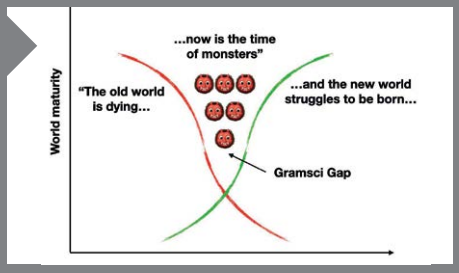
ISSUE 35 | JANUARY 2026

# TECH FARMER

TECHNOLOGY FOR FARMING

TECH MAGAZINE

# Mind the gap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# MIND THE GAP:
## WHY UK AGRITECH IS STUCK IN THE "TIME OF MONSTERS"

WRITTEN BY CHRIS FELLOWS

The promise of a high-tech farming future is here, but for many UK farmers it remains tantalisingly out of reach. We are caught in a dangerous limbo: a "Gramsci Gap" where the old ways of farming are dying, but the new, tech-driven world is struggling to be born.

As a farming journalist (self-declared non-official title), I've seen more than my share of glossy brochures and slick presentations showcasing the latest in agritech. Drones that map fields with pinpoint accuracy, robots that zap weeds with lasers, and AI systems that predict yields to the last kilogram. This is the future we've been promised: a cleaner, more efficient and more profitable agricultural sector. Yet, for all the hype, a walk around the average UK farm tells a different story. The reality on the ground is one of frustratingly slow adoption.

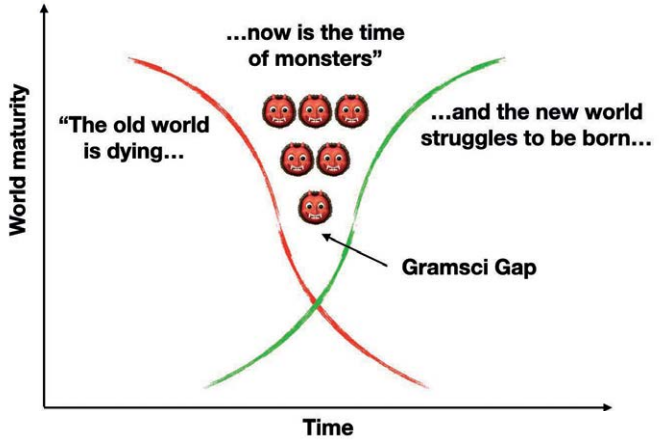
This isn't just a feeling; the numbers back it up. A recent Barclays report found that while six in ten farmers want to invest in new technologies, significant barriers are holding them back. We are stuck in what the Italian philosopher Antonio Gramsci called an "interregnum": a gap where "the old is dying and the new cannot be born." In this gap, he warned, "a great variety of morbid symptoms appear." For UK agriculture, these symptoms are all too familiar: crippling uncertainty, wasted innovation and a growing sense of pessimism.

### The old world is dying

There's no doubt that the traditional farming model is under immense pressure. Volatile markets, soaring input costs, unpredictable weather and a seismic shift in government support have left many farm businesses on a knife-edge. A staggering 74% of British farmers are pessimistic about the future, with more than half considering leaving the industry altogether, according to a sobering 2025 Farmdex report. The old certainties are gone. The system that has sustained British farming for generations is proving increasingly unviable. It is, in Gramsci's terms, dying.

### The new world struggles to be born

In its place, a new world of agritech promises solutions. But this new world is struggling to take root. Why? Because the bridge to get there is riddled with potholes. The Barclays report highlights the key obstacles: nearly half of farmers cite an unclear return on investment (45%) and prohibitive upfront costs (41%) as major financial barriers [1].




Beyond the farm gate, the problems are systemic. A lack of clear, long-term government policy creates a fog of uncertainty, discouraging long-term investment. Poor rural broadband and mobile connectivity mean that even if a farmer buys the latest cloud-connected gadget, they may not be able to use it. Add to this, a persistent digital skills gap in the agricultural workforce, and you have a perfect storm of barriers preventing the new world from being born.

### Living in the "time of monsters"

This is our Gramsci Gap. We are caught between a dying past and an unborn future. And in this gap, "morbid symptoms" or "monsters", as one translator put it, are multiplying.

