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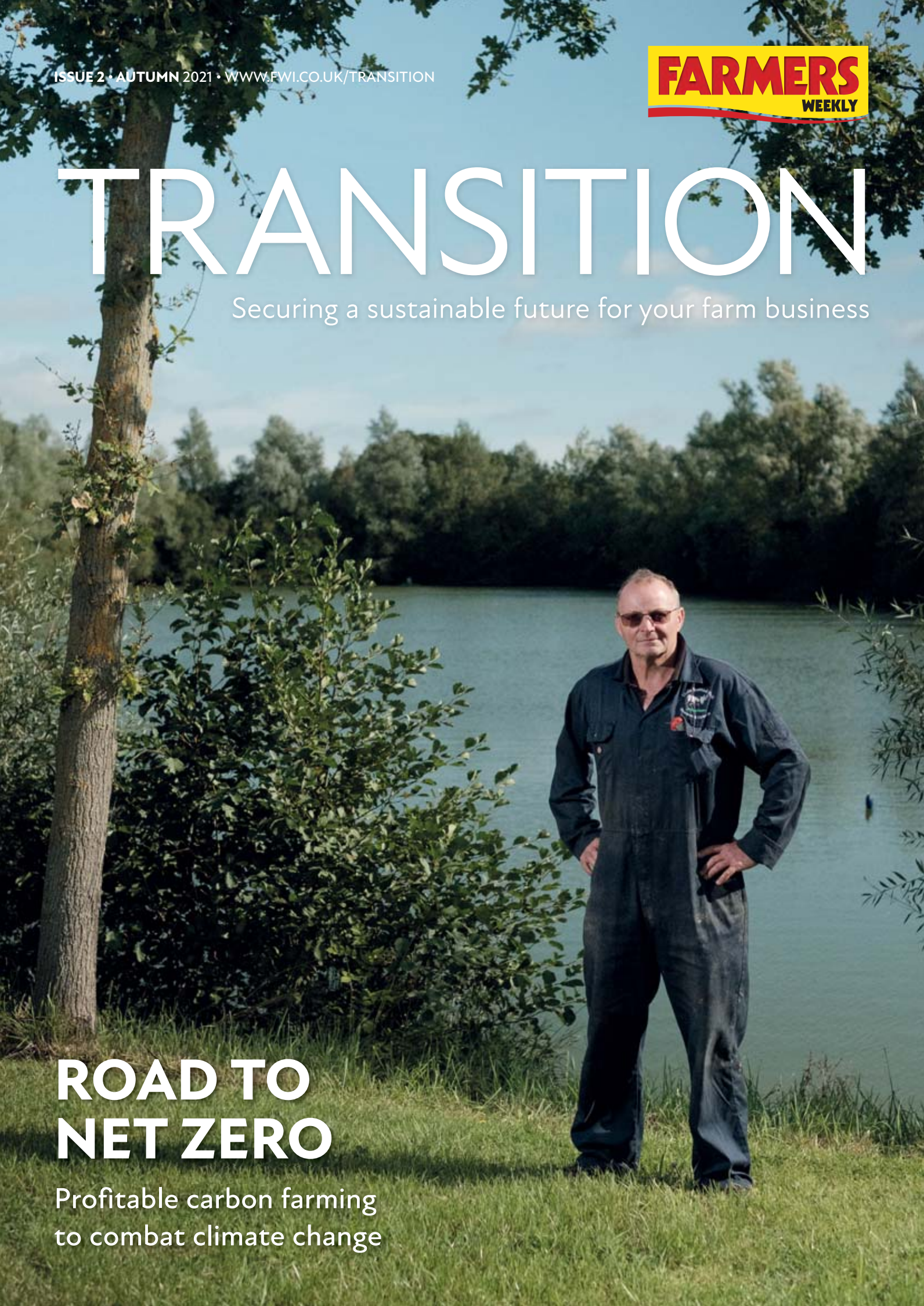
FARMERS WEEKLY

TRANSITION

Securing a sustainable future for your farm business



ROAD TO NET ZERO

Profitable carbon farming to combat climate change

Farmers have vital role in climate change mitigation

Welcome to the second issue of *Transition* – the quarterly supplement from *Farmers Weekly* to help secure a sustainable future for your farm business.

The COP26 international summit in Glasgow (31 October-12 November) is seen as crucial in the battle to mitigate climate change. It will see 200 countries outline their plans to cut greenhouse emissions and help limit the rise in global temperatures.

Farmers have a major part to play in achieving this goal – by changing farming practice. And in this issue of *Transition*, we examine ways growers and livestock producers can take action on their own farms to help reach this target.

Doing so makes good business sense – as well as making a vital contribution to help secure the future of the planet. Action can include soil management, capturing carbon and using renewable energy.

Scientists say keeping the rise in global average temperature below 1.5C is essential if we are to avoid the worst effects of climate change. Failure to do so will mean more frequent and intense extreme weather.

We are grateful to our Transition Farmers, who are sharing their stories as they strive to remain profitable, while reducing their carbon footprint. We are grateful too to our Transition Partners, who have agreed to share their expertise along the way.

