2021 Field Lab Journal

Practical results from farmer led research
We face urgent climate, nature and health crises. The role that our farming, land use and food systems play in tackling these is vital, with farmers' decisions, skills and opportunities at the forefront. Practical on-farm research is helping farmers adapt, by exploring ways to make their farms more sustainable, resilient and agile in the face of unprecedented challenges.

Our unique collaborative approach to on-farm innovation benefits from the specialist advice and knowledge of our partners. Farmer groups are paired with scientists from the UK’s leading agri-research institutions. Across the UK, coordinators expertly facilitate groups, manage relationships and keep field labs on track. Field labs enhance collaboration between farmers, growers and the research community. Bringing a range of experiences together builds relationships and a better understanding of each other’s disciplines and perspective.

The programme also awards grant funding to help cover out-of-pocket expenses, equipment, materials, sampling and analysis to support the design and data collection for the trials. This reduces the risk for farmers who might not otherwise have the capacity to try something new.

Thank you to the members of our independent steering group chaired by Prof Tim Benton and our partners; LEAF (Linking Environment and Farming), Innovation for Agriculture, the Organic Research Centre and the Soil Association.

The network is part of the Duchy Future Farming Programme, and is funded by The Prince of Wales’s Charitable Fund through the sales of Waitrose Duchy Organic products.

The programme is also grateful to our funders and supporters

Thank you
What effective alternatives are there to plastic mulches in horticultural production?

Why

While plastic mulches are effective in controlling weeds, the environmental problems associated with their use are becoming increasingly clear. One of the most popular options available to growers - polyethylene mulch - is cheaply available, but quickly breaks down into soil and water courses. This field lab aims to find viable alternatives to polyethylene. A group of small and medium-scale market gardeners and a large-scale top fruit farm came together to find practical ways of reducing plastic use on their farms.

The trial compared a range of commercially available non-biodegradable and biodegradable film mulches, to evaluate their impact on weeds, crop yields, costs as well as other parameters. The range of products tested and compared with polyethylene included biodegradable starch-based film, woodchip, grass cuttings, cardboard and woven polypropylene fabric.

Trial Design

The trialists laid out the plots as per the example below, replicating this if possible, to make the data more robust. Mulches were laid to simulate normal practice.

Measurements

- Weekly visual estimates of percentage weed coverage at five points along each strip. Researchers to review photos of this to account for differences in perception between growers.
- General observations recorded at the same time as weed assessments.
- Total yield for each plot.
- Costs e.g. mulch materials, labour to lay mulches, cost of supplementary weeding.
- (Optional) Soil temperature, soil nutrient status, pest and disease severity, soil microbial activity, earthworm counts.

Current practice

Woodchip

Grass clippings

Cardboard

Biodegradable film

Onion weight and weed biomass at harvest on Five Acre Farm

Research concluded that there are range of viable alternatives to plastic - some local, some commercially sourced - that can reduce the need for weeding. All growers reported difficulty with biodegradable mulches tearing and disintegrating or detaching from the bed.

5 Acre Farm in Warwickshire, the translucent Novel Polish 1 mulch let more light in, allowing weed growth. The film was quickly punctured by weeds and disintegrated as a result. Yields in the weeded control were lower than mulched plots because mulching helped retain water in the spring.

Ash and Elm farm in Ceredigion, yields were highest under grass clippings. There was considerably higher slug damage in the biodegradable plots; 35% compared with 6% for the other mulches. The biodegradable film mulch blew off and needed replacing.

Feering Bury Farm in Essex, the mulches were equally effective at suppressing weed cover, resulting in slightly taller plants compared with the un-mulched plot.

Emma and Ben’s analysis

The trial has been extremely interesting. The fact we are looking at it scientifically and recording data means we know so much more about our crops than we would otherwise. The trials are an excellent thing to do on your own farm. The results are directly relevant to you and they mean a lot more than looking at some else’s trial. I’d encourage everyone to do it if they can.

Emma Maxwell, a market gardener on 2 hectares in mid Wales

Traditionally, we use black plastic film under the bushes that suppresses the weeds and we’re having to spend a lot of time picking up bits of black plastic as it breaks down - these are the microplastics of the future. I hope woodchip will be the most successful mulch, because we’d very much like to end up with a situation where we’re using entirely biodegradable mulches sourced from the farm. It would mean planting willows to sustain the quantity, but we have a good deal of spruce and poplar available too.

