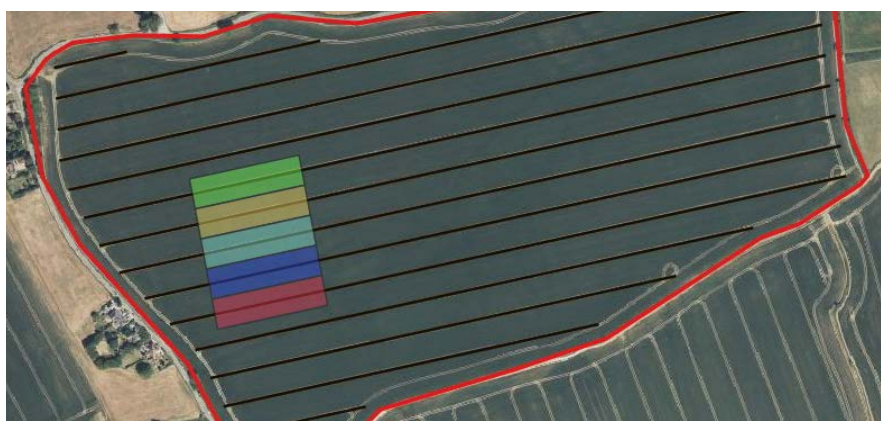
Consider how the treatments being tested will affect the trial design, e.g.:

- rotational/cultivation comparisons often require larger plots than sprays.
- experiments involving spinning disc spreaders need at least double tramline plots, since there will be mixing of treatments between adjacent tramlines.

### CASE STUDY: AICC Crop Nutrition Club

One trial had three treatments, replicated three times. The yield results had confidence intervals of  $\pm 0.5$  t/ha.

Another trial had five treatments, unreplicated in short plots. The yield results had confidence intervals of  $\pm 1.2$  t/ha.



### 3. UNDERLYING VARIATION

The underlying variation in a field can be understood from:

- previous yield maps
- historical aerial images (available for free from Google Earth Pro)
- soil maps (e.g., soil type, nutrient, electric conductivity)
- satellite NDVI images, e.g., from [www.datafarming.com.au](http://www.datafarming.com.au), Climate FieldView, Contour, Omnia, Rhiza, SOYL, xarvio Field Manager, etc.

For most experiments, **choose a field that is as even as possible**. Avoid fields with obstructions, recent changes in management or where recent trials have been carried out.

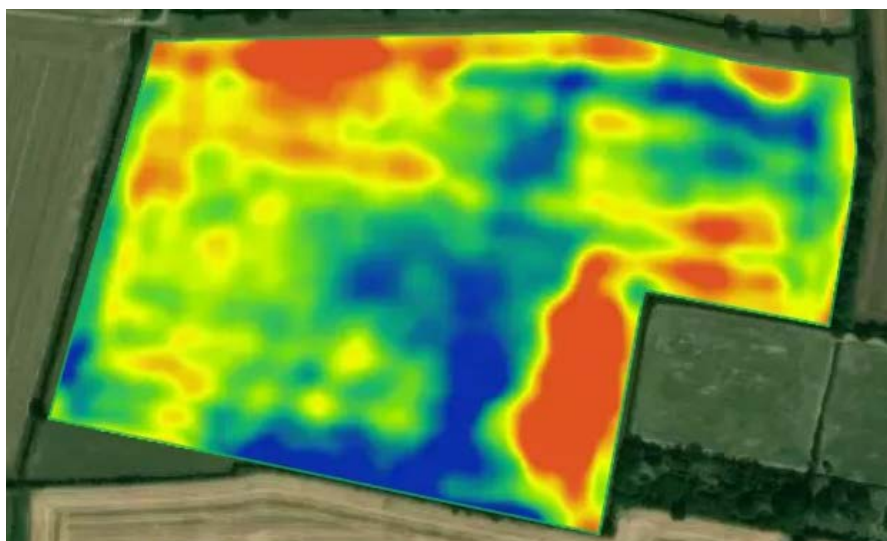
An exception is for trials of variable rate (VR) technologies versus flat rate, in which variation is necessary to allow benefits from the VR. However, aim for a field where **the main variation runs across the tramlines**, to make it fair.

In very large fields, choose the most suitable section of the field for the trial and leave out the rest. Avoid using headlands in the trial.

#### CASE STUDY: AICC Crop Nutrition Club

In this field, the west side of the trial area had lower NDVI (lower biomass) before the trial began.

Treatments 1, 3 and 6 were disadvantaged by this underlying variation, so the results were biased.



DataFarming NDVI image from before treatments (24/03/22)