For more about our Transition initiative, visit our knowledge hub at **fwi.co.uk/transition**

Johann Tasker, *Transition* editor

OUR PARTNERS

The *Farmers Weekly* Transition Partner Network is a UK-wide community of farmers, industry stakeholders and influencers working together to secure a sustainable future for UK agriculture.

CONTENT HIGHLIGHTS

OUR COW MOLLY

How collaboration and good marketing are helping smaller dairies thrive See p8

MAG/COLIN MILLER

How bridging income gaps and adopting new enterprises are key to sustainability See p16

NFU

How innovation and good management can help reduce carbon footprint See p19

If you are interested in joining the network and would like to find out more, please contact Anna Eccleston at anna.eccleston@markallengroup.com

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NUTRITION AND FEED SOURCING CAN DRIVE DOWN EMISSIONS

Dr Michael Marsden, product development director at KW Feeds explains how co-products can help reduce environmental impacts of food production, while bringing performance benefits

The main focus of ruminant feeding has historically been to drive profitability using key performance indicators such as margin per head, hectare, or by unit of production - either litres of milk or kgs of meat - all within strict health and welfare guidelines and legislation.

However, the world of animal protein production is changing very rapidly, with consideration for the environmental impact racing up the priority list of processors, retailers and consumers.

The livestock industry needs to respond positively to these challenges and continue to develop and adopt production systems that take advantage of current and emerging knowledge and technologies which will deliver desired environmental benefits.

From a nutritional perspective, one way to reduce the environmental footprint of production, for all producers, is to look at feed ingredient composition, type and origins.

For example, the use of co-products, such as those generated from the production of beer, whisky, ethanol, starch and sugar, have been shown through globally recognised methodology, to carry a significantly lower carbon footprint.

Co-products are highly desirable packages of nutrients, so using more co-products in feed rations can provide the majority of nutrition required, while driving down the footprint of the daily ration significantly by as much as a third compared to a more 'traditional' grain or soya.

Therefore understanding where animal feeds and proteins are sourced and produced, along with their nutritional values, can have a huge impact on both performance, health and fertility of animals, as well as the environmental footprint of every litre of milk or kg of meat produced.

Sourcing home produced co-products, such as the moist British cattle feed C*Traffordgold, or the sustainable rumen protected protein NovaPro, can help reduce the negative environmental impact of ruminant milk and meat production.

C*Traffordgold makes effective use of the co-products left behind after wheat is processed for the human food, pharma, drink, aquaculture, and pet food industries, while award winning NovaPro is produced using rape expeller, from UK sourced rapeseed, in a new state of the art factory using renewable fuel.

Key to any change to diet, of course, is that it must be nutritionally balanced to maintain or improve performance and profitability. Having consistent, accurately nutritionally defined and validated product trials is therefore vital.

For example, with increasing pressure on milk producers to remove or reduce soya, KW Feeds has introduced NovaPro as a high energy and sustainable rumen protected protein for dairy cows.

On top of the clear environmental benefits of a UK sourced and produced protein, trials run at the University of Nottingham by Professor Phil Garnsworthy found rations containing NovaPro produced an additional 1.7 litres of milk per cow per day compared to a soya and rape ration, with no significant effect on milk constituents.

This was coupled with a significant reduction in milk urea, suggesting an improvement in nitrogen efficiency and less direct and indirect emissions from manure. Professor Garnsworthy has also published a paper showing UK wheat distillers can achieve a similar reduction in soya.

From a carbon footprint perspective, a very recent study at SRUC combined with detailed Life Cycle Analysis, has shown using C*Traffordgold and NovaPro can dramatically reduce the GHG footprint per litre.

Feed ingredients and feeding management can make a very measurable impact on emissions. Sourcing and feeding more low environmental impact co-products can significantly reduce the emissions per litre or kg of product, while also providing performance benefits.

Advice on reducing emissions and storing carbon

To reach net zero, greenhouse gas emissions need to be reduced, and carbon in the atmosphere sequestered. **Louise Impey** reports on the role farmers can play

Farming has been recognised for the key role it can play in helping the UK meet its net-zero emissions target by 2050, with individual farmers being encouraged to do their bit.

There's no magic bullet or one-size-fits-all approach, say experts, who highlight that we will need a multitude of different options to both reduce emissions and capture or store carbon in soils and woodlands.

"Achieving net zero in agriculture is challenging," says Dave Freeman, business area manager for agriculture with Ricardo Energy & Environment. "There are three main greenhouse gases [GHGs] to deal with from agricultural activities, all of which are produced within a complex biological system."

For net zero to be reached (see "What is net zero?"), these GHG emissions need to be reduced, while carbon has to be removed from the atmosphere and sequestered, or stored indefinitely, he explains.

"Farming can't be decarbonised completely. Emissions are part of the biology of plants and animals growing," he says. "There will have to be some carbon sequestration to balance or offset the remaining emissions."