Ben Coode Adams, blackcurrant grower in Essex
Each of the two groups met ten times throughout the co-design process. At initial workshops, they shared their experiences of agricultural innovation and discussed why they should innovate in the first place. In subsequent sessions, they compiled a list of the issues the farmers experienced and scored each issue to rank their relevance, importance and solvability. After drawing maps and timelines to understand the issues further, the group decided on which ideas to take forward. Each technology design was supported by engineers and went through iterations of development and testing.

Trial Design

Why Can engineers and farmers work together to design technology that's fit for purpose, easy to implement and practical for on-farm use? That was the essential question the IKnowFood project was trying to answer. One of the first large-scale academic research projects to integrate a farmer-led approach into its methodology, IKnowFood brought farmers together with the Universities of York and Manchester. The aim was to try and find an alternative to the research and development philosophy that treats farmers as end users of a product, rather than involving them in the design process. During the field lab the farmers’ needs were taken onboard from the outset.

Two separate groups of mixed livestock and arable farmers from the Scottish borders and Yorkshire worked with engineers from the University of Manchester to co-design a range of tools to make their farming systems easier. This was complimented by research and facilitation by the University of York, which investigated how a co-design process can support the emergence of farmer-led innovations. The co-design model will ultimately be shared with other institutions to inform best practice in research and development.

The Results

The groups of farmers and engineers worked together to design four technologies:

1. An on-farm safety app which detects if a user is motionless for longer than an agreed period and remotely alerts colleagues. This solution is particularly tailored to staff working in sheds and barns where GPS technology can’t be relied on. This technology has received lots of interest with many farmers coming forward to test the app on Android systems.

2. An on-farm blood sampling tool (still in development) to rapidly diagnose infectious diseases which is especially useful for new livestock arriving on farms.

3. A livestock database phone app to help farm staff record and share notes on livestock. This app has since been distributed within the Innovative Farmers network for testing.

4. A leaf mimic tool that is placed within crops and notifies farmers of the presence of disease, such as rust before symptoms appear in the crop, giving farmers a head-start with treatment. This tool is still in the early stages of development.

Malcom and Jonathan’s analysis

In this field lab we had 10 meetings where we all put our ideas to the engineers and came up with solutions ourselves. We thought it was important to try and cover some of the health and safety aspects on the estate. During calving time, I’d be out during the night. The cows are very unpredictable at that time. There’s a high potential for them to strike a human. The idea of the app is that it alerts other workers around that something is going on. We’ve trialled other devices in the past but it would only give you an alert 3 or 4 hours after the incident happened whereas this device will tell you in around 1 or 2 minutes.

Malcom Wilson, herdsman at the Buccleuch Estate

The IKnowFood project has provided a fascinating insight into how agricultural science and technology development can become a truly collaborative venture. Rather than being led by ideas that emerge off-farm, our process started with problems that farmers themselves identified. A crucial step was to ask farmers two questions right at the start – “Why do you farm?” and “What are your positive and negative experiences of agricultural technology?” Each stage of the co-design process returned to these questions, ensuring the technology design choices maximised positives for farmers, and avoided the pitfalls of earlier agricultural technologies.

Dr Jonathan Ensor, Senior Research Fellow at University of York
Can lucerne improve the resilience of sheep systems in dry arable areas?

Why

With increasing likelihood of drought in many parts of the UK, livestock farmers, particularly in the east of England, have been struggling with the effect low rainfall has on the available forage for their livestock. Some may have to give up livestock production if solutions are not found. Farmers in this field lab set out to investigate grazing their sheep on lucerne, a legume that is widely used as forage for sheep in New Zealand and valued for its high yield, drought tolerance, protein content, and digestible fibre.

If successful, lucerne will make livestock farming more viable in drier areas previously dominated by input intensive arable production, enabling a return to mixed farming. The theory is that soil health will benefit from the nitrogen fixing qualities of lucerne as well as the reintroduction of livestock (and therefore manure) into arable farming rotations. As grazing lucerne can present a risk of bloat or red-variety, set up as a comparison.