One of these monsters is **wasted potential**. Billions are being poured into developing brilliant new technologies that never leave the lab or the trade show floor. Another is **deepening inequality**, creating a two-tier farming system where only the largest, best-capitalised farms can afford to cross the tech divide, leaving smaller family farms further behind.

But perhaps the most dangerous monster is **despair**. When farmers see a future that is both necessary and unattainable, the result is a corrosive pessimism that saps the energy and innovation from our most vital industry. This is the true cost of being stuck in the gap.

To escape this time of monsters, we need to build a bridge. This requires a concerted effort from all sides. The government must provide a clear, long-term strategy for agriculture and invest in the rural infrastructure needed to support it. Tech companies need to design solutions that offer a clear, demonstrable return on investment for the average farm. And as an industry, we must champion the training and upskilling needed to create a workforce ready for the future.

Until we do, UK farming will remain stuck in the dangerous and unproductive space between two worlds. The future is there for the taking, but we must first find the courage and the collective will to bridge the gap.

#### References

*[1] Barclays. (2025, April 3). Agritech - sowing the seeds to Britain's farming success. Barclays. Retrieved from https://home.barclays/news/press-releases/2025/04/agritech---sowing-the-seeds-to-britain-s-farming-success/*


# **TRADITION**, TRIALS AND TECH

Running both a specialist engineering business and his small family farm in Lincolnshire, Chris Marshall has learned to spot opportunities and adapt quickly. Now, after a successful first year as a farmer trialist in a project led by the British On-Farm Innovation Network (BOFIN), Chris has committed to two more Defra-funded projects.

The instinct to innovate runs deep in the Marshall family. Over the past century, the farm at Gedney Hill near Spalding has produced soft fruit, dairy products, pigs and chickens, potatoes and onions, cut flowers and cereals, each shift marking a decision to adapt to new opportunities and changes in the marketplace.

Chris Marshall is continuing that, using trials and technology to build knowledge, resilience and a sustainable business. However, farming wasn't his original career plan.

"Much as I loved the farm, I knew there was no job here for me here when I left school," he says. Instead, he embarked on an engineering apprenticeship scheme and qualified as a foundry engineer. He enjoyed the work, but after 11 years he recognised his dream to work in agriculture and jumped at the chance to join Bayer Crop Science as a seed treatment engineer.

"Working with Bayer gave me a broader view of farming, from agronomy and seed treatments to

trials," Chris says. "I did my BASIS and FACTS qualifications too which really accelerated my interest." The seasonal commitments of the business – and his ability to work from home – gave him the flexibility to get involved in the family's arable unit alongside his father, Colin.

And while Chris's ambitions for the family farm grew, Colin was keen to take a step back. This led them to divide the business, with Chris initially taking on around 8-12ha of the 40ha holding.

In 2022 Bayer made the decision to close its seed treatment business and Chris was made redundant. However, he turned this change into an opportunity and, together with a colleague, bought the seed treatment engineering business from their employer. Now having grown the business further (and recently taken on their first employee), they

manufacture and maintain equipment across the UK and Ireland as ProSeed Technology.

## Small farm, big ambitions

Meanwhile, Chris has increased his proportion of the family farm and is now responsible for around 32ha although he and Colin continue to work together across the whole farm, he explains.

Decisions on cropping, cultivation and chemistry are Chris's domain, while his father provides practical support.

"We're lucky," says Chris. "You hear a lot about farming family tensions, but we're open to each other's ideas. He enjoys being involved and is happy for me to make most of the decisions."

This has included Chris's desire to pursue a more regenerative approach – increasing focus on soil health to reduce spend on chemical inputs. "Studying for my BASIS and FACTS qualifications gave me a really good handle on modern agriculture, while learning about regenerative principles gave me another view.

"For me, it's about combining both approaches. I don't particularly like using chemicals, they are so expensive, and I believe with the right management we can significantly reduce the need for them. So, when someone says to you that if you look after your soil in the right way and minimise cultivations too, then you don't need to apply those chemicals, it's a very exciting prospect."

The farm's rotation is cereals, oilseed rape and beans, but like many small arable units, the challenge is to remain profitable without economies of scale. That's why Chris is so committed to trial work, not just as a means to finding the approaches that best suit his business, but also as another income stream as part of the British On-Farm Innovation Network (BOFIN).

A new Weaving Sabre Tine drill, part-funded by his redundancy package and a Farming Equipment and Technology Fund grant, was a transformative investment that made it happen. Chris says: "Before, I never felt we had the kit to do proper trials. Now we do, and that's given me confidence."

## Learning through trials

Joining BOFIN gave him the opportunity to conduct structured trials and share data with other farmers, and being paid for his time and resources makes it even more worthwhile. "For me, it's all about learning," he says. "If we all share, we can all learn and move forward more quickly."

With his interest in soil health and regenerative principles, joining the TRUTH (Thriving Roots Underpinning Total soil Health) project as a Root Ranger in 2024 was an obvious choice. This included the opportunity to trial different soil sampling methods, take soil cores, attend training in the use of Shovelomics and test the PES Technologies sensor on his farm.

"The knowledge I've gained is superb and I've been paid for my time. But as well as that, it makes you to look more closely at your fields, pay attention and really think about what's working."

Chris is always looking for additions to his rotation and has let some land for potato growing in 2025/26. The opportunity to learn more about growing pulses prompted his decision to join the NCS project as a Pulse Pioneer for 2025-26. He has grown field beans before with mixed results but is keen to persist as he sees their value for reducing fertiliser bills and giving a good entry to the following wheat crop. Having attended the first From Soya to Sustainability conference in January 2025, he also understands the value of beans as a feed source for livestock in reducing the need for imported soya.

"We have a big problem with bruchid beetle in this area, so don't have any ambitions to grow for human consumption, but if we can grow beans more reliably for feed it would be good for us," he says.

His NCS trials will be carried out on four neighbouring fields which are separated by dykes. The plan is to compare wheat grown on fields previously used for beans, with second wheat.

"This year I have focussed on drilling the beans earlier than I have before. The aim was to get them into warm soils in early October to help them get away."

The third BOFIN project he's joined in 2025-26 is SLIMERS (Strategies Leading to Improved Management and Enhanced Resilience against Slugs) which brings scientists and farmers together to explore sustainable slug solutions. This includes monitoring fields for signs of slugs and the damage they cause.

Chris explains: "We stopped using pyrethroids under SFI and at the same time we stopped putting slug pellets on. I'm very interested to take part in SLIMERS to understand whether our issues with establishment in wetter areas is down to slug damage. It will

be very useful to learn what sort of slug pressure we really have, so I'm looking forward to getting started."

## Towards a sustainable business

While Chris would like to take on more land if the opportunity arises, his ambition is not to expand for the sake of it but instead to create a business that does the right things for the environment, while also stacking up financially.

"I believe we are custodians of the land. We take care of it to hand it on in a better state. I hope I can make the business environmentally and financially sustainable – profitable enough to earn a living – and give my children the opportunity to do the same."

## Get involved

BOFIN is open to anyone interested in agricultural innovation, whether you're a farmer, consultant, agronomist, scientist, other agri-professional, citizen scientist or 'just curious'. Farmer members can apply to join trials, but all members are welcome to get involved in knowledge exchange and discussion.

There are still opportunities to join the NCS project as a Pulse Pioneer in 2026. To find out more and to register your interest visit www.bofin.org.uk/GetInvolved

## About the projects:

**TRUTH** (Thriving Roots Underpinning Total soil Health) is funded by the Farming Futures R&D fund, part of Defra's Farming Innovation Programme. Defra is working in partnership with Innovate UK, the UK's innovation agency, who are delivering the programme. TRUTH is led by the British On-Farm Innovation Network (BOFIN) alongside partners PES Technologies, UK Agri-Tech Centre, the John Innes Centre and University of Nottingham.

**SLIMERS** (Strategies Leading to Improved Management and Enhanced Resilience against Slugs) is a three-year £2.6M research programme involving more than 100 farms and seven partners. Funded by Defra's Farming Innovation Programme and delivered by Innovate UK, the project is led by BOFIN with partners the UK Agri-Tech Centre, Harper Adams University, John Innes Centre, Fotenix, Farmscan AG and Agrivation.

**NCS** (Nitrogen Efficient Plants for Climate Smart Arable Cropping Systems) is a four-year £5.9m research programme led by PGRO with 17 partners. It aims to enable UK agriculture to bring about a reduction of 3.4Mt CO2e per annum through increased pulse and legume cropping. The ambition is to increase pulse and legume cropping in arable rotations to 20% across the UK from the current 5% and to replace 50% of imported soya meal used in livestock feed rations with home-grown legumes. The NCS Project is funded by the Farming Futures R&D Fund: Climate smart farming, part of Defra's Farming Innovation Programme, and is delivered by Innovate UK.

# PRECISION BREEDING REGULATIONS COME INTO FORCE

The first three gene-edited cereals are being submitted for approval to be drilled in commercial farm trials in England during 2026. Tom Allen-Stevens explains the new regulatory regime.

New regulations governing the development, release and marketing of precision-bred crops in England came into force in November, marking a major step in the implementation of the Genetic Technology (Precision Breeding) Act 2023.

The secondary legislation – the Genetic Technology (Precision Breeding) (England) Regulations 2025 – sets out in detail how gene-edited plants can be field-trialled and placed on the market, provided they meet the legal definition of being "precision bred". This creates a new regulatory route where genetic changes could have arisen through traditional breeding distinct from the route for genetically modified organisms (GMOs).

At the heart of the framework is a two-stage process: notification to Defra for release and marketing of precision-bred plants, and authorisation by the Food Standards Agency (FSA) for food and feed use.

Two winter wheats and a spring barley have been or will be submitted for approval by the John Innes Centre and Rothamsted Research, as part of the Defra-funded PROBITY project (Platform to Rate Organisms Bred for Improved Traits and Yield). Carrying novel traits with potential benefits for farmers, food manufacturers, consumers and UK agriculture's net zero ambitions, seed is currently being multiplied up and may be planted on commercial farms in England as early as spring 2026 (see panel for more details).

## What counts as precision bred?

Under the Act, a precision-bred organism is one in which genetic changes have been made using modern biotechnology, but where the resulting genetic sequences could have arisen naturally or through conventional breeding. This includes techniques such as gene editing, provided no foreign DNA remains in the final organism.

Developers must be able to demonstrate that threshold clearly, and the new regulations spell out the information required to do so.

## Releasing precision-bred plants

Anyone intending to release a precision-bred plant into the environment for research – for example, through field trials – must submit a Release Notice to Defra at least 20 days before planting.

One notice can cover multiple trial sites, multiple years and multiple organisations, provided there is a single notifier who takes responsibility. Different plant lines can also be grouped within a single notice, as long as they are of the same species and fall within a shared "general description".

That general description must include the species involved, the intended trait changes, the types of genetic changes introduced and the techniques used to make them. The notifier must also confirm that all plants covered by the notice meet the legal criteria for precision-bred organisms, and that appropriate measures are in place to prevent material from being marketed prematurely.

The regulations also include transitional arrangements for plants previously notified as Qualifying Higher Plants under earlier rules. Where those plants have already been field-trialled, no

## inches forward

The European Union has reached a provisional political agreement on a new regulatory framework for New Genomic Techniques (NGTs) — its term for gene-editing and similar precision-breeding methods — that could reshape how such crops are treated in the EU.

Once formally adopted and published, the agreed rules will create two distinct pathways for NGT plants entering the EU market. Category 1 NGT plants are those with changes that could also occur naturally or through conventional breeding. They will undergo a verification procedure and, if they meet defined criteria, will not be regulated under the current GMO regime. Category 2 NGT plants, with more complex or engineered changes, will still be subject to full GMO-style authorisation, traceability and labelling requirements before they can be marketed.

The agreement also includes measures on transparency, monitoring and oversight of licensing practices and intellectual property, aimed at ensuring farmer and breeder access to new varieties.

These provisional rules still need formal adoption by the European Parliament and Council and will take around two years to apply after publication in the Official Journal. This means commercial NGT crops are unlikely to appear on commercial farms in the EU before 2029–2030. This timeline continues to place the UK's precision-breeding regulatory framework significantly ahead in practical application.

new notification is required. Where they have been notified but not yet planted, they can be grown immediately, provided a precision-breeding notification is submitted within three months of the regulations coming into force.

## From trials to market

Before a precision-bred plant can be marketed, Defra must formally confirm its status. This requires submission of a Marketing Notice, which is considerably more detailed than a release notification.