In the first instance, targeting waste and inefficiencies can help bring emissions down, while land use change can give opportunities for removal – forest and grassland are carbon stores, while cropped arable land emits carbon, for example.

Cattle can be a large emissions source, mainly from the digestive process of enteric fermentation, acknowledges Mr Freeman, who suggests that the first thing to do is to see whether the system is working as efficiently as possible.

"Actions that are taken to improve the carbon >

PHOTOGRAPHY: TIM SCRIVENER, OUR COW MOLLY

WHAT IS NET ZERO?

Net zero is the balance between all greenhouse gas (GHG) emissions and removals in the annual cycle of agricultural production systems.

The emissions, which are the result of GHGs from farming activities, go into the atmosphere and contribute to warming. In farming, these arise from manures, fertilisers, enteric fermentation and fuel use.

Removal of GHGs from the atmosphere is achieved by growing things. This sequesters carbon dioxide into carbon in biomass, both above and below ground, and accumulates organic matter. On farms, woodland, hedgerows, grassland and soils are involved in this process.

TRANSITION FARMER: EDDIE ANDREW, SHEFFIELD

Dairy farmer Eddie Andrew is reducing his carbon footprint by supplying milk to a key customer in stainless steel churns instead of plastic bottles.

Mr Andrew milks 90 cows at Cliffe House Farm, Dungworth, on the outskirts of Sheffield. He supplies about 160,000 litres of milk annually to Sheffield University's cafés and restaurants under the farm's Our Cow Molly brand.

Switching to stainless-steel churns has reduced plastic waste by 87,000 single-use bottles a year. Each steel churn holds about 10 litres of milk. When empty, they are returned to the farm where they are washed, refilled and reused.

Working with Mr Andrew, the university invested in 70 churns. The decision has reduced the carbon footprint of milk delivery to the university by more than 65% – equivalent to some 6.5t of carbon dioxide every year.

The best way to deliver milk was researched by the university's Grantham Centre for Sustainable Futures. Previous studies considered milk cartons or glass bottles – but these were deemed impractical for a commercial business using large volumes.

For more about Eddie Andrew's Our Cow Molly dairy farming business, see **p8**.

< balance tend to have benefits for other parts of the business. So it makes sense to target these improvements to get multiple benefits, such as reduced costs and better margins."

Given the current situation, a focus on fertiliser efficiency and reduced rates, for example, will drive both emissions reductions and manage costs, he notes.

What can farmers do?

Start by understanding what the emissions sources on your farm are and where the removal opportunities occur, advises Mr Freeman.

For that, he suggests using a carbon audit tool. While they do require data and effort, they will help to show you where your major emissions sources are as well as how they vary across and within enterprises. "Once you have a measure of these you can start to look for opportunities to reduce them. Then you can plan your actions and make changes."

He warns that none of the carbon footprinting tools are perfect and all have pros and cons. However, he sees them as important for helping farmers understand their starting point and says they are really useful in planning actions and tracking progress over time.

"Currently, most of them lack sequestration or carbon removal capability and some don't include the uncropped areas. Consistency between the tools can be an issue, so select the one best suited to your situation and stick with it.

"Fortunately, they are evolving all the time and continually improving in the information and insight they provide."

Reducing emissions

Once the main sources of GHG emissions on farms have been identified, farmers can look for opportunities to reduce them. That may be by increasing productivity, making better use of inputs, or changing farm practices.

"Again, as this is not about one type of farming or one system, there will be something for everyone. Individual businesses will be making different decisions," Mr Freeman says.

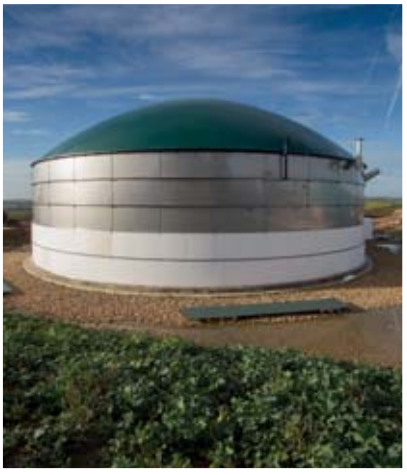
The next step is to look for offsetting or removal opportunities. Assessing what assets you have as a land manager allows you to identify areas of land that can be changed.

"Less productive land could go into an agri-environment option, such as wild bird cover or a pollen-rich flower mix, for example.

"Agroforestry or silvopasture may be appropriate for marginal areas, or even woodland. Of course, putting the right trees in the right places is important."

Storing carbon

Where carbon sequestration is the aim, consider



practices that involve the production of both above- and below-ground biomass. New tree plantings, new pasture and hedgerows all fit the bill, while historic woodlands, which tend to be in equilibrium, need to be managed and protected.

Moving to permanent pasture or new woodland are sure-fire ways of long-term carbon storage in the soil, notes Mr Freeman. "Soil has huge capacity to store carbon but farmers need to protect it and build it. This can't happen unless they do something different with it to get the full benefit.

"That might mean changing the way they use the land rather than the way they interact with it."