Trial Design

The farmers established 6 hectares of lucerne and 6 hectares of a mixed sward containing ryegrass, white clover, chicory and plantain for comparison. Each field was split into paddocks for rotational grazing and stocked with twin-bearing ewe lambs. The lucerne grew whilst grass fields had browned off, despite a 50% greater ewe stocking rate in the lucerne field. The grass, herb & clover field needed further subdividing and five extra permanent pasture paddocks needed to be added to the rotation for the group of animals allocated to the control. Ewe lambs on lucerne initially had access to fodder beet and a back run of grass to help their gut digestion, and another 1.6 ha of grass to help with their gut biology adapt to lucerne. Their lambs were weaned on lucerne only.

Measurements

- Sward height, used for nutrient budgeting and estimating feed availability.
- Livestock weight, blood samples, faecal egg count, body condition score (ewes only), mortality data. These help the farmer group understand nutritional requirements, worm burdens and any adverse effects of grazing lucerne.
- Soil organic matter.

Extra Lucerne paddock – 2ha of a non-grazing variety, set up as a comparison.

The Results

Total weight gain per hectare of forage (ewes and lambs*)

* Lamb weights assessed at roughly 100 days after lambing. Assumption of a weight gain of 10kg per ewe lamb on lucerne from the point of lambing to weaning and a loss of 10kg per mixed-age ewe on mixed ley.

- The farmer reported consistently strong growth and drought resilience in the lucerne paddocks.
- Lucerne's fast regrowth means rotations can be reduced to 25 days prior to weaning.
- Lucerne caused increased photosensitivity and mortality from clostridial infections. The high protein nature of lucerne and rapid passage through the gut can cause bacteria to multiply.
- Constant access to roughage (high fibre) is important, as lucerne's high protein levels can cause digestive upsets. Growing with larger grass margins, e.g. with cocksfoot, would reduce the need for fibre to be provided.
- Three times as many sheep on the diverse sward required anthelmintic treatment compared to the lucerne-fed sheep.

David and Liz's analysis

With twin bearing ewe lambs, in the past we've taken one off and hand reared them just so we weren't asking too much of the ewe lamb and not having a negative impact on her future productivity. With this system we've left them on and the ewe is in the best condition she's been in. The plant is so leafy, there's such a huge amount of easily consumable feed in each little paddock that it takes them a short period of time to get what they need for the day. David Cross, farms a 385 hectare mixed farm in North Norfolk.

This year's weather showed the potential of lucerne over grass and white clover in dry conditions, but even lucerne was struggling before July's rainfall. Dave managed the crop well in its first year but identified a few issues – photosensitivity and post-weaning growth rates. We are taking advice from a professor in New Zealand on how to deal with this. For next year, we're tweaking a few things, including the age of ewe grazing and perhaps prioritising thinner ewes given lucerne's big advantage of weight gain in ewes. A herbal ley for grazing alongside the lucerne will also be added into the trial. We're also gathering a range of people to share their experiences of grazing lucerne with sheep, to help us decide what to look at in year two.

Liz Genever, researcher and group coordinator

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### Table: Total weight gain per hectare of forage (ewes and lambs*)

<table>
<thead>
<tr>
<th></th>
<th>Lucerne</th>
<th>Grass &amp; clover</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamb weight gain (100 days)</td>
<td>1400 kg/ha</td>
<td>400 kg/ha</td>
</tr>
<tr>
<td>No. lambs</td>
<td>3000</td>
<td>1000</td>
</tr>
<tr>
<td>Ewe weight gain/loss</td>
<td>800 kg/ha</td>
<td>200 kg/ha</td>
</tr>
<tr>
<td>No. ewes</td>
<td>500</td>
<td>100</td>
</tr>
<tr>
<td>Area (ha)</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Total weight gain per ha (ewes + lambs)</td>
<td>2000 kg/ha</td>
<td>600 kg/ha</td>
</tr>
</tbody>
</table>

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### Graph: Total weight gain per hectare of forage (ewes and lambs*)

- Lucerne
- Grass & clover

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Lamb weights assessed at roughly 100 days after lambing. Assumption of a weight gain of 10kg per ewe lamb on lucerne from the point of lambing to weaning and a loss of 10kg per mixed-age ewe on mixed ley.