## 4. REPLICATION

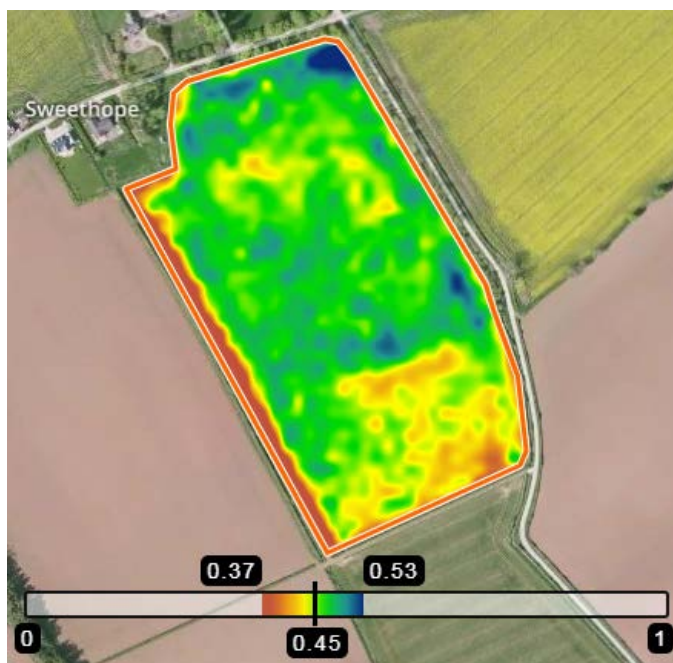
At the very least, place the strip of 'test' treatment with 'farm standard' on both sides, but where possible, **repeat each treatment two or three times**.

In a simple split field, it can be difficult to tell whether a difference is due to treatments or just to underlying variation, unless there is a very clear treatment difference at the line of the split. Replication makes it easier to distinguish real treatment effects.

Always **keep accurate records of treatment positions**. Place canes or flags in the field to mark tramlines with the test treatment, and record the GPS coordinates of treatments.

### Example good trial design:

Test treatment replicated three times, in alternating tramlines with farm standard control. Trial placed to avoid uneven area at south end of field, visible in NDVI image before trial began.



## 5. ASSESSMENTS

Yield results are the most important output of any trial, but it is also worth assessing during the season. Good options include:

- satellite NDVI: look before the canopy closes or as it senesces, since NDVI saturates mid-season such that treatment effects can't be seen
- visual differences and photos: stand on the boundary between two treatments and look up the field to spot effects
- counts of emergence (for a treatment applied at drilling) or tillering (for an early spring treatment).

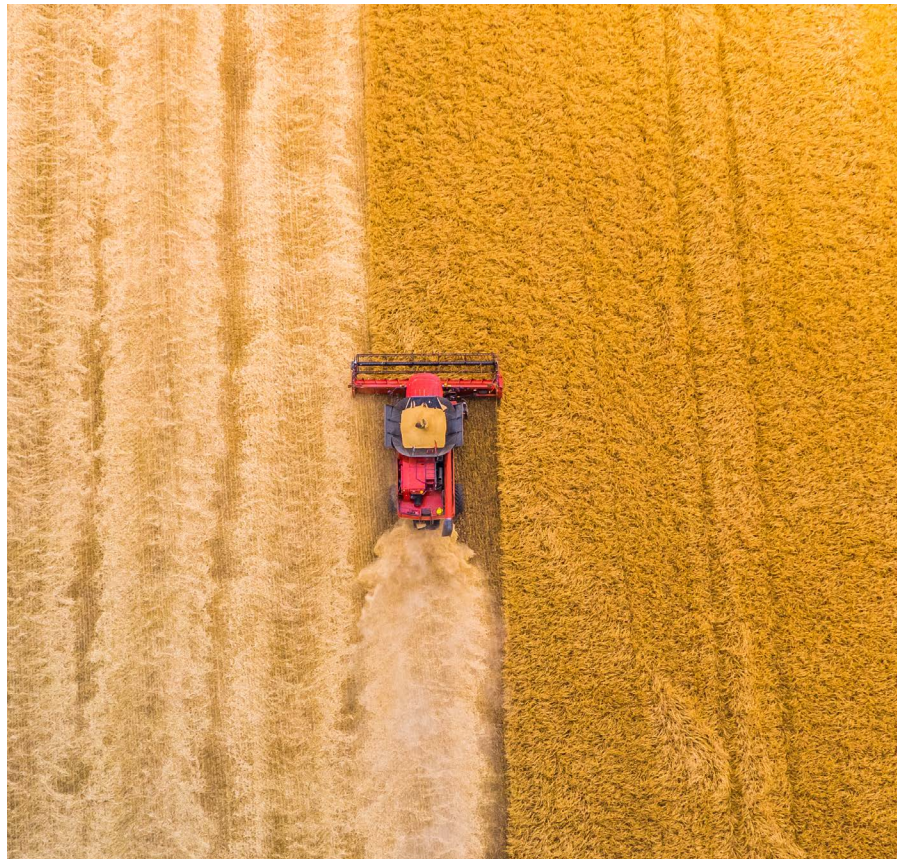
ADAS Agronomics is a system for analysing yield maps to determine treatment effects on yield, precisely and with robust statistics, to establish how confident we can be that a treatment effect is 'real'. Contact [agronomics@adas.co.uk](mailto:agronomics@adas.co.uk) for a quote for yield map analysis, or for other assistance with on-farm trials.

However, effective trials can be run without Agronomics, either using yield mapping and/or a weighbridge.

### HARVEST TIPS

With **yield mapping**, ensure the yield monitor is calibrated and the combine header is full wherever possible – some combines can accurately adjust recorded yield where the header is not full, but most can't. Simple yield map cleaning and analysis may be possible using farm software or free mapping software (e.g., [www.QGIS.org](http://www.QGIS.org)).

If using a **weighbridge**, ensure accurate measurement of the harvested areas to enable conversion of weights to yield.



When your trial is complete, please share the results on [www.farmpep.net](http://www.farmpep.net). By sharing trial results across the industry, we can learn together more effectively.



## CONTACT

Ask us how we can help.

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