Working together

NFU climate change adviser Ceris Jones points out that there will need to be a partnership approach for farming to reach net zero by 2040 – which is the NFU's ambitious pledge.

"We need to work with others – such as the government and the supply chain – to achieve the balance between emissions and taking carbon dioxide out of the atmosphere."

She highlights a range of practices for farming businesses intent on making changes, which fit into one of three pillars:

1. Reducing emissions by being more efficient This involves managing the things that give rise to GHG emissions, such as livestock feed policy and arable nutrient management, as well as by increasing productivity.

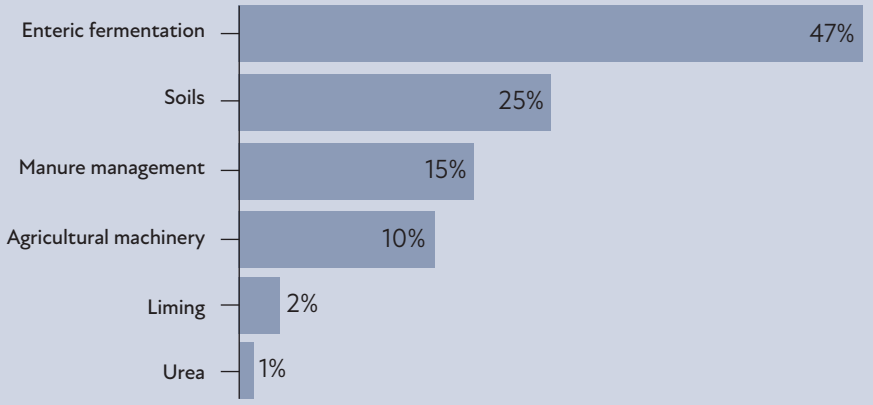
2. Storing carbon on farmland From fine-tuning grassland management to introducing cover crops and integrating livestock on arable farms, there are possibilities for storing carbon in soils and in woody vegetation.

3. Boosting renewable energy and building a zero-carbon economy Bioenergy has enormous potential for farms, from the use of anaerobic digestion to produce energy to the planting of perennial energy crops such as miscanthus.

NFU analysis shows that it is possible for the industry to get to net zero, she adds. "One-quarter of the challenge will be achieved by increasing productivity, with a further quarter coming from carbon storage.

"The final half will come from bioenergy measures – for which we do need a strong domestic bioenergy chain." ■

WHERE DO FARMING'S EMISSIONS COME FROM?



Source: National Air Emissions Inventory 2012

WHAT ARE THE MAIN GREENHOUSE GASES IN AGRICULTURE?

Carbon dioxide (CO2) comprises 12% of total emissions and is created by energy use, specifically combustion

Methane (CH4) accounts for 56% of farming's emissions and comes from enteric fermentation in ruminants and manures

Nitrous oxide (N2O) forms 31% of the industry's emissions and comes from soil as fertiliser breaks down and nitrification occurs

Source: National Air Emissions Inventory 2012

ACTIONS THAT CAN ALTER THE GHG BALANCE

Land use
- Conversion of arable land to grassland
- Agroforestry
- Woodland planting
- Managing existing woodland and hedgerows
- Wetland/peatland restoration
- Preventing the removal of existing farmland trees

Crop production
- Reduced tillage/zero tillage
- Leaving crop residues on soil surface
- Soil amendments
- Using cover/catch crops
- Growing legumes in the rotation

Livestock production
- Disease management
- Using sexed semen
- Feed additives in rumen diets
- Improving herd fertility
- Optimising feed strategies

Nutrient/soil management
- Use of nitrification inhibitors
- Improved nitrogen efficiency
- Biological N fixation in rotations

Other
- Carbon auditing tools
- Nutrient management plans
- Renewables

‘It’s about three dairy farms working together’

Collaboration and good marketing are helping smaller dairy farmers thrive in a competitive milk market. **Johann Tasker** reports

FARM FACTS

Cliffe House Farm, Dungworth, Sheffield

- Farm size: 73ha
- Soil type: Mixed clay loam
- Rainfall: 850mm

TRANSITION GOALS

- Co-operating to reduce cost
- Establishing a new dairy
- Reducing carbon footprint

Transition Farmer Eddie Andrew has an ambitious goal: to continue producing milk profitably from his 90-cow dairy herd – while reducing its reliance on fossil fuels.

The family-run 73ha farm on the edge of the Peak District National Park includes an ice cream parlour and shop – and a thriving milk delivery service to some 1,350 local homes and businesses.

Mr Andrew’s grandfather, Hector, started the farm with eight cows and borrowed money in 1947. Today, it remains a close-knit family partnership between Eddie, his parents, Graham and Thelma, and his brother, Dan.

Based in the small village of Dungworth, just four miles from the centre of Sheffield, milk deliveries have always been a key part of the business. Today, the main delivery area is the Sheffield suburb of Stannington, with some 1,200 doorstep customers.

Relatively small compared with many dairy farms, the business has found its own way to compete. It devised a marketing strategy and works with two neighbouring dairy farms to reduce its environmental footprint and input costs.

