Background

The Covid-19 pandemic restrictions and Brexit have contributed to a shortage of agricultural labour in the UK. This, along with the pressure on agriculture to be more sustainable, environmentally-friendly and cost-effective, is driving the need for innovative agri-tech solutions.

But while the pandemic and Britain leaving the EU may have accelerated the approach to automation, harvesting specialist produce by any other means than manual labour remains a challenge. And it is one the Agri-EPI Centre is helping a consortium led by Earth Rover to meet head on.

Automation in harvesting was a decades-long focus for one of Earth Rover’s founders Professor Simon Blackmore, of Harper Adams University, who pioneered research in the UK on agricultural robotics.

Across the road from the campus, at the Agri-EPI Centre in Newport, Shropshire, Earth Rover is continuing his work to develop a world-leading proof of concept broccoli harvesting machine.

Chief executive of Earth Rover is David Whitewood. He said: “One of the challenges in our sector is that it is so big and very fragmented and harvest automation is a problem across the whole of the specialist produce market from apple and berry picking to asparagus and courgettes – it’s all very manual and labour intensive.

“While you might technically be able to produce a robotic system which can cut a head of broccoli so it can replicate what a human is doing, that might not be the best approach to doing it from a whole business perspective. This is why having access to the support which the Agri-EPI Centre provides is so important.”
Earth Rover began as a result of a challenge faced by Pollybell Farm in Yorkshire – one of the UK’s largest organic broccoli producers.

David, who was brought on board in 2017 to help move the Earth Rover project toward commercial development, said the farm was keen to understand how technology could help with both the counting of crops and new approaches to weeding.

What’s been developed is Earth Rover’s ‘crop scouting’ system, which aims to predict the size and timing of harvests and uses cameras fitted to a tractor to scan the plants and measure their growth.

The data is then analysed using artificial intelligence (AI) on board a supercomputer on the vehicle. The next stage of the project is R&D into robotic systems for weeding, using lasers, and harvesting, with trials ongoing.

David said: “People have been trying to solve this issue since the 1970s and there is still no automation for broccoli harvesting. It has taken intensive research and development and importantly, funding.”

Earth Rover – which uses technology developed for the Mars Rover project – secured grants from the European Space Agency, Innovate UK and has an engineering team based at the Agri-EPI Centre leading the harvesting information project.

A field test of a rig was completed last season and the factory test of a field prototype was carried out at the Agri-EPI Centre in Newport in December 2021. The team is currently building a field trial prototype for this season.

David added: “If successful in trials, we’ll move toward commercial production, building multiple machines for customers, creating new jobs and investing in production facilities.”

About Earth Rover
How Agri-EPI has made a difference

David is in no doubt that the role the Agri-EPI Centre has played in the development of Earth Rover is invaluable – he says others may mimic the offer, but what the AEC has is unique.

“The quality of the accommodation is amazing; not only do we have the office space which is great but the workshop too – that’s a pretty unique situation for a start-up company to find itself in.

“It’s extremely rare to find such modern workshop space, including crane facilities, and the security and safety we need to undertake the tests we need to do. Security is key – knowing that we don’t need to worry about kit and machinery being stolen and eliminating the potential disruption to the business means we can focus on the R&D without those concerns.

“I don’t think a start-up would find this type of facility commercially, so you’d be working in the back of a farmers’ shed or similar and a farm environment is busy, so there’s potential disruption to farm operations.

“But the Agri-EPI Centre doesn’t just provide facilities for research and development, it provides real expertise in everything from understanding carbon costs to help with funding bids.

“It’s really, really hard to write a successful funding bid and competition is tough – having expert eyes to review, make suggestions, and challenge us has been particularly useful. It’s certainly resulted in us receiving funds which we might not have secured otherwise.”

In June 2022, the Agri-EPI Centre partnered with Earth Rover to secure an additional £393,725 of funding from UK Research and Innovation (UKRI) as part of Defra’s Farming Innovation Programme.

The award will support an approach to harvest the whole plant, opening up the potential to create valuable and nutritious plant-based foods from what was previously seen as crop waste. It will aim to automate broccoli harvesting to increase grower productivity and resilience towards net zero.

David says the network provided by the Agri-EPI Centre has also resulted in significant supply chain opportunities.

“We’ve had some great introductions to harvesting machine companies, some wiring specialists and also to local skills – if we’re building something and we need a welder, for instance, this has been really valuable.”

David is convinced that the agri-tech sector itself is making strides forward thanks to Agri-EPI Centre support – but believes there is more which can be done.

“There will be plenty of innovative research and development projects which don’t even get off the ground. Often that’s because they don’t have a base, access to facilities or help to access funding. All of which we have secured through the Agri-EPI Centre.

“If this kind of help was available to more startups and indeed established businesses looking to innovate, we would be able to solve the challenges faced by our sector more quickly.”

“The facilities, expertise and network at Agri-EPI Centre are amazing. There’s no way a start-up would find a set-up like this commercially. With Agri-EPI Centre support, we are on the way to solving a decades-long sector-wide challenge – developing harvest automation for the specialist food produce market.”

– David Whitwood
CEO, Earth Rover