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Lucerne, Grass & clover

* Lamb weights assessed at roughly 100 days after lambing. Assumption of a weight gain of 10kg per ewe lamb on lucerne from the point of lambing to weaning and a loss of 10kg per mixed-age ewe on mixed ley.
What soil management practices are effective at increasing deep burrowing earthworm numbers?

**Why**

Limited rooting depth is suspected to be a major limitation to cereal crop yields, as many crops have shallow roots that can't fully access water and nutrients below 40cm depth. In this field lab, farmers are researching whether sustainable soil management practices – like minimum tillage and organic matter application – can increasing rooting by boosting deeper-burrowing earthworm populations. Deeper burrowing earthworms provide multiple benefits to crops; they can aid water infiltration, help prevent waterlogging, and break up soil below the level that everyday machinery can access. This allows crop roots to take hold and access previously unavailable nutrients and moisture.

However, current numbers of deeper burrowing earthworms in many arable soils are suspected to be below historic levels. This is thought to be due to intensive cultivation, the use of artificial fertilisers, lower applications of organic matter and a reduction in rotations that include livestock grazing. As a result, the level of organic matter has been falling in the soil and depriving earthworms of their food source. This field lab hopes to strengthen the case for practices which increase earthworm populations.

Each farmer picked soil management practices that were relevant to their farming system, such as deep cultivation, strip till, direct drilling, but always included with or without farmyard manure. They set up different tramline trials, with some replicating these, in order to test the impact of these different soil management practices. All the farmers grew winter oilseed rape for the trial.

Measurements

- Counts of earthworms and middens - small accumulations of digested/plant material above the burrow of a deep-burrowing earthworm.
- Visual evaluations of topsoil and subsoil structure.
- Yield map data.
- Visual assessments of rooting in 1 metre deep soil pits.

Key

1. Strip Till
2. Deep Cultivation
3. Deep Cultivation + FYM
4. Strip Till + FYM

**The Results**

Soil health across soil treatments on Rory’s farm in Shropshire

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Organic matter as % of dry soil weight</th>
<th>Earthworms per 0.01m³</th>
<th>Middens per m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strip till</td>
<td>6.5</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Deep cultivation</td>
<td>7.0</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Strip till + FYM</td>
<td>7.5</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Deep cultivation + FYM</td>
<td>8.0</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Deep cultivation</td>
<td>8.5</td>
<td>6</td>
<td>9</td>
</tr>
</tbody>
</table>

Total number of earthworms and deep burrowing activity counted during spring assessments

- Soil organic matter was notably high for plots with added manure. Soil structure (assessed visually) was very similar across treatments, however differences would only be expected to show after several years.
- Earthworms were particularly abundant in plots which were treated with farmyard manure additions. This is because added farmyard manure provides a food source for the earthworms.
- Visual assessments showed a lot of evidence of oilseed roots growing down earthworm channels, up to depths of 90cm.
- The group is interested in doing further research to see if deeper crop rooting from utilising earthworm burrows has allowed more access to water and nutrients, thus positively impacting yields.

**Rory’s analysis**

“We’ve got our own beef cattle but previously we’ve always put the manure onto a spring crop of fodder beet or maize which don’t go through the whole farm rotation. This meant all our manure used to go on only 25% of the farm. The rest of the farm, which was in a wheat, wheat, oil seed rape rotation, never had any. I joined the field lab as I wanted to try and put some figures and facts on what the benefits of putting manure on the rest of the farm might be. So far for me the research has proved that manure is a definite positive upon the soil, the worm populations and upon the crop yield. It has had the biggest effect compared to cultivation. The trial on my farm seems as you would expect- but the other farms have not had the same results.

Rory Lay, farms a 457 hectare mixed farm in Shropshire
Potato growers in fenland areas like Holbeach Marsh lose considerable economic yield due to common potato scab. In other areas this disease is controlled largely by targeted irrigation for 4-6 weeks after the tubers start to grow. If growers could use slightly more brackish water for irrigation, it would reduce their reliance on freshwater. The farmer in this field lab, a member of the supplier group Nene Potatoes, can access water for irrigation from the fens, but this is often not used due to high salinity levels. Salty water can scorch potato plant leaves, if applied directly. The soil in this area is also hydrophobic, so overhead application doesn’t reliably reach the plant.