Milk and ice cream are sold and marketed under the family’s Our Cow Molly brand. Retail customers include about 150 coffee shops, local branches of the Co-op and supermarket Morrisons – as well as Sheffield University.

“We are very much a local business,” says Mr Andrew. “Our milk comes super fresh from our cows on the same day, it’s not mixed together with milk from other farms, and it doesn’t travel hundreds of miles to get to the shops.”

Customer expectations

As much milk as possible comes from grass, with some 65ha of the farm down to grazed pasture or silage. The remainder is winter wheat, mainly for straw, with the grain rolled and used as home-grown feed, says Mr Andrew.

“We’ve usually taken three cuts of silage in the past, but the summers are getting warmer and wetter and the grass crops have been so heavy that we’ve only needed to do two cuts for the past two or three years.”

Rather than cows being housed, Mr Andrew says his customers expect them to be grazed most of the time. The challenge is to balance this expectation while producing profitable milk at a price customers are willing to pay.

To keep costs down, the farm joined forces with two neighbouring farms that have similar herd sizes to build their own dairy. Further collaboration and cost-sharing – including machinery and farm management – are likely within the next few years.

“It’s about three family farms working together. We are all about the same size and, ultimately, it could see all the cows moved to one site, with the youngstock on another. But for now, we are taking it one step at a time.”

Mutual benefit

At the moment, each of the three farms has its own feeder wagon, telehandler, tractors and muckspreader. The plan is that costs could be cut if one farm provided the machinery for the other two – reducing overall overheads.

“One of our neighbours already runs a good contracting business. The idea is that they could come and do all the farm jobs – they have more modern kit and could get it done must faster than us because we stop to milk at each end of the day.”

Restructuring machinery use this way will reduce the farm’s need for fossil fuels. So too will plans to build an on-farm anaerobic digester, which could help displace the use – and purchase – of fossil fuels for fertiliser, heating and electricity.

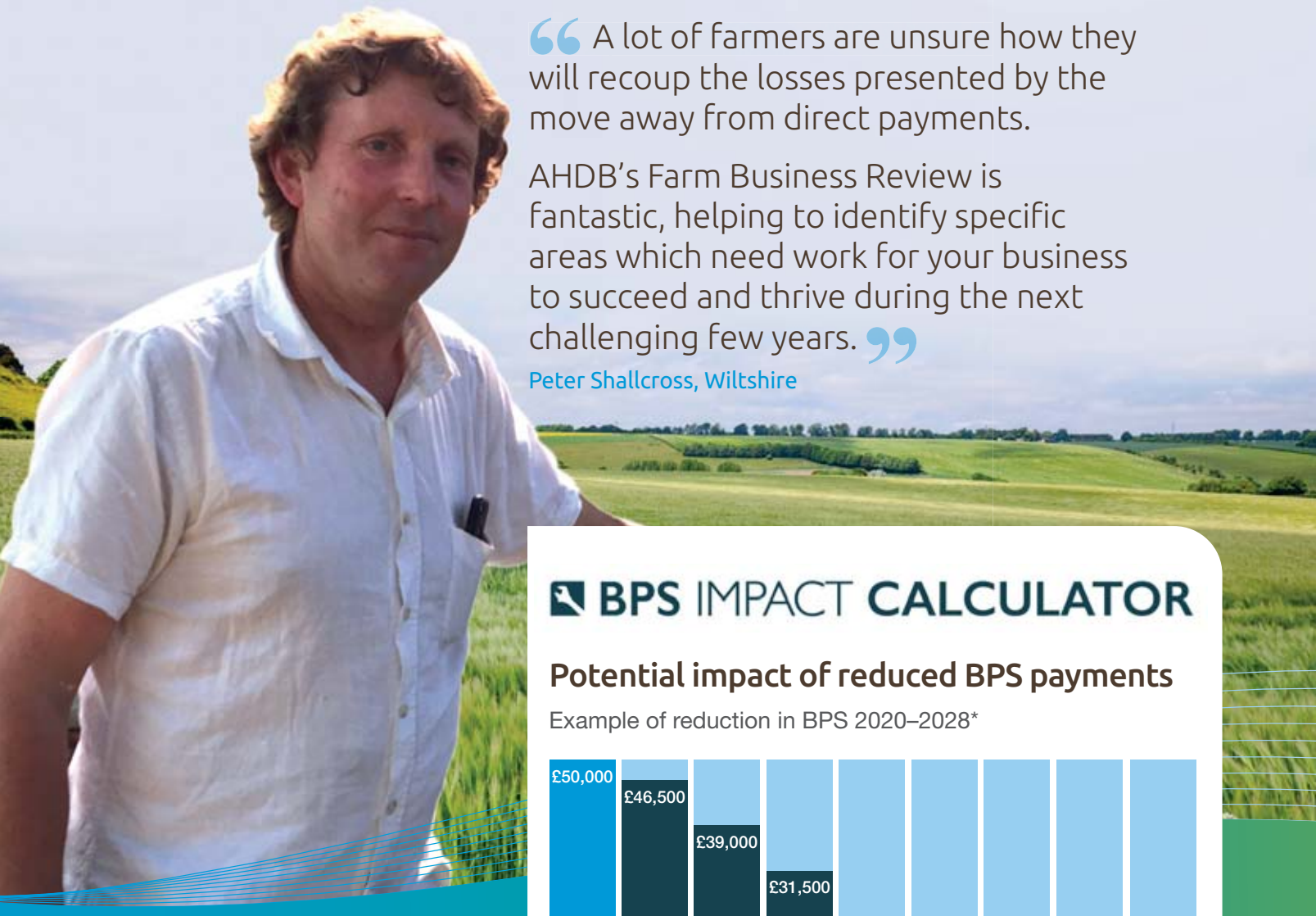
The farm already has close links with the Grantham Institute for Sustainable Futures at Sheffield University – working on initiatives which include replacing plastic milk bottles with reusable stainless-steel churns (see **p6**).

“Being on the edge of Sheffield is a big benefit. It means we have lots of local customers – we can see thousands of houses from the farm – and we also have the expertise of the university on our doorstep. We are right on the edge of the Peak District National Park, close to our local customer base, and at the same time we are working with international experts on sustainability. In many ways, it’s a perfect location.” ■

OUR COW MOLLY

AHDB

Prepare your business for the post-BPS world

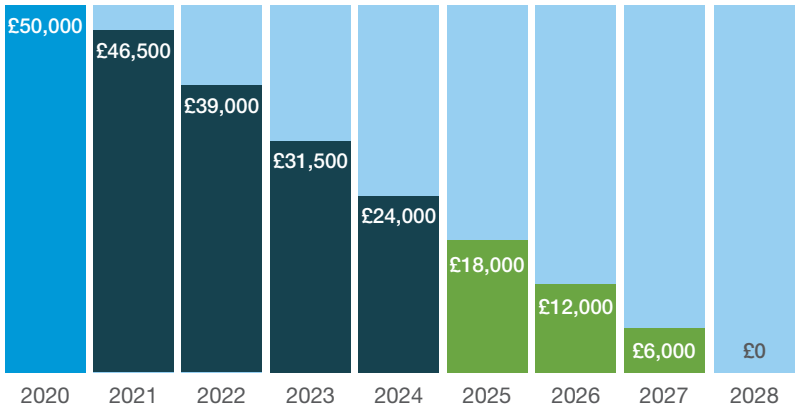


> A lot of farmers are unsure how they will recoup the losses presented by the move away from direct payments.
>
> AHDB's Farm Business Review is fantastic, helping to identify specific areas which need work for your business to succeed and thrive during the next challenging few years.
>
> Peter Shallcross, Wiltshire

BPS IMPACT CALCULATOR

Potential impact of reduced BPS payments

Example of reduction in BPS 2020–2028*



*Illustrative figures based on a 220 ha (544 acre) cereal farm claiming non-SDA entitlements at £233/ha

Farm Business Review

- Free one-to-one advice from an approved consultant
- Access to our Farm Business Review tool, including the BPS Impact Calculator
- Peer support from like-minded farmers

Sign up: ahdb.org.uk/farm-business-review

HOW BREEDING AND FEEDING CAN HELP MEET THE METHANE DEBATE HEAD-ON

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By Beth Alexander, QMS Cattle and Sheep Specialist

There is no denying that beef production emits methane. We could debate how the cycle of methane is less damaging in comparison to exhaust emissions but, in the long term, how much time can we afford to spend changing a sold story?

Methane is a waste product, so ultimately it is in our best interests as beef producers to reduce methane produced by cattle to improve efficiency. Approximately 6 to 8% of the energy from feed consumed is emitted in the form of methane. There are two main approaches we can take to reducing emissions: breeding or feeding, genetics versus diet.

There is a lot of research being carried out in Scotland by SRUC and around the world on the effect feed additives have on methane emissions. Altering the composition of the diet, by increasing proportion of concentrates and reducing fibre content can reduce methane output by up to 30%.

Research in Canada has looked into the effect of methane inhibitor 3-NOP which has the potential to reduce emissions by 40% plus. Increasing fat content of diet is another method albeit with varying results. Much of this research has been carried out on uniform feedlots or on animals with a supplemented diet.

The majority of our suckler herd in Scotland is grass or pasture based and is not supplemented for a proportion of the year, so how can we apply these principles? One easy win for the industry is better quality feed. The better quality the silage, the more digestible, with less fibre requires less work for the rumen to digest therefore less methane emitted, win – win scenario?

In a growthy season like we have been experiencing this year, taking more cuts of better-quality fodder is certainly achievable. Opting for a range of grass varieties or legumes rather than perennial rye is another veritable option worth considering for grazing animals. When accounting for reduced requirement for nitrogen the effect could be confounding.

On the other side of the coin, we have breeding. Selecting for feed conversion ratio seems to be the big hitter for reducing methane through genetics. Studies by Rainer Roehe and colleagues from Scotland's Rural College and the Universities of Edinburgh and Aberdeen has paved the way for an approach to reducing methane produced by cattle farming using modern breeding approaches. By linking bovine host genetic variation and the influence on rumen microbial methane production is a step towards selecting for low methane emitting and efficiently feed converting cattle.

But really, we need to take it back one step further. By improving the number of calves reared per cow we can produce the same number of calves with less cows. Less inputs and the same, if not more, outputs, good for the bank and good for the environment.

Reducing emissions and improving profitability are not mutually exclusive! This sounds simple in theory but requires farmers to sit down and scrutinise their business to find out where the outliers are to put it into practice.

These outliers are unproductive year on year offering nothing saleable to the business, apart from herself, and emitting methane. A focus on maternal traits to breed productive replacements is worth serious consideration when looking further down the line past the kill sheet.

It's finding the optimal cow, big enough and productive enough to produce marketable progeny but not too far that she costs too much to maintain. More input does not always correlate to more output or more profit.

There is no one solution for reducing methane emissions for Scottish beef farmers but the important thing is there are achievable solutions there for Scotland's farmers, on any scale. While adding to or altering diets offers an immediate reduction, breeding can give small but cumulative gains allowing the industry to advance for the next 20, 30 years and beyond. But still the number one way of reducing emissions is by improving efficiency of kilograms of beef produced.

Measuring and managing carbon: What to consider

Carbon sequestration can help improve farm business performance, but this must be done correctly. **Louise Impey** reports

Growing recognition that farmers have an important role in combating climate change is shining the spotlight on carbon management.

Carbon is an important subject for farmers to understand for two main reasons. The first is that farms are a store of carbon, thanks to historical land management practices and factors such as geology and weather patterns.

The second reason is that all farms offer an opportunity to increase carbon stocks. This benefits the farm business and will help to improve crop performance and resilience.

"The challenge with any carbon store is to make sure that the carbon stays there – if it goes, you are losing a key asset and compounding the climate change issue," says Becky Willson (left), project officer for the Farm Carbon Toolkit.

PHOTOGRAPHY: TIM SCRIVENER. INSET: SUPPLIED BY BECKY WILLSON

"There's also a wider role with carbon for farmers to deliver climate solutions. They can help agriculture to reach net zero and also give a helping hand to other industries through offsetting." For that reason, practices that increase soil carbon should be of interest to all farmers and land managers.

Where is carbon stored?

Soils are the third largest store of carbon in the world, and the scale of carbon in farm soils is often vast. To put this into context, the amount of carbon often found in a farm's fields are equivalent to 60 years of the annual carbon footprint of the business, says Ms Willson.

Soil organic matter – a metric that most farmers are familiar with – is about 60% carbon, so practices that improve soil health do have a carbon benefit.

"The two are intrinsically linked. As you build soil carbon and improve soil health and structure, you see a rise in crop productivity and the overall resilience of the farm," she says.

Woody biomass, both above and below ground, is the other main store of carbon on farms. That includes woodlands and hedges, as well as some environmental habitats such as scrub.

Often overlooked, hedges are a key feature for carbon storage. Managing them can have just as important an impact as planting new ones, with their roots also helping to enhance fungal populations.

"Where hedges are already established, aim to cut them less frequently – perhaps every second or third year – to maximise carbon storage," advises Ms Willson. "That will also help with biodiversity."

Planting new hedges, especially across sloping fields, brings more than an increase in woody biomass, she continues. "They help to reduce soil loss and prevent erosion, link up habitats and provide shelter. Meanwhile, the underground network of their roots helps to keep soil biology functioning well."

Habitats and environmental features also store carbon and have a value for the farm. Stewardship options, buffers and wetlands all make a contribution, with waterlogged areas having less microbial activity and slowing carbon release. >

Habitats and environmental features such as wetlands all have a carbon value

"It's important to remember that the environmental areas found around most farms also have a carbon value, and should be included in any calculations," she says.

How to measure carbon

There are two main ways to measure the carbon stored on your farm – whether it's in the soil or found in woody biomass.

There are default values for woodlands and hedges used in the main carbon footprint calculator tools. Users can specify the age, species and density of the trees, as well as the area, to get an accurate value.

"The most carbon sequestration occurs when the trees are between 15 and 45 years old," says Ms Willson. "But ancient woodland is really important for carbon storage, so also has default values in a carbon calculator."

For soil carbon measurements, a laboratory analysis is required. Once it's been done, farmers have a baseline to work from and can target fields for improvement.

"There is some debate about which is the best method for measuring soil organic matter. We do need to get a universal analysis methodology."

Until that happens, consistency is important. "Whichever method you use, stick to it. Sample at the same time of year, to the same depth. Doing a basic soil organic matter test is a good place to start."

An active carbon test might be appropriate as management practices are changed, as it shows any improvement in the microbial biomass. However, it's not the right place to start if testing hasn't been done before.

What destroys carbon?

Keeping soil covered and protected is essential for preserving its carbon content and preventing losses, so farmers should aim to avoid having bare soil wherever possible.

"That applies to livestock farms too," says Ms Willson. "Poached land is not desirable either."

Soil disturbance releases carbon through oxidisation, with deep disturbance being worse, she adds. "There's a trend to less disturbance and non-inversion cultivation methods, which is great. No-till is even better for carbon."

Cutting hedges less frequently and managing woodlands can also make a difference, as there's often more that can be done for sequestration, she notes.

Keeping wetlands waterlogged is also important for preventing carbon loss, as it slows decomposition rates and helps to accumulate organic matter.

What else can be done?

Understanding what you've got on the farm is the best way to fully assess the carbon sequestration and storage possibilities.

"Remember that soil is a complex living thing and there will be variables. What you need to be happy with is the right direction of travel."

A good starting point is to get a spade and have a look at your soil – checking it for structure, root development and worm numbers.

"Having a healthy soil is a fundamental requirement. Once it's in good shape, you get higher yields from lower inputs, reduced costs and more resilience."

What about carbon schemes?

There's a great deal of interest in soil carbon schemes that reward farmers for storing carbon, and it's a fast-moving marketplace.

While recognising that there may be opportunity for farmers who increase carbon sequestration, experts say care is needed before signing up.

Farmers should go into these schemes with their eyes wide open, says agricultural lawyer Julie Robinson, a partner with Roythornes Solicitors.

Before going ahead, farmers should understand their current position and be clear about whether the carbon within their soil is theirs to sell.

Some fledgling schemes are scheduled to operate over a number of years, potentially restricting farming practices for the duration of any agreement.

"As always, it is a case of buyer beware – and do read the small print," says Ms Robinson. ■

EXERCISE CAUTION WITH SELLING CARBON OFFSETS

Farmers should fully investigate the credentials of any organisation that wants to pay them for carbon offsets. Sam Smith, general manager at the Farm Carbon Toolkit, offers the following advice.

Future claims

In a carbon offset, the sequestered carbon on offer is taken off the farm balance sheet, so that it can appear on the buyer's balance sheet.

This means that the buyer has an exclusive claim to the carbon removals made by the farm. In this situation, the farm is unlikely to be able to make any claims about its produce being low carbon.

Transparency

Offsets should be considered by their approach to:

1 **Permanence** – standard convention in offset markets has been to guarantee that carbon is kept out of the atmosphere for 100 years. That may not be practical for soil carbon.

2 **Additionality** – the payment received must reflect that the farmer has played a decisive role in removing carbon from the atmosphere. This can be difficult to determine.

3 **Measurement** – knowing what's included in the scope of the carbon footprint is important, as is understanding the protocols and tools used to measure the sequestration and whether payments are based on models or actual measurements.

Seller's choice

Any organisation seeking to offset should prioritise cutting their own emissions and buyers should disclose their current emissions, accounting practices, reduction strategies and targets to reach net zero.

Farmers wishing to maintain their reputation should be entitled to have a say in who is buying the carbon offset.

HOW TO PIVOT YOUR FARMING BUSINESS TO DEAL WITH LOSS OF BPS

Farmers are facing once-in-a-generation decisions about the direction of their businesses.

Generating a positive financial return from agricultural production is going to become increasingly challenging as the Basic Payment Scheme (BPS) is phased out, and major new legislation – much of it associated with mitigating climate change and fostering environmental benefits – is phased in.

"Marginal adjustments to production are important, but are not going to be enough to make up for the loss of BPS support," says Jonathan Armitage, Head of Farming at Strutt & Parker. "Similarly, they are unlikely to help you negotiate the challenges and take advantage of new opportunities as they arise."

So how do farmers go about preparing for this new chapter?

It requires examining your business in a different way to how you might have previously. You need to step back, view it objectively and consider options that will lead to a step-change in what you do and how you do it.

"This necessitates asking big – and sometimes tough – questions," says Mr Armitage. "What am I doing and why? What do I want to be doing? Am I up for the challenges of the future? What assets do I have at my disposal? What am I really good at?"

Much is said about needing to farm sustainably from an environmental perspective, but businesses also need to be sustainable from a financial perspective. This means they need to deliver profits and be resilient to the unexpected and unique challenges facing the business of farming.

"Getting the input of someone independent can be invaluable in this process – bringing a fresh eye, tabling questions you might be reluctant to ask yourself, presenting new options which may never have crossed your mind – then, of course, steering you through the process of changing your business so it is fit for purpose in the 21st century," says Mr Armitage.

There will be difficult decisions to be made, as for some the best course of action might involve changing direction and shrinking some enterprises or letting others go completely. But there will be some exciting new business opportunities to be had – which will deliver profits and could herald a better quality of life for you and your family.

"If the figures point to you not being able to carry on as you currently are, consider your business structure," he says. "Collaborating with others through joint ventures can achieve economies of scale, but it also allows businesses to flourish by letting different stakeholders concentrate on the aspects at which they are best and creating space for investment in the best new techniques."

Diversification is not a new phenomenon in the farming sector, but now is the time to start thinking about it in the widest sense of the word. It will spool out beyond the 'traditional' opportunