

Hutchinsons 2024 Agroecology Conference Special

Ed Brown, Hutchinsons Head of Agroecology Services opened the 2024 Hutchinsons Agroecology Conference with the announcement of an industry first Agroecological Charter.



Ed Brown (Hutchinsons Head of Agroecology Services)

Hutchinsons Agroecology Charter will:

1. Clearly define the meaning of agroecology
2. Outline key management processes including objective setting and resource building
3. Highlight key risks associated with them and ultimately reduce the chances of costly mistakes
4. Point to the relevant tools and resources to reduce risk

2023 saw the hugely successful inaugural Hutchinsons Agroecological Conference. Since then, there has been a large uptake in agroecology across UK farms. Even so the practice remains relatively niche, and this needs to change.

However, there are challenges to this; the terms 'regenerative' or 'agroecological' have become watered down meaning they are in danger of losing their impact. To avoid this, where claims are made around regenerative credentials, be it large corporations, retailers, or farmers themselves, this needs to be evidenced.

As with all change there is a risk to changing practice and moving into new territory. Unfortunately, for various reasons, agroecological farming practices are often poorly understood or implemented - which inevitably means they go wrong. So, the farmer loses income, probably also confidence in the system - and ultimately none of the goals have been met.

Taking these challenges into account, Hutchinsons has worked hard with leading industry experts to produce the first **Agroecology Charter**, which will be published later this year.

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Understanding soil resilience

Raising soil organic matter levels is the Holy Grail for most farmers, but what is its true value? Professor Andy Neal explains.



Professor Andy Neal (Soil Microbiologist)

Understanding the soil is one of the greatest challenges facing scientists, believes Professor Andy Neal, soil microbiologist at Rothamsted Research's North Wyke Farm in Devon.

"Scientists have a lot to learn from the people that are working the soil and for many of the techniques that farmers are innovating and developing, there just isn't the scientific evidence out there to give confidence in outcomes," he says.

It's bridging that gap, putting some science behind regenerative management practices, that has become Andy's research mission as scientists play catch up. Using the research knowledge gained, he explains the real value in increasing soil organic matter (SOM) levels has nothing to do with increasing yields or carbon markets, but everything to do with creating resilience.

To understand why that is, it's necessary to zoom into the structure of the soil and understand it at the 1–100 micron scale, which is where most microbial activity and plant root interactions occur, he says.

"I see the soil as a place where microbes live, and the structure of the soil influences the way microbial communities build up and respire."

The habitat for soil microbes is the pore spaces between soil particles and within aggregates, and a healthy soil is one where there is good pore connectivity, explains Andy.

"We focus on these tiny pore spaces for several reasons. The very small pores act as a reservoir when the bigger pores have drained, and so they determine a soil's water holding capacity. It's also where there's the greatest enzyme activity, and where we find fine roots. It's where rhizodeposition occurs and mycorrhizal fungi reside.

"These pores are less than the diameter of a human hair, but this is where the rubber hits the road in soils."

Influence of soil texture

Andy explains that soil texture greatly influences structure – clay soils develop a dynamic structure linked to organic matter levels, forming connected pore networks, while

sandy soils show little response. Increased organic matter in clay soils leads to more pore space, potentially improving water storage by up to 354,000 litres/ha (to 30cm depth) for a 1% rise in soil organic carbon.

"There's a real advantage to increasing pore space and the way you do that is to pump more organic matter through the soil. Microbes use that carbon and break it down into a form that can stick to mineral surfaces, creating a fabulous architecture," explains Andy.

Using X-ray computed tomography (CT) scans of 2mm sized soil aggregates to illustrate the difference in pore structure in a high and low SOM farming system, Andy highlights the effect of organic matter on pore connectivity. ➤

▶ In these examples, the low-carbon soils have little pore space and connectivity – hindering water, nutrient, and root movement – while the high-carbon pasture soils have abundant, well-connected pores.

“The amount of organic matter we put in our clay soils, the ones that respond to organic matter, can drastically change the environment that plants and microbes have to live in.”