Drip irrigation could avoid both these problems, but the participants are interested to find out whether saline water might negatively affect soil structure or crop yield. The research will test different levels of salinity, pumped directly to the roots of the plants through drip irrigation and comparing that with traditional overhead application.

### Trial Design

The trial consists of 5 plots which were set up in a subsection of a field of Maris Piper planted in Spring 2020. Each plot received a different treatment. Intermediate bulk containers (IBCs) were filled and diluted with the corresponding salinity levels and linked up to each plot, 950ppm representing similar salinity to reservoir water in the area at the time of sampling and would represent a practical option for growers.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (E)</td>
<td>Overhead irrigation (950ppm)</td>
</tr>
<tr>
<td>B</td>
<td>Drip irrigation (950ppm)</td>
</tr>
<tr>
<td>C</td>
<td>Drip irrigation (2000ppm)</td>
</tr>
<tr>
<td>D</td>
<td>Drip irrigation (4000ppm)</td>
</tr>
<tr>
<td>E</td>
<td>No irrigation</td>
</tr>
</tbody>
</table>

**Measurements:**
- Canopy
- Yield and graded yield
- Soil quality:
  - Aggregate stability
  - Infiltration
  - Soil respiration
  - Soil moisture – probes were set up in plots irrigated with brackish water. Baseline soil samples were also taken at two soil depths to assess soils before saline-irrigation

### The Results

**The effect of water salinity and irrigation delivery on potato yield and grade**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Total yield</th>
<th>Potato grade &lt;45mm</th>
<th>Potato grade 45-65mm</th>
<th>Potato grade 65-85mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (E)</td>
<td>50</td>
<td>10</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>B</td>
<td>45</td>
<td>15</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>C</td>
<td>40</td>
<td>15</td>
<td>25</td>
<td>10</td>
</tr>
<tr>
<td>D</td>
<td>35</td>
<td>10</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>E</td>
<td>30</td>
<td>5</td>
<td>15</td>
<td>10</td>
</tr>
</tbody>
</table>

- Higher levels of salinity did not impair potato yield or grade.
- Although unirrigated plots had the lowest overall yields, this is not statistically significant. Regular rainfall events from July-Sept meant that yields were not strongly impacted by the presence or absence of irrigation.
- As expected, tuber quality and skin brightness were better in irrigated plots. All salinity levels and irrigation delivery methods controlled common scab equally well and resulted in similar levels of skin brightness.

### David and Iain’s analysis

**The exciting bit for me is looking into how we can use our water more efficiently. Drainage and irrigation are going to become more important as our climate changes. We are getting more sustained wet periods and more sustained droughts. So, we need to be able to get rid of water more efficiently or put water on more efficiently. We haven’t got a lot of fresh water around here it’s mainly salty water. So, if this research gets the results I am after, it means there is more water in my drains and dikes that I could use for irrigation purposes rather than it just going out to the North Sea. And that’s applicable to farmers in quite a wide area of the fens, from Kings Lynn up to Boston.**

**David Hoyles, farms a 700 hectare arable and field vegetable farm in the South Lincolnshire**

**This field lab has been an excellent group effort. I am really pleased with the process, especially as we started just after lockdown. Applied research into how soils and irrigated crops adapt to increasing salinity is becoming more important. In a changing climate with increased sea level rises, more water shortages and increased ground water salinisation, we will potentially face more water issues in the irrigated areas of eastern England so working with farmers on this is very important.**

**Dr Iain Gould, researcher, University of Lincoln**
Measuring and reducing production losses in the blackcurrant sector

Why

Food surplus and waste in primary production is estimated to be 7.2% of all food harvested in the UK. This would have a market value of £1.2 billion at farm gate prices. Some of this waste is down to supply chain structures and market fluctuations out of farmers control. Farmers involved in this field lab wanted to look at what waste percentages, there are in their farm systems, if any, and what caused this to happen. Over the last two years, a series of field labs have been set up to look at practical ways of monitoring this issue and finding solutions to on-farm food waste across a range of sectors.

One of these sectors is blackcurrants. Through the Innovative Farmers programme, growers teamed up with the resource efficiency organisation WRAP and sustainability consultancy 3Keel to investigate on-farm efficiency. The objective of the research was to find practical ways to measure pre-farm gate waste and identify waste reduction opportunities.

Trial Design

The group first met virtually to discuss the drivers of on-farm losses, the hotspots where waste occurs, and ways that the group could go about measuring this waste. Sampling was split into 5 sample points, 3 metres long each. This included one end of row, where losses were thought to be higher due to the functioning of the harvesting machine. The growers laid down sheeting a week before harvest to collect and weigh berries that dropped prematurely. Immediately after harvest, berries remaining on the bush and ground were collected and weighed.

The Results

<table>
<thead>
<tr>
<th>Farm</th>
<th>Preharvest losses</th>
<th>Postharvest losses</th>
<th>On bush</th>
<th>On floor</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>64</td>
<td>4</td>
<td>33</td>
<td>37</td>
</tr>
<tr>
<td>B</td>
<td>78</td>
<td>6</td>
<td>29</td>
<td>39</td>
</tr>
<tr>
<td>C</td>
<td>61</td>
<td>5</td>
<td>36</td>
<td>25</td>
</tr>
<tr>
<td>D</td>
<td>78</td>
<td>4</td>
<td>36</td>
<td>32</td>
</tr>
</tbody>
</table>

Losses by producer (% of total produced)

Rosie and Catherine’s analysis

I was shocked by the results. I now know waste is an area we should improve when I previously thought we were pretty efficient. We do lots of mini trials on our farm that inevitably we don’t record in the correct way, so the results are lost. With Innovative Farmers, it’s all written up in an easy way that we can share with other growers. We want to present our findings to the other 35 blackcurrant growers and work out how we can become more efficient as an industry.

Rosie Begg, blackcurrant grower based in Norfolk

The field lab worked particularly well because the structure of the blackcurrant industry facilitates collaboration and the growers don’t see each other solely as competition – this is also greatly helped by Ribena’s support. The findings were significant, shining a light on an area that the growers hadn’t spent a lot of time looking at, and gave them something to work with moving forward.

Catherine McCosker, researcher, 3Keel
Perspectives from the field

Why we need more farmer-led research

The really great thing about field labs is that it’s farmers deciding what they want to research, having the technical support to enable them to do it and Innovative Farmers have given us a fantastic framework in the field lab for doing that. Farmer led research speeds up innovation without question because it’s immediate. You can see something, and immediately respond to that.

Ben Coode Adams, grower in Essex
Plastic free mulch field lab

Knowledge exchange is really important but it’s also about [the] need to connect the researchers and the facilitators together to bring some order to it and to quantify it. Larger on-farm trials are more realistic because you’re subjected to the impacts that a real farm has to deal with, so farmers can relate to it more.

Clive Bailye, farmer in Staffordshire
No till and living mulch field lab

It’s quite difficult to bring farmers to the table and tell them they could do things differently, so if we can bring a different ways of doing things and showcase them working in a practical way, that will help bring about positive change. And when farmers come together in a process like this, one of the biggest things they gain from is just being able to talk to each other.

Annie Brown, farmer in Sussex
Nitrogen-free soil treatments for grassland productivity field lab

Field labs are a golden opportunity to get together and talk about innovations with other farmers, something we wouldn’t usually do in social situations. The level of learning between our group has made us think a lot harder about what we do on our farm.

Sylvia and Will Terry, farmers in Yorkshire
IKnowFood field lab

Farmers have been doing trials on their farms forever in one form or the other. You might try a bit less fertiliser here and a bit more fertiliser there. Innovative Farmers has come along and given us the ability to put the numbers and knowledge into what we learn on farm. We can all go out with a spade to look at our soil and see if it’s improving or not but having researchers on board means they can bring a robust science that matches our practical knowledge.

James Alexander, farmer and contractor
Participant in multiple field labs

It’s important for farmers and researchers to work together because there’s a lot we can learn together. Without speaking to farmers who are out there every day, tending a crop, keeping their eye on everything there’s lots of things that wouldn’t occur to us as researchers. By working with farmers and by understanding their issues, we can come up with solutions that are much more likely to be of use and be taken up by the industry.

Judith Conroy, University of Coventry
Researcher on plastic free mulch field lab

Testing on real working farms means you can work with larger areas and in realistic farm conditions, with variations in fields that are naturally there. Farmer led research is important because it’s answering our questions. What the farmers are actually dealing with day to day or year to year. The scientists then put the scientific results and statistics together to tell us what we see and feel is right is actually true.

Rory Lay, farmer in Shropshire
Deep burrowing earthworm field lab

We’re constantly trialling different techniques to see what works best for the farm but we’re never able to get the scientific confirmation of what we’re seeing. I’m really looking forward to having the figures in black and white. Carrying out this research at farm scale means we can test what works and what doesn’t in real farm conditions.

Alex Jasinski, farmer in Lincolnshire
Catch crops field lab

Going forward we anticipate more of our funding opportunities will be for applied research so it’s really important that more researchers make links with industry partners. Industry moves really quickly and we as the research community really benefit from these kinds of connections it’s vital we don’t miss out on exciting opportunities.

Dr Iain Gould, University of Lincoln
Salinity control and drip irrigation for silt soils field lab

A farmer working with a researcher is a bit like ‘you scratch my back, I scratch yours’. When we’re encouraged to work towards the same goal the different perspectives and areas of expertise can be very mutually beneficial. We all want to be moving our businesses forward.

Shona Phillips, farmer at Sparsholt College in Winchester
Reducing antibiotics field lab

Got an idea for a field lab? Contact info@innovativefarmers.org or 0117 987 4572
Field labs on the horizon

Strip grazing in pig farms – Pig farmers will look at the practicalities of implementing a strip grazing system, which has the potential to reduce the impact of pig production by allowing larger areas of paddocks to recover from grazing and more evenly distributing faeces and urine, thereby reducing soil erosion and reducing nutrient runoff. They will be supported to measure the impact on sow health, sward coverage and biodiversity, and nutrients in the soil and nearby watercourses.

Collective approach to improving soil health in the Westmorland Dales – A farm cluster group in Cumbria will work with researchers to compare ways to measure soil health across their farms, choosing a toolkit that is useful and relevant to the farms and landscape in the North West. They will then work with advisors to plan and implement management changes that will be monitored using the chosen toolkit of techniques.

Introducing silvopasture to grazing systems – Eight farmers will plant silvopasture systems with a range of designs, to understand the potential return on investment of integrating trees with livestock and monitor the impact on livestock welfare and behaviour, soils and biodiversity.

Nutrition in pig farms – This trial will look at trialling a dietary supplement to determine if changing nutrition is an effective strategy to reduce excreted minerals and nutrients, with subsequent implications for soils and runoff.

Sap flow sensors in tomatoes – Tomato growers will install sap flow sensors in greenhouses to inform their optimisation of water inputs and environmental conditions. They hope that the knowledge generated will help reduce losses from tomato splitting and blossom end rot.

Biochar for carbon sequestration in orchards – This trial will look at the practicalities of producing biochar on farm from prunings and grubblings, and its potential as a soil amendment. The exact research question will be determined after an initial desk study has taken place.

Organic hops varieties – Organic hops growers will test varieties that are hoped to provide more resistance to diseases and pests under organic production. They hope to compare price, yield, ripening times, resistance to disease and pests. Quality will also be assessed with the help of a brewery.

How to set up a field lab

1. A group of farmers or growers come together around an idea
2. Farmers are matched with a researcher and coordinator. Together they turn an initial idea into a field lab to explore a challenge or trial a new farming practice
3. The group decides together what data to record and monitor, ensuring the trial is both scientifically robust and practical for a working farm
4. The group analyses the findings and identifies what has been discovered. The results are shared with the farming community, online and in the media

Find out more about these live and upcoming field labs, and how you can get involved at innovativefarmers.org
Innovative Farmers puts farmers in the driving seat of research to help speed up the adoption of sustainable farming practices in the UK. By introducing farmers and researchers to the benefits of on-farm research, they are supported to collaborate and find solutions to future opportunities in farming. Our overall aim is to enhance the sector’s knowledge and understanding, making the results open to all so everyone can benefit.

Have an idea for a field lab? Could your organisation support the programme? Get in touch:

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