Marketing Notices must include comprehensive information on the intended genetic changes, their location and stability, and – critically – evidence on any unintended genetic changes. Developers must describe how they checked for unintended changes, how any were removed, and how they confirmed that the final organism contains only genetic sequences that could arise through traditional processes.

Multiple plants can again be grouped within a single notice, but only where they are from the same species, use the same precision-breeding techniques and share the same trait alterations.

The Advisory Committee on Releases to the Environment (ACRE) has up to 90 days to review the information and provide Defra with a recommendation on regulatory status. ACRE can request further information during that period, which developers must supply within a further 90 days.

Defra also retains the power to revoke a precision-bred confirmation if false or misleading information comes to light, or if new genetic evidence emerges. Where confirmation is withdrawn, any food or feed derived from that plant automatically loses its authorisation.

Food and feed authorisation

Even with Defra confirmation in place, precision-bred plants cannot enter the food or feed chain without approval from the Food Standards Agency (FSA). The FSA framework forms the second stage in the approval process and introduces two regulatory routes.

A Tier 1 route applies where the precision-bred organism clearly meets defined safety and eligibility criteria. Applications under this route are applicant-led and may be subject to audit checks.

Where those criteria are not fully met, applications fall under Tier 2, triggering a more bespoke assessment. In those cases, applicants must submit additional supporting evidence, and the FSA can request further information as part of its evaluation.

While the FSA has not issued detailed information on timelines and review periods, Tier 1 is generally regarded to be a relatively brief, "light-touch" approach. Tier 2 timescales and the cost for developers will depend heavily on the nature of additional information requested. Feeding trials, such as those often required under GMO regulations can take years to complete and are viewed by many commercial developers as prohibitively expensive and time-consuming.

## Transparency and enforcement

Both Defra and the FSA are required to maintain public registers of precision-bred organisms, including information from release and marketing notices. While developers can request confidentiality for commercially sensitive information, the general description of a precision-bred organism cannot be withheld.

The regulations also establish inspection and enforcement powers. Inspectors can enter premises where there is reasonable suspicion of non-compliance, take samples and documents, and issue compliance, stop or monetary penalty notices. Decisions can be reviewed and appealed through formal processes.

## A new regulatory landscape

Taken together, the regulations complete the legal framework needed to move precision-bred crops from laboratory to field and, ultimately, to market in England. For developers, the emphasis is on robust documentation and traceability. For policymakers, the challenge will be ensuring the system remains proportionate, transparent and trusted as the first commercial applications begin to emerge.

## EU framework on NGTs Farmers set to probe precision-bred cereals

Three of the first crops being submitted to ACRE for approval are being developed as part of the PROBITY project. The three-year £2.2M study, led by the British On-Farm Innovation Network (BOFIN), aims to drill these cereals on up to 10 commercial farms in England during 2026.

The three crops are:

1. Wheat with superior processing properties and food safety – This is a line of Cadenza winter wheat, edited by Rothamsted Research to be low in asparagine. This natural amino acid forms acrylamide – a known carcinogen – when baked or toasted. Breakfast cereal and biscuit manufacturers currently use additives or extra processing to avoid acrylamide formation. The low-acrylamide wheat will allow them more flexibility to make potentially healthier and tastier products. The plan is to plant enough wheat in autumn 2026 to process at batch-scale, producing around 50-80t in total.
2. Bigger, bolder wheat – A trait first identified in the tetraploid wheat Triticum polonicum, this line of Fielder spring wheat has been edited by John Innes Centre so that it should form longer glumes and grain. Initial assessments have found the change produces wheat with longer grains, but effects on yield and nitrogen use efficiency are not yet known. The plan is to plant the crop on up to eight farms during late autumn and early spring 2026/27 to assess nitrogen regimes, yield and quality through tramline trials.
3. High lipid forage – This is an edit that has been made by Rothamsted Research to spring barley to deactivate a gene that breaks down lipids in plant tissue. This results in higher levels of lipid (and energy) in the leaves, stem and grain. The edit has been made to barley, which is quicker to breed than ryegrass, and enough seed has been produced to plant around

6-7ha as early as spring 2026. This will then be made into wholecrop silage and fed to dairy cows with performance closely monitored. If the silage is higher in lipid (and energy), this could improve production efficiency and significantly lower methane emissions. Alongside the trials, Aberystwyth University is working to bring the edit into ryegrass.

The crops will be grown alongside unedited versions of the same variety with the trial protocol geared towards monitoring any effects of the trait on field performance. The farmers will also monitor and record co-existence and storage arrangements to ensure integrity of the precision-bred produce, other crops on the farm and in neighbouring fields.

As a farmer-led project, one key aspect of PROBITY is an emphasis on transparency and openness – discussions are already underway on the Sequence Circle. This community of farmers, scientists and others with an interest in precision breeding, is free to join and is hosted on The Farming Forum.

But while knowledge will be shared far and wide on the new technology and how the crops perform in the field, the produce itself won't. Grown under closed contracts and research conditions, none of the produce will be made available to the open market. This is to ensure cultivation of the crops in no way compromises the Sanitary and Phytosanitary (SPS) Agreement currently being negotiated with the EU, where precision-bred crops are still treated as genetically modified organisms.

For more on PROBITY and farmer-led trials currently underway, see issue 3 of BOFIN Insight, enclosed with this edition of Direct Driller.

## But will you want to grow them?

The only published survey to date capturing UK farmers' views on gene-edited crops shows strong support for the technology, alongside clear conditions around regulation, trialling and public trust.

The survey, carried out by BOFIN in 2023, explored attitudes to genetically modified organisms (GMOs) and precision-bred organisms (PBOs) among farmers and others involved in agricultural innovation. A total of 85 respondents* took part, of whom 81% were farmers, making it the most detailed publicly available snapshot of farmer sentiment on gene editing at a time when new regulations are now coming into force in England.

The results highlight a marked distinction in how farmers view GMOs compared with precision breeding. While opinions on GMOs were mixed, with 49% saying they would be happy to grow GM crops commercially if approved, support for precision-bred crops was far stronger. More than four-fifths (81%) of respondents said they would be happy to grow precision-bred crops commercially if approved for cultivation in the UK, with only 4% opposed outright.

Farmers described precision breeding as a "common sense" and "science-led" progression from conventional breeding, offering a faster and more targeted route to improved traits. Respondents consistently emphasised the potential for PBOs to contribute to farm business sustainability, resilience and reduced reliance on crop protection inputs, provided the underpinning research was robust and transparent.

The survey also explored attitudes to co-existence measures for those who do not wish to grow precision-bred crops. Views were nuanced. While 25% felt no specific measures were needed, the largest group (35%) supported voluntary agreements in which PBO growers would take responsibility for minimising any risk of cross-contamination. Only 21% favoured mandatory buffer zones set through regulation.

Farmers were asked how traits derived through new genetic technologies should be prioritised, from a choice of food safety, nutrient use efficiency, pest and disease resistance, and drought/salinity tolerance, spanning traits that address both productivity and wider societal benefit. Preference was shown for productivity traits, with food safety seen as lowest priority. However, many respondents stressed that all the traits were important and should be actively pursued.

On research and development, farmers expressed a strong preference for approaches that combine cutting-edge science with farmer-led trialling. Almost equal numbers favoured science-led innovation using the latest genetic tools (45%) with 42% favouring farmer-led development to integrate new traits into practical farming systems.

Taken together, the findings suggest farmers are open – and in many cases enthusiastic – about precision breeding but expect it to be delivered through well-designed on-farm trials, proportionate regulation and clear communication with the public. As one respondent put it: "carrying the customer will be essential".

More research to assess how farmers and other stakeholders feel about precision-bred crops is currently underway as part of the PROBITY project, and is led by University of Nottingham. Results and progress are published on the Sequence Circle.

*All respondents were BOFIN members so results cannot be interpreted as the views of farmers in general. Significantly, 62% of BOFIN members identify as pioneers, keen to try a new technology, according to a survey conducted in 2025. AHDB research conducted in 2021 showed almost 70% of farmers show a strong preference for theorist learning – they prefer to learn from the experience of other farmers.

# GAME-CHANGING TECHNOLOGIES FOR FARMERS: NEW TOOLS FOR WEED CONTROL

*Written by Susan Wilson from Aphaeas Agriculture*

I was recently introduced to the RumboJet technology for tackling docks and other weeds such as ragwort, thistles, dandelions and buttercups in grassland. Buttercups are generally a feature of acidic land and I would recommend a basic soil test and liming if this is the case. However, this high-tech sprayer is ideal for those weeds which do not respond to simple changes in management. By the time this magazine hits the shelves, LAMMA will have been and gone and many of you will have attended and you may have seen this on the CW Agri stand.

Ubiquitous nettles and thistles need no introduction, but it is worth taking a closer look at docks and ragwort, which are problematic. While not mentioned in the literature, rushes and reeds are a major challenge in the wetter parts of the British Isles and Ireland and research has shown that "weed wiping" is one of the most effective controls. It is to be hoped that these will be included in the identification technology at some point, if not already.

An easily-identifiable broad-leaved perennial weed, the dock grows at all elevations under 850 metres, which means that they can be found pretty much anywhere throughout Scotland, England, Ireland and Wales. They are difficult to eradicate for a number of reasons:

- Seed longevity in excess of 5 years (AHDB) or up to 80 years (Corteva)
- Large number of seeds / plant that can be easily spread: 8,000 (AHDB) or 80,000 (Corteva)
- Deep taproots (up to 1.5 metres)
- Plants can regenerate from root fragments
- Plants can be very long lived, especially in pastures

However, that is not to say that if controlled, docks are bad! With their deep taproots they are highly nutritious with a high mineral content and in intense grazing rotations, cattle will eat them so long as they are not allowed to grow too big. Foliar feeding urea + humic acid helps make them more digestible by increasing the Brix levels and this in turn helps control them as they never get to seed. They are not ideal in silage, which perpetuates the problem as slurry from cattle fed on the silage is then returned to the land, so the docks proliferate.

Ragwort is classed as a noxious weed and landowners have a legal obligation to control it. (One would never know, so ubiquitous is this weed!) It is particularly poisonous to horses and often spirals out of control where land is neglected or over-grazed. Sheep eat out the rosettes in early spring and this is one of the few management tools available, but not everyone carries sheep on their farm – and they do require good fencing. It is rarely found on arable land. As with docks, seed longevity is in excess of 5 years and each plant can produce 50-60,000 seeds (AHDB). If your docks and ragwort have become unmanageable, then this new technology is worth looking at.

Targeted precision treatment is always more efficient and herbicide use can be cut by up to 98% using the RumboJet sprayer. Cutting back on chemicals is a key feature of environmentally friendly farming, but a problem with some herbicides used to treat docks is that they are also toxic to clovers. This way, both the grass / clover sward and the environment are protected.

## How does it work?

Developed initially as part of a university project, the RumboJet was launched in 2022 by the Allgäu Automation company, which is based in Bavaria and focusses on "technological solutions that minimise resource use, protect the environment and soil, and create real added value". In other words, the perfect fit for regenerative farmers.

There are currently over 130 machines operating in Europe and it is now available in the UK and Ireland. A tractor-mounted machine, the system is easily controlled from the cab and is an amalgamation of lighting, cameras, computer software and the latest spraying technologies – all combining to identify specific weeds and target them with herbicide. The RumboJet 880 (so called because it covers 8.8 metres) features 6 high performance cameras, which can take up to 90 pictures per second at 3cm spacings, based on a travelling speed of 10km/hr. Fully laden, the total weight is almost 2.5 Tonnes, requiring a 100hp tractor for operation.

There is a main tank with 600L capacity and a mixing tank with 200L capacity (if required). The combined capacity should cover a minimum of 32Ha, but one hazards a guess that this is dependent on the intensity of the weed population. The spray jets ensure that the herbicide is fully concentrated on the weeds and unlike conventional sprayers, the chemical is not applied all over the ground.

It must be pointed out that, unlike other similar technologies, there are no satellites involved nor expensive fees for the use of.

One expects that this machine will prove a popular addition to contractors' fleets as well as to large livestock farms. One also hopes that this exciting technology will be developed further for use in arable crops.

# REDUCING FERTILISER WITHOUT TAKING ALL THE RISK

For many arable farmers, the desire to reduce fertiliser is already there. Inputs remain a major cost, margins are tight, and there is growing interest in building soil health and resilience into the system.

While fertiliser prices have eased from their peak, volatility and margin pressure remain. Cutting fertiliser still carries risk. The challenge is not whether change is needed, but how to do it whilst balancing yield and income.

## Paying farmers to act

Exchange Market is a funding mechanism developed by Soil Association Exchange, in partnership with nature finance experts Finance Earth, and designed with farmers and participating funders. It directs money from food businesses, banks, and landowners straight to farmers to help de-risk practical changes that reduce greenhouse gas emissions on arable crops. The companies that fund the scheme do not buy credits or carbon, and they can only report on emissions reductions associated with farms linked to their own sourcing footprint.

In many cases, farmers can access the largest funding amounts by reducing synthetic fertiliser use. That is why fertiliser reduction is often the starting point. But it is not the only option.

Exchange Market will pay farmers for any action on arable crops that can be evidenced to reduce emissions – including switching to a lower emissions fertiliser source, or reducing cultivations and associated fuel use. The focus is on what works for each farm, and Exchange Market's independent advisors work with farmers to find the right plan for them.

## Can I take part?

Exchange Market is available to farmers that have a reporting link to its funders through:

- Their supply chain (major arable traders)
- Their lender (Lloyds Bank, Bank of Scotland, AMC)
- Their landowner (Church Commissioners for England)

Exchange Market can be stacked with SFI, and may be able to operate alongside other funding so long as it relates to different crops or areas of the farm.

Farmers need to have min 30ha arable land on which to undertake new actions – although for better payments it is recommended to involve around 100ha or more.

You ca find out if you could be eligible for Exchange Market using the quick, online Eligibility Checker www.bit.ly/exchangechecker or scan the QR code below.

## Why fertiliser is the obvious place to start

Nitrogen fertiliser sits at the heart of cost, risk and emissions. Reducing rates can lower spend and improve efficiency, but it can also feel like

a gamble, particularly in difficult seasons, or where the business relies on consistently meeting yield or grade requirements.

That is why it features heavily in Exchange Market agreements as payments can help to reduce risk. Importantly, changes can be incremental and targeted, rather than whole-farm, all-at-once decisions.

## What sort of actions are funded?

Exchange Market can support a range of changes on arable crops, including:

- Reducing nitrogen application rates
- Improving nitrogen use efficiency through better planning, timing or placement
- Using legumes or organic inputs to replace part of the fertiliser requirement
- Rotational or management changes that reduce fertiliser demand

## How payments work

Exchange Market is designed to be flexible, and it rewards farmers for the outcomes they achieve, whatever actions they choose to take. Payments are based on the emissions reductions that farmers achieve each year compared with their emissions impact

when they joined. The payments are estimated, and 50% is paid upfront, based on a crop level carbon calculator baseline and a realistic assessment of what change looks like for that farm business. And end-of-year payment is calculated based on a second carbon calculation following actions undertaken.

## Farmers receive:

- An advisory session to assess options and risks
- A baseline emissions assessment for eligible arable crops
- A payment offer linked to emissions reductions delivered through agreed actions
- 50% payment upfront

Payments are set at £60/tonne of $CO_2e$ reduced. In the first year of the pilot there is a £1 million pot and average payments for the first farms going through the programme are around £4500.

## Short contracts, real flexibility

The programme has been designed to avoid long lock-ins.

Contracts run for 12 months, giving farmers the freedom to test changes without committing years ahead.

Exchange Market does not buy or sell carbon. Farmers are paid for outcomes delivered, not for giving up ownership of carbon or future environmental claims.

*I was involved from the start in helping shape Exchange Market, and it was clear the team genuinely wanted to build something that worked for farmers, not just tick boxes. What's come out of it is a practical, flexible scheme — without forcing us to sell our future carbon. It's farmer-led, and that makes all the difference.*

***James Hay – Barton Place Farms***

## Why this matters

Even with lower fertiliser prices, uncertainty is here to stay. For many arable businesses, the real question is how to manage change without undermining profitability.

Exchange Market enables farmers to share the risk of farm transition and emissions reduction with businesses in their supply chain.

For farmers already thinking about reducing fertiliser use, Exchange Market helps make that step more manageable — and pays them to take it.

Places are limited, so act fast to have a chance to take part. Visit https://bit.ly/exchangechecker to take the 5 minute eligibility test today or **www.soilassociationexchange.com/exchangemarket** for more information.

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