Andy highlighted another study using CT scans which looked at the effect soil structure and architecture had upon plant root exploration in the soil. “Researchers found that in very poorly structured soil, the hormone ethylene reaches critical levels around the root tips, where it acts to inhibit root growth. In contrast, in well-structured soil, ethylene diffuses away from the root tip, so it doesn’t limit growth.”

In the long-term Broadbalk experiments at Rothamsted, an evolution of soil microbial communities has been observed in response to the way the soil is managed. These same experiments

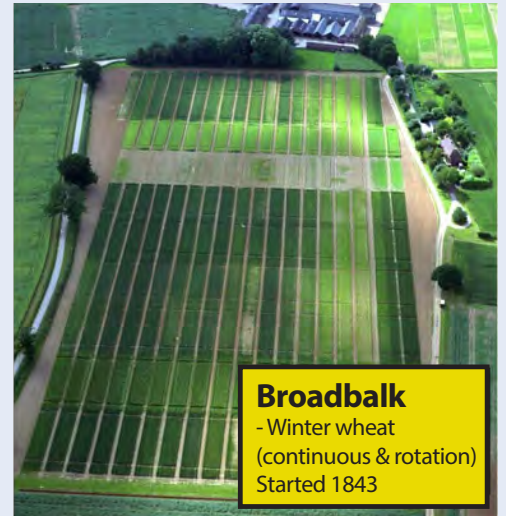
also show that however you’re managing a system, the carbon to nitrogen ratio doesn’t change, explains Andy.

“Whether you’re putting nothing in at all or tonnes of farmyard manure, the soil has an intrinsic carbon to nitrogen ratio that isn’t influenced by the way you’re managing it because it’s under the combined influence of microbial metabolism and mineral geochemistry. All that changes is the more nitrogen you have in soil, the more bulk carbon you can sequester.”

The structure of the soil also influences microbial gene expression, adds Andy. “For example, in nitrogen metabolism, when there’s insufficient oxygen around, the soil bacteria are able to use nitrate as an alternative electron acceptor. The evidence suggests that if you start throwing lots of nitrogen around a system, that community adapts by increasing the number of genes

that code for proteins. However, the soil structure influences the expression of these genes and where soil oxygen is low the microbial community uses nitrogen in bad ways – generating nitrous oxide and robbing N from crops.

“Again, the way you’re managing your soil is influencing the genetic capabilities in the soil, in this case with some potentially very negative outcomes.”



Knowing your numbers

*To understand the impact of adopting agroecological practices over a conventional approach on farm performance, it is crucial to look at the data, and truly understand the financial implications of a certain approach, was a clear message from **Will Foyle**, Hutchinsons farm business consultant.*

“Adopting an agroecological approach is just not as simple as buying a new drill or turning the taps off inputs. Understanding the relationship between input and output is still paramount and keeping an eye on yield and financial performance.”

“Just as in any conventional operation, it doesn’t take much of a loss in yield if inputs are reduced more than they should, to have

an impact on the bottom line and become financially unsustainable,” he explained.

Much of the data needed to be able to do this, is already to hand, pointed out Mr Foyle. “Most farms will have yield data and input data, such as spray records, fertiliser and seed costs, even if these can only be related back to invoices. Then bring in fixed costs from fuel, labour, and

other sundry overheads, which will help to provide a base level cost of production at a farm enterprise level or even a field or sub field level if overlaying a yield map.”

So how can this data be used to inform decision making on farm and assess one approach or, for example, type of machinery against another when choosing to move over to a more agroecological approach?

“Having these figures to hand, is enough to provide a base level cost of production or net margin at a field level, to compare different systems or rotations. For example, comparing the financial performance of one part of a field against another, or in monetary terms the impact of moving away from a winter barley to two years of herbal ley under the Sustainable Farming Incentive (SFI),” said Mr Foyle.

But he added, equally as important is **quantitative** data. “This is based on soil data; most farms will have information to hand on soil nutritional data such as soil pH,



Will Foyle (Hutchinsons Farm Business Consultant)

➤ organic matter, soil organic carbon, and perhaps even worm counts, Vess scores, water infiltration.”

“This quantitative data can help inform management decisions in the short term as to how any changes are affecting soil health, to indicate if going along the right route, and reflects the building blocks for long term success.”

“Improvement of these figures will ultimately give better financial performance in the long run, and it is key to understand these especially when looking to monitor change in a farming system to justify the right decisions are being made,” he noted.

He recognised there can be an unavoidable drop in yields from agroecological farming in the short term, which must be justifiable.

“With current margins it doesn’t take much of a drop off in yields for incomes to become unsustainable. Unless achieving premiums, yield should remain king, and ensuring this is the goal underlines the importance of the correct advice.”

“Where agroecology is carried out correctly overall spend can be potentially reduced, with net margin increasing, reducing exposure to risk and fundamentally building more resilient farm businesses.”

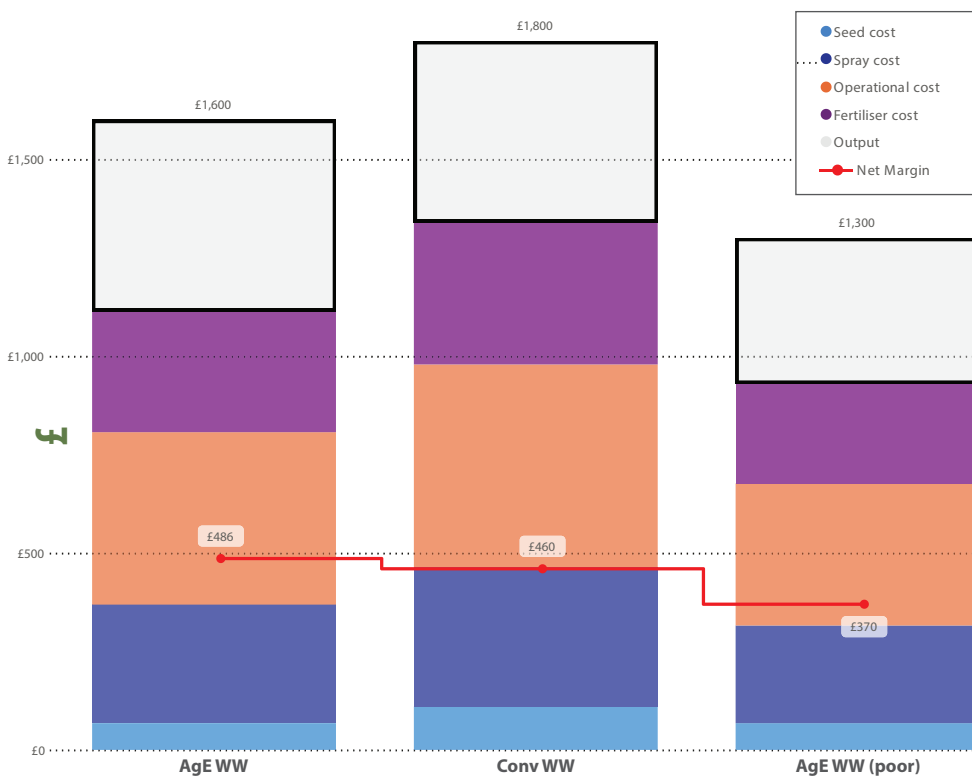


Chart 1: Comparison of net margin effects of agroecological and conventional winter wheat production.

What are the challenges in our current farming climate and what opportunities does Agroecology offer?

- 1. Political:** Climate goals and questions around food security linked to global conflicts.

Opportunity: Agroecology is the best placed farming system, which provides most opportunity to take hold of the argument and stake out how to produce food in the most sustainable way.
- 2. Financial:** 2024 halfway through agricultural transition period. BPS cheque in 2024 will be half of that of BPS in 2021. Only 3 years from BPS being abolished. New income based on a ‘something for something’ basis.

Opportunity: Agroecology offers opportunity to build premiums, integrate stewardship and build markets where less emphasis on being price takers.
- 3. Environmental:** Many options at various levels of engagement.

Opportunity: Various but top two within Agroecology SFI £102/ ha combined for no-till drilling & variable rate application of products.
- 4. Cultural changes:** Ageing population that may not want to embrace wholesale change unless succession clear.

Opportunity: Entrants or expanding businesses who are happy to farm land on embracing change on a range.
- 5. Technical:** Regulatory pressure on farm and consumer pressure through the food chain.

Opportunity: Using data to justify decision making on farm.
- 6. Energy costs:** Energy price volatility.

Opportunity: Potential grants for farm level roof top solar, technology becoming cheaper.
- 7. Carbon:** Be aware - lots of different advice.

Opportunity: Irrespective of trading, good husbandry for soils is good for carbon.



Adding value from field to plate

*Building a high street brand is no easy task, but that's exactly what **Andy Cato** and his team at Wildfarmed has done, adding value to its products based on the agroecological principles behind them.*

It was after reading an article highlighting the environmental consequences of food production that Andy Cato started growing his own vegetables and became fascinated by seeing seeds become plants and plants become food.

Andy's self-sufficiency hobby soon turned into selling vegetables at the local market where he was living in France. But his growing ambition didn't stop there. Andy made the decision to step away from the music industry, selling his publishing rights to buy a farm in France so he could grow cereals and vegetables at scale. The experience was life changing, but perhaps not in the way he'd envisaged. "It went terribly, terribly wrong. I just didn't have any notion of the vast array of skills that's required to be a farmer," he admits. "On top of that, the farm had been in intensive maize

cultivation for decades and the soil was heavily degraded. I thought I could just go in there, remove all the chemicals, and keep growing crops. But of course, the weeds came at me from all directions, and I got very close to giving up.

"I was lucky that I could go away and play records at the weekends to avoid going bankrupt. But it was an exhausting, dark and lonely place."

Epiphany moment

An epiphany moment, thanks to Albert Howard's 1940's book 'An Agricultural Testament', led to Andy experimenting with permaculture and agroforestry techniques – planting trees, hedges, and bringing in livestock. Pasture cropping became his new obsession and he sought to add value to the farm's produce by opening a farm bakery.

The seeds of the concept that was to later become Wildfarmed were beginning to grow.

"We began baking bread for schools and the school children came to the farm to see where their bread came from. We ended up with a field to plate community in France, where customers were buying their food from a farm because they wanted to support it, and the farm was growing the kind of food they wanted to buy.

"I'd love the countryside to be organised like that, but it isn't. Most people live in cities, and they buy their food from supermarkets. And that's where we began to wonder how we could create this kind of field to plate community at scale."

Diversity – the driving factor

The idea led Andy and his family back to the UK, where he took up a tenancy at a National Trust farm in Oxfordshire. The work of Australian soil scientist, Dr Christine Jones, brought another 'ah-ha' moment with the realisation that diversity – above and below ground – was the driving factor in the soil recovery he'd seen under pasture, rather than perennial pasture per se. As a result, his focus shifted to bi- and poly-cropping.

"Like many new ideas, there's nothing new about it. Indigenous farmers in South America planted the 'three sisters' – beans, corn, and squash' – because together they're more productive," he explains.



Andy Cato talking at the Agroecology Conference...



...and appearing live on stage with Groove Armada

a high street reality. We can't build a collaboration for change through anonymous commodity markets."

Defining regenerative agriculture is a divisive subject, admits Andy, but Wildfarmed has adopted a set of standards to give both consumers and retailers clarity. "We felt we had to draw a line in the sand to say, 'this is what we stand for and this is why you should pay a little bit more to farmers growing food in this way'."

The Wildfarmed team has also been busy engaging with the procurement departments of big retail companies, bringing them onto farms and opening the door to considering how flour is produced rather than as a commodity bought on price alone. Adoption of the brand by retailers is growing, as is its network of farmers, which currently stands at around 100.

Above all, growing the Wildfarmed way is proving to be profitable, which has always been Andy's aim. "We want to de-risk and improve net margins for farmers, while not significantly increasing the cost of food – that's not an option as cheap food is baked into our society, certainly at the moment."

Andy stresses that to become involved with Wildfarmed isn't a whole farm commitment, it's a field at a time. **"What we're trying to do is to be agents of change."**

It's an area where science has been playing catch up, but several research projects show a correlation between diversity of crop species, increased microbial diversity, and productivity.

"Dr James White, in the States, talks about the extraordinary world of endophytes, where it's hard to say where the plant microbiome ends and the soil microbiome starts. This endophyte transfer between plants in a diverse community explains how these communities 'help' one another and are more resilient than monocultures."

Wildfarmed growers

Andy's journey of agroecological discovery underpins the standards now adopted by Wildfarmed growers, but it's the network that the brand is building that makes it so unique.

"I think it's just outrageous that we've asked farmers for yield at all costs for decades – and they have absolutely nailed it – and now we're asking them to do something completely different but putting it all on the farmer to deliver that change, whilst the rest of an extractive food system stays the same.

"I'm mindful of the very lonely moments I had in France. Farming involves an intense level of stress – decisions that determine the next 12 months, critical decisions, often taken in isolation. This is why we

set about building a supportive farming community – that in turn is supported by our customers – so that transition is collaborative and knowledge, and risk, are shared."

The importance of knowledge sharing has been underlined by Andy's own evolution as a grower, discovering that many of his experiments, undertaken at great effort, had already been tried by someone else. The Wildfarmed WhatsApp group has become "a hive brain with 1200 years of farming experience".

One of the big realisations in the Wildfarmed journey has been that the term 'regenerative farming' isn't really understood by consumers, says Andy. "We did some unofficial – but telling – Voxpops in London where we asked 100 people 'what does regenerative mean to you?'. We didn't get one positive response.

"So we've got a lot of work to do to spread the word. The good news is that it's a really empowering message. There are a lot of people worried about health, biodiversity, and climate change who feel like they're in a slow-motion train crash over which they have no agency. The idea that their food can make such a difference is very well received.

"To turn this idea into action, we need to follow it up with field to plate communities of farmers and customers that can make affordable food from flourishing ecosystems

Wildfarmed Standards

- Cash crops sown with either pulses or annual/perennial companions
- Minimise bare soil: overwinter cover crops ahead of spring drilling
- Nutrition based on need: plant sap analysis and 80kg N/ha max
- No insecticides, fungicides or herbicides on the growing crop
- Integrate livestock into the cropping system at least once in a three-year rotation.



BUILDING A SUPPORT COMMUNITY

Capturing value

Clare Hill is a founder of the Roots to Regeneration programme and farms agroecologically in her own right. Set among 80 acres of ancient trees and rolling pastureland, Planton is a working regenerative livestock farm in the Shropshire hills, providing a blueprint for a different future for agriculture: one that puts nature, people and profitability first.

Clare shares her views on how to create value through agroecological farming.



Where is the value in an agroecological system?

She began by pointing out in a conventional system, financial value is usually equated to yield and turnover, but in an agroecological system, our focus is on profit and resilience.

“It’s not about daily liveweight gain and feeding some yeast enhancer mix that we have bought in; it’s about never having to plough up our old pasture to replace it with a new ley.”

So, what do we value in an agroecological system? Clare highlights key areas where value is measured on Planton.

- 1 Soil** is our best asset, and we are working hard with our accountant on how to attribute the value of soil onto our balance sheet. Currently, it is easier to do this with the value of a tractor rather than our most precious asset, soil.
- 2 Dung beetles** - these insects can reduce methane emissions by 14%. Dung beetles are always front of mind when planning field work and we outwinter cattle as much as possible, so the beetles have food all year around. We also seek the root cause of every parasite before treatment and think ahead as to how this will impact not only the dung beetles, but also their food sources.
- 3 Bird’s-foot trefoil** is a flowering plant which appears in pastures that have been allowed long periods of recovery and rest.

This flower can fix 22-23kg/ hectare/year of nitrogen and it can also transfer 5.2kg/acre to nearby grassland.

- 4 Water infiltration** - not how quickly it drains off when it rains, but how soils are able to store rainfall deep down in the sub soil and aquifers for when drought inevitably comes.
- 5 Nutrient density** - food needs to be valued on what it offers in terms of micronutrients, not calories and how as food producers we can counter the current approach which supports ‘hidden hunger’.
- 6 Learning new things** - adopting new ways means we are always on a learning journey. This year for example I grafted a tree!

➤ How do we create value at Planton?

Regenerative cattle

- 590-680kg liveweight
- 20-24 months to finish
- O3+ to R3L
- 55% KO%
- 0.9kg DLWG across lifetime
- Pasture only
- Minimal inputs (no ghost acres)

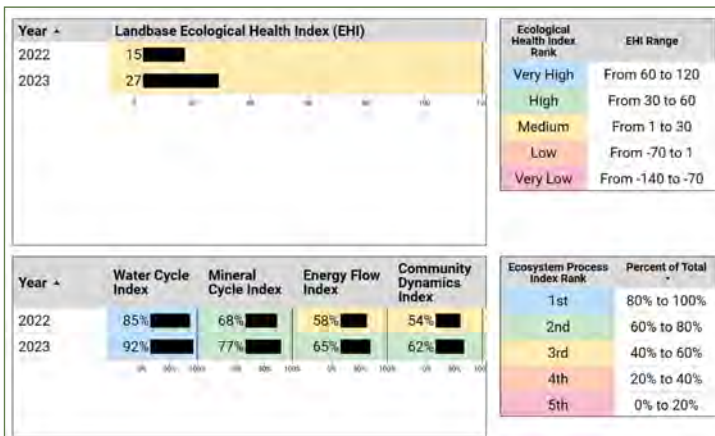
These figures are based on adaptive multi paddock grazing, which means having a high number of animals on a pasture for a short period of time, followed by long rest time. This is for full expression of all plants in the pasture and is the difference to rotational grazing. More grass means less overwintering and a more diverse sward for cattle.

**Figures from previous farm in Oxford*



How do we know we are regenerating?

Key measurements on a national level.
European Alliance Regenerative Agriculture.



Ecological Health Index

Key measurements on a farm level Ecological Health Index

Using measured outcomes that look not at paper records but at the land's responses to management practices. Ecological Outcome Verification measures water cycle, mineral cycle, energy flow and community dynamics index (interaction between organisms).

Does the food sector reflect the value in agroecology?

In the main no, we have a long way to go! Greenwashing is a common practice; this is the process of conveying a false impression, or providing misleading information, about how a company's products are more environmentally sound.

For example:

- 64% of agri-food companies that publicly report on regenerative agriculture as an opportunity, do not put in place any formal quantitative companywide targets to achieve those ambitions.
- Only 8% of companies that publicly report on regenerative agriculture as an opportunity have financial commitments in place to support farmers in their supply chain to incentivise uptake of agroecological practices.

(Source FAIRR 2023)

How do we change this?

Society needs to value the nutrition/hectare of food produced; we need to change our relationship with what we grow and look at how we grow it.

Selling direct to consumers allows for producers to monetise the value more easily and whilst this is currently only a very small fraction of the industry, the law of diffusion of innovation shows us that the tipping point between early adopters and the majority is only 17% before the majority become adopters.

"If you want to make small changes, change the way you do things, if you want to make major changes, change the way you see things."

The question of potatoes

We ask a potato grower and a leading processor how they approach the challenge of producing potatoes in an agroecological manner.

James Young

Vice President of Agriculture at McCain Foods GB



Left to right, James Young with John Bubb

McCain Foods have committed that 100% of their potato crop will involve regenerative agricultural practices by 2030.

“Securing a long-term sustainable supply of potatoes is the driving force behind the business’ partnership approach to regenerative potato production, and to this end, is working hard with its partners to achieve this,” he says.

For example, with McDonalds - its largest customer globally - expectations to explore and invest in regenerative farming is growing

Mr Young recognises the challenges with growing potatoes regeneratively are different to those of other crops. “Changing the way that things are done on farms can come with risks. That means the commercial model for regenerative farming must evolve.”

He highlights the Regenerative Agriculture framework that has been developed by McCain to measure progress. “This framework is not prescriptive but allows growers to pick and choose what they are able to do whilst still producing a profitable crop.”

The changes that can be made at farm level are exciting, and he outlines six key regenerative principles that can be applied to potato production (see box, below):

McCain smart and sustainable farming – six key principles

- Ensure farm resilience
- Armour soils, preferably with living plants
- Enhance crop and ecosystem diversity
- Minimise soil disturbance
- Reduce agrochemical impact and optimise water use
- Integrate organic and livestock elements

JM Bubb & Sons

Potatoes are grown for McCain Foods on 162ha of the 810ha farmed in Shropshire by John Bubb.

In 2021 John approached Ed Brown of Hutchinsons to discuss how to grow potatoes in a more agroecological manner and came home with a 21 point action plan!

“A major focus was to get the soils functioning better and to rebalance

the soil food web, leading to a healthier, more resilient system,” he says.

“This required a whole-farm approach to soils and cultivations, with efforts to reduce working depth and eliminate the number of passes being made in potatoes complemented by using strip tillage to establish other crops.”

“Multispecies cover crops are grown twice in the six-year rotation, that also includes wheat, oilseed rape and flowers. These go in ahead of potatoes and flowers – and an eight-week catch crop is fitted in between oilseed rape and winter wheat.”

“We are trying to grow as diverse a mix as possible with as many species as possible, while still being affordable,”

“We use Hutchinsons Maxi crop which contains linseed, buckwheat, phacelia, vetch clover and oats; brassicas aren’t included and oats don’t feature ahead of the flower crop. Cover crops are terminated using sheep and/or glyphosate, so we are still getting some livestock on the farm,” he says.

Since the introduction of cover crops, soils have become more friable so potato cultivation passes and depth can be reduced, says Mr Bubb.



Herbal leys

Companion cropping

"In the potatoes we have been able to eliminate some passes, and we try not to plough, using a DTX machine instead. We have reduced the depth of the destoner, which has share tines on it to get rid of any pan, and we are also doing much less bed tilling."

He believes having the right equipment and enough of it is important, to avoid travelling when conditions aren't right, which minimises soil damage.

Other plant diversity comes in the form of stewardship mixes and companion planting; the latter involving peas and beans being grown with potatoes, for a nitrogen and diversity benefit and buckwheat and clover, with oilseed rape.

"In wheat, this diversity is being trialled by establishing a living clover mulch, with the wheat being drilled in 50cm rows in a wide band and the clover grown between them."

"The idea is to help with plant diversity, give nitrogen to following crops, give green cover to soil and act as a weed suppressant. Eventually, if we can get it working, we're looking at inter-row mowing

to manage it in the spring to release nitrogen into the neighbouring plant, as well as trying some with DeCyst [trap crops] amongst the clover to help with PCN."

Along with appropriate variety selection and testing, this has helped bring nematicide use down to just 8% of the potato ground, where previously it had been 90%.

Re-ridging trials are being conducted to see if herbicide reductions can be achieved, but fungicides are proving to be more difficult, especially where blight is concerned.

While pesticide use has been markedly reduced across the whole rotation, cutting down on blight sprays is a key challenge still yet to be addressed.

"Getting away from routine prophylactic blight sprays is quite difficult, because when it goes wrong, it can go spectacularly wrong. We are trying to put in the groundwork now to build healthy soils and plants and manage nutrition to make plants much more resilient to pathogens like blight. Before too long we will start to pull back where we can."

"It can be slow progress but an exception to that is our fertiliser regime, which has changed massively, thanks to the use of soil testing and sap analysis," highlights Mr Bubb.

Building fertility across the rotation has reduced the overall nitrogen (N) requirement and allowed the farm to move away from ammonium nitrate fertiliser, in favour of urea and foliar applications.

In addition, biologicals and organic acids have replaced phosphate fertiliser and a feed-the-crop approach has seen potash use drop.

"By increasing fertility across the rotation, we've reduced our nitrogen requirement and seen phosphorus (P) fertiliser use drop by 90% and potassium (K) fertiliser use fall by 35%."

"In future, compost extracts will be evaluated on the farm and more will be done with plant diversity and input reductions."

In summary, he believes these management changes have made the crop more resilient and profitable with no noticeable impact on yield. The increase in organic matter has also helped with water retention and reduced the amount and frequency of irrigation requirements.

If you have questions about any of the articles in this agroecology special, or wish to be included in our emailing list for future agroecology and environmental e-bulletins, please contact us: information@hlh ltd.co.uk

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