



## Back to the future

Advances in technology are changing the way food is produced across the globe. CPM seeks advice from the experts on what to consider before investing, as well as taking a look at some of the latest innovation on the market.

By Charlotte Cunningham

**When we look back to the days where a plough was operated with a horse, it's remarkable to see just how far innovation has progressed.**

In recent time, a big part of this has been down to the advances in precision technology, robotics, and automation. And while not all are convinced about the benefits, the importance of this area, in this new generation of agriculture, is certainly increasing, says Michael Haverty, senior research consultant at The Andersons Centre. "When we previously examined in detail the adoption of precision technology (across all sectors) back in 2017, the uptake of soil mapping for instance was sitting at around 25% — up from 20% in 2012. In 2019, the overall adoption in England was estimated at 29%, though for the cereals sector specifically, this is significantly higher (47%)."

Though the technology on the market now can provide some really impressive benefits — like soil mapping, robotic weed and pest management and variable rate applications — there are a number of factors to consider before making a potentially costly investment, warns Michael. "Having access to this type of

innovation now has scope to bring value to a business, for example, providing growers with a more in-depth insight into the condition of their soils, and crops, so they can tailor inputs accordingly — which is beneficial from both a management and a cost saving point of view.

"However, it's essential that any investment brings about a tangible return."

So how do you ensure that it does?

"Andersons has been evaluating the return and cost of investment on our Loam Farm Model — with the 2019 update set to be presented at Cereals LIVE — but when we last did the analysis, we found that there was scope to increase yield through the use of precision technology," explains Michael.

Looking at the figures, the Loam Farm was able to generate a 1.3% improvement on yields and a gross margin increase of 2% across the whole farm. "Obviously, this doesn't reflect a massive surge in profits, but it's still incredibly



*It's essential that any investment brings about a tangible return, warns Michael Haverty.*

significant. Often, it's these marginal gains that make the biggest difference to the bottom line."

With most on-farm machinery now fitted with some form of precision technology as standard — such as auto-steering — an investment in training could also be really beneficial, adds Michael. "Most new purchases coming on to farm now have the capacity to collect data and provide input to make precision decisions, without requiring significant additional investment from growers. However, there's often a lot of uncertainty with how to get the best from this technology, so investing in some training could help to generate a bigger return on farm."

While technology can play a particularly useful role in modern day scenarios, it's essential that the general principles of good farming don't get overlooked, adds Michael. "If you don't get those right, it's likely to have a much bigger impact on profitability — and not in a good way."

### Small Robot Company

Looking to the tech on the market at the moment, Small Robot Company recently announced a potentially game-changing robotic monitoring and treatment system for slugs, which is anticipated to enter early field trials in summer 2021.

The new 'SlugBot' project aims to develop an innovative technology for autonomous slug monitoring and precision treatment of bio-molluscicides, and according to SRC is a major technological milestone which will provide a post-metaldehyde future solution for farmers.

The initiative is being led by Dr Jenna Ross from UK Agri-Tech Innovation Centre, Crop Health and Protection (CHAP), in collaboration with the SRC, COSMONiO, a British artificial intelligence start-up; and Devon based farming

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The Andersons Loam Farm was able to generate a 1.3% improvement on yields and a gross margin increase of 2% across the whole farm through the use of precision technology.

“Phase two will then look to deliver slug detection using SRC’s ‘Tom’ robot. This will use hyperspectral imagery and artificial intelligence to detect slugs both at scale and autonomously. “Mobile imaging of slugs and field-surface

materials in glasshouse conditions is anticipated by autumn 2020 and the detection and mapping of slug infestations is anticipated to be delivered in-field in spring 2021.”

Phase three will then focus on the ▶

enterprise, AV and N Lee.

“I travelled the world in 2018 as a Nuffield Farming scholar and noticed a gap in the market for autonomous slug monitoring,” says Jenna. “In addition, bio-molluscicides are currently too expensive for use in arable crops. Therefore, this game-changing project fills a market demand and opens up an exciting opportunity for farmers.”

Ben Scott-Robinson, Small Robot Company, believes that robotic slug control is the natural next step for the firm. “Precision robotics has tremendous potential for agriculture across the board. Slugs are a terrible bane for farmers — they can decimate emerging crops and have a significant impact on yield — but treatment is problematic.

“Both water and wildlife have been impacted by chemical methods. Legislation is looming — farmers require an affordable alternative.”

The technical development kicked off last month and phase one of the project will focus on developing the artificial intelligence slug detection capability, including with multispectral imagery, says Ben.



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# innovation showcase

► development of precision spraying, delivering an in-field slug treatment solution with SRC's precision spraying 'Dick' crop-care robot prototype for autumn 2021.

The slug control service will be the next phase in SRC's 'Dick' crop-care robotic service, following its first commercial service to deliver non-chemical weeding.

The longer-term plan is to deliver a holistic service for all aspects of arable crop care and protection, including the ability to handle all pests and diseases, as well as no-till precision planting, adds Ben.

"We believe our robots are the tractors of the future. Essentially, they're multifunctional



*The mission of AgreCalc's soil sequestration tool is to assess what is technically feasible to get a farm, or supply chain, to lower carbon emissions, explains Julian Bell.*

workhorses with the potential to integrate just about any agricultural functionality."

## Claas

Tackling the minefield that is on-farm data collection and usage is Claas, who launched Claas API at the end of last year, in a bid to help facilitate smooth data exchange.

The new Claas API was designed to provide an interface between Telematics and third-party Farm Management Information Systems (FMIS) — making it much simpler for farmers to use their chosen software solution for planning and documentation.

According to Claas, the API enables Farm Management Systems to easily exchange data with Telematics. "The open standard interface with defined processes and support mechanisms is available to all interested suppliers of Farm Management Systems," says Edward Miller, Easy product manager at Claas UK.

"To connect their Telematics system to their chosen FMIS, farmers simply have to enable data

exchange in Telematics. Once this process is complete, data is exchanged between the connected systems automatically. This makes documentation tasks easier for the farmer and avoids errors and data losses."

The "automatic documentation" add-on module automatically assigns recorded data to the fields which have been worked.

To put this into a practical scenario, The Claas API enables field boundaries to be synchronised with Telematics, says Edward. "This allows them to be maintained centrally in one system.

Automatic documentation data on consumption, time and yield for individual fields can then be transferred to the Field Management System.

Several FMIS suppliers have already enabled the data exchange system, with more expected to follow in the future, these include:

- Cropio
- Trimble
- Omnia (Hutchinson)
- SOYL
- Climate FieldView
- 365FarmNet
- SEGES
- MyEasyFarm

## AgreCalc

As pressure mounts on UK agriculture to be more environmentally aware with its practices, the importance of capturing, measuring and sequestering carbon has been pushed into focus.

Not only has this become a priority in the field, but also for the wider supply chain, government, and even financial institutions, as the world looks to reduce the carbon footprint of land use and food production.

In response to this apparent growing requirement for simple, accurate carbon auditing tools, SAC Consulting — part of Scotland's Rural College — has developed a new soil sequestration module for its AgreCalc platform.

For those who are yet to come across it, AgreCalc is used by a host of retailers and their supply chains, corporate farming businesses, and by governments to track carbon payments schemes.

## Top tips for investment

For those sitting on the fence over whether or not to invest in precision or robotic technology, Michael highlighted his top tips for consideration

1. Focus on the value of it to your business — to be successful, any financial expenditure has to have a return on investment.

2. Be clear on what you need or require from the investment — if this is data-collection software, for example, what is the data going to tell you? Will it really inform your decision-making, or will it just distract you?

3. When it comes to selecting the exact technology, think about how inter-operable it is — does it facilitate data/knowledge exchange easily or not? Can it be integrated with other platforms or tools? If not, this could be a hidden hurdle that impedes the true value of the technology.

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The latest addition to the tool is a soil sequestration module, which has been much anticipated by the industry, says Julian Bell, AgreCalc's business lead. "We've always viewed carbon as part of accounting and of farm efficiency calculations, and it's increasingly being seen as a good discipline for business."

The mission of the tool is to assess what is technically feasible to get a farm, or supply chain, to lower carbon emissions, and the ultimate goal of net zero, where viable, he adds.

"AgreCalc takes farmers beyond a simple tick-box tool, to one that assesses all the farm practices and looks at layers of change — from the simple to the more complex — to improve their efficiencies.

"We have a model farm that allows us to examine how management practices contribute to carbon reduction. Importantly, this now considers the role of soils and their management."

Typically, most farms can attain the first 10-15% of carbon reduction with changes in practices, explains Julian. "The next level of 10-15% improvement should be feasible from more significant investments such as new machinery or systems' changes, while achieving 30-40% reduction is likely to require more drastic measures such as afforestation."

Some of the strongest recent interest in the tool is coming from farmers themselves, as well as the more established supply chain and governments, notes Julian. "It's free for farmers to use as a single licence and is very easy to operate, taking around one to two hours to input the information.

"What farmers like is that it's another way to look at their business, it's a great way to feed their competitive nature and it's making them examine the nitty gritty to deliver more profit."

Companies and institutions pay for the service via a user licence-model, and all profits are invested back into the system to further develop its capabilities and to keep it scientifically up to date, he adds.

Despite the number of scientific models and studies used within the feature, AgreCalc's agricultural modeller is simple to use, adds AgreCalc's Dr Alasdair Sykes. "Calculating emissions from farming systems is often complicated because agricultural production is complex and decentralised, and the data gathering process is multifaceted.

"Added to this, farmers may often be subjected to information overload regarding their emissions, with much of it often being contradictory."

He adds that the aim with the all-new AgreCalc soil carbon module has been to make accounting for soil carbon sequestration easy via a simple interface, while still extricating the all-important farmer effect, versus what would happen naturally.

"The core elements of this are land-related variables, such as soil type, climate and land



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use, overlaid with management factors, like tillage, and finally factors relating to inputs to the soil, such as fertiliser or manure."

To find out more about how one farmer has benefited from the AgreCalc tool, check out this month's Climate Change Champion article on p65. ■

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