CLIMATE CHANGE CHAMPIONS

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> "This is a soil that'll hold on to its carbon."

The business case for soil sense

Innovation Climate Change Champions

Taking the long-term view has not only ensured a profitable and sustainable future for a Cotswold farm, but made it carbon positive. *CPM* visits for a closer look.

By Tom Allen-Stevens

The term 'Climate Change Champion' doesn't sit right with Hamish Campbell. "My idea of sustainability is to make it work as a business," he says.

"I look after the soil, but the overriding aim is to have a farm business that's still here in 20 years' time. So for me this isn't about championing climate change, but about identifying end market opportunities and adding value."

Whether by luck or by design, these business practices appear to be delivering for Net Zero, too. Hamish has been assessing his carbon footprint with the help of Velcourt agronomist Kieran Walsh, using the Farm Carbon Toolkit. Initial calculations suggest the business, RA Campbell and Partners, based at Upper Swell in the Cotswolds, is actually carbon positive — sequestering more greenhouse gases than it emits — and that's largely down to how Hamish has been managing his soils.

Soil organic matter

"The farm's soil organic matter (SOM) has increased on average by 0.6% in 6 years," reports Kieran, who's come to the farm to review the figures. "This has mostly come from applications of manure, but also the techniques taken with drilling and cultivations. Improving the soil structure from these two methods have created a good environment for Hamish's crops."

And it's with his crops that Hamish has been making progress that absolutely fits with his aims for sustainability and business opportunity. He's been growing hybrid rye for grain, supplying a local mill that's using it for speciality flours.

"The market price for grain rye is not all that special, compared with milling wheat or malting barley," notes Hamish. "The difference is that you're not spending on the crop. Switching out of spring barley into hybrid rye could be worth as much as £45,000 for my business."

This productivity push has a carbon consideration, too. Joining Kieran and Hamish is KWS maize and hybrid rye product manager John Burgess. He confirms that on average, hybrid rye delivers about the same consistent grain yields in the second cereal slot as other cereals. "But it has a nitrogen input 45% lower, or around 100kgN/ha less, compared with second wheat.

Based in the Cotswolds, 240m above sea level, RA Campbell and Partners has been building the organic matter content of its thin, brashy soils.

What makes Hamish Campbell a Climate Change Champion?

Innovative ideas

A keen eye to develop a local market for value-added and niche products from the arable enterprise has ensured a healthy return from combinable crops. This is coupled with a resolve to bring onto the farm manure and digestate from local sources to help with its soil-improvement drive and reduce dependence on applied fertiliser. The result is a profitable business model with long term sustainability.

Productivity push

A switch into crops and varieties with lower input requirements but a similar output has helped the farm reduce its carbon footprint, while lowering reliance on pesticides and fertiliser. Water-efficient crops suit the drought-prone soils.

Cultivation care

Tillage has been reduced to a minimum, and this has gone hand-in-hand with manure and digestate applications. The result is a steady and measured improvement in soil organic matter that locks away carbon, outweighing the farm's overall emissions. The move to rye, with its adventurous roots, will sequester further carbon into the soil.

A number of straw-for-muck deals bring manure to the farm from surrounding livestock units as well as horse livery yards.

Bio-based boldness

A focus on supplying produce to local markets displaces alternatives from further afield that have a higher carbon footprint.

"Nor does rye suffer from septoria, rhynchosporium, and rarely gets yellow rust, typically needing only one or two fungicides to control mildew and brown rust. Its high straw yield offers further opportunities for renewable energy."

Suited to free draining, acidic or sandy soils, rye uses 25% less water per ha than wheat. "It puts out a good root system, and has less leafy growth than wheat, so it captures more carbon in its biomass," notes John.

The lower water requirement is a plus for Hamish, whose crops regularly suffer a soil moisture deficit (SMD) on Cotswold brash that rises around 240m above sea level. He grew 9ha of KWS Edmondo hybrid rye last year.

"Currently we have spring barley in the rotation with winter wheat and oilseed rape. But our Higher Level Stewardship agreement comes to an end next year, and with 65ha in overwintered stubbles, we're wondering whether a switch to rye from spring barley might deliver a net environmental as well as financial benefit."

Suited to free-draining soils, hybrid rye tillers 'like an animal', needs 45% less N than a second wheat and generally suffers only from mildew and brown rust.

The rye was drilled on 30 Sept at 75kg/ha, giving him only 230 seeds/m^2. "We drilled it into a seedbed that had plenty of straw on the surface and it looked awful. But it's an animal when it tillers — we had 15-20 tillers per plant."

In the spring rye moves quickly, he notes. The crop was given two dressings of liquid N and SO_3, with PGR joining a mid April mildewicide, and another spray for brown rust a month later. Input costs came to over ▸

Climate change solutions may already exist in plant genetics

While UK Farming may currently be focused on achieving Net Zero by 2040, it's quite probable that the genetic solutions that will take farming to its next achievement are already making their first step into a plant breeder's innovation pipeline, points out John Burgess.

"Innovation is at the heart of everything we do at KWS. The goal of our breeding program is to provide farmers with precisely those varieties that meet their operational needs," he says.

But varieties must anticipate growers' requirements some 10-12 years in advance — the time it takes to bring an initial cross to market. That means a breeder needs an eye on the future to anticipate Society's future needs, and it means the crops and varieties that can deliver Net Zero are probably already on or close to the market.

"At the start of every crop is a seed, and every seed is a variety. The correct variety choice goes beyond what you can glean from the AHDB Recommended List," notes John. "Sowing for peak performance aligns more closely with meeting the challenge of climate change."

This involves looking in more detail at the genetics of a crop and variety to ensure it has the potential to deliver on your wider objectives, he says. "It's the step Hamish has taken by moving into hybrid rye for grain. The crop fits the limitations of his soils and brings with it a lower reliance on input use."

While the largest market for rye is for pigs where the crop has distinct health benefits over other cereals, John notes that Hamish has found a niche local market for his crop. "He's not only chosen a crop that's more sustainable but developed a business opportunity that's fit for the future. That's why KWS is pleased to support his nomination as Climate Change Champion 2020."

John Burgess believes the breeding innovation may already be in place to help UK Farming meet its Net Zero objective.

The farm's soil-feeding programme has gone hand-in-hand with reduced cultivations to make the farm carbon positive, points out Kieran Walsh.

▸ £100/ha less than for spring barley.

"The growth was nuts and the straw came to shoulder height, but the stems were like tree trunks — it's an exposed site that took some wind and rain in mid-June, but the rye stood firm," says Hamish. The grain yield came to 9t/ha, and the straw delivered another 4.5t/ha.

Hamish has a number of straw-for-muck deals that bring around 3500-4000t of manure to the farm each year from surrounding livestock units as well as horse livery yards. This is what underpins the farm's soil-improvement programme, largely responsible for the climb in SOM levels, reports Kieran.

"The soil may appear to be thin, but much of it has a high total exchange capacity (TEC), which means it can hold on to and store nutrients and moisture if you treat it right. It's like having a very large sponge," he explains. SOM levels, based on results from the Dumas combustion method, have risen from around 4.8% to as high as 7.7% in some areas — an average rise over six years across the arable area of 0.6%.

"A new step on Hamish's farm is the use of digestate from a nearby AD unit that helps reduce reliance on fertilisers like TSP and MOP. This soil-feeding programme has gone hand-in-hand with reduced cultivations."

The farm is part of a joint venture that owns all the machinery run over a total area of 1400ha. This puts a 4.3m Horsch Terrano to a depth of just 25mm through Hamish's soils. The drill is a 6m Horsch Sprinter or equally low-disturbance Horsch Focus.

"We haven't gone down the direct drilling route as I believe our soil needs a cultivation to take out any compaction," says Hamish. "But we have significantly reduced depth of tillage, and I've noticed how the soil responds — it travels far better."

Firm underfoot

The group takes a trip out to assess this year's crop of hybrid rye, drilled at the end of Oct. Despite suffering one of the worst winters on record, and it being a particularly wet day, the ground feels firm underfoot with no puddling.

"What you notice about this soil is its smell," remarks Kieran as he digs up a trowelful to inspect the roots that have just started their spring growth. "There's a good earthy smell and along with its friable soil structure the roots have a good place to grow over the coming months. Even after this prolonged wet period, there are no signs of anaerobic conditions. This is a soil that'll hold onto its carbon."

Digestate from a nearby AD unit helps build SOM, as well as reduce the applied fertiliser requirement.

Hamish Campbell takes in the good earthy smell of his soils that shows, even after the prolonged wet period, there are no signs of anaerobic conditions.

Also in the ground is the farm's winter wheat, and that's seen a shift from Gallant to KWS Extase. "It didn't add up growing milling wheat," maintains Hamish. "Gallant needed a lot of fertiliser, a lot of fungicide and we were struggling to get the 13% protein on our brashy land."

Extase's vigorous growth and early harvest suit the cold, exposed soils, notes Kieran. "Up on the Cotswolds you need a variety that pushes out the tillers and keeps them. Extase is a fast developer, so should do well, and it's early to harvest, which fits in with the SMD. With its high septoria rating, it's also a move away from a variety that's dependent on fungicide input and a good supply of applied N, which in itself encourages disease."

The focus for the oilseed rape is its oil, and as with the rye, Hamish has developed a local market for the produce he grows. The variety, Molten, produces oil with a good balance of essential fatty acids in Omega 3 and Omega 6 and high in Omega 9. The rapeseed is cold-pressed on farm and sold as R-Oil to local outlets, including top restaurants, and as a health product for horses. The rapemeal is sold as high protein feed to displace imported soymeal for local beef finishers.

"We've developed good, local markets for our produce, and want to focus more on wheat and rye and opportunities to add further value. I think there's potential to drop spring barley — too many people are growing it with no consideration for their end market," notes Hamish.

"But all we're doing is making the most of what we have and trying to come up with a blueprint for how we farm this land so that it'll still be farmed productively and profitably in 20, even 50 years' time. That has to revolve around how we manage the soil, and if we can keep that in good health, it'll keep the business in good health, too." ■

Climate Change Champions

UK Farming has set itself the challenging target of Net Zero emissions by 2040. Although led by the NFU, it will take the entire industry, working together in a partnership approach to meet this ambitious goal.

But there are individual growers, thought leaders who have already started on this journey. They have the ideas, the progressive outlook and the determination to shape positive change. *CPM* has teamed up with leading agricultural suppliers who have a credible Net Zero aspiration to identify these individuals and bring them into the top-level discussion about how farming can position itself as the solution to climate change. *CPM* readers will get the chance later this year to decide who will be awarded the accolade of Climate Change Champion 2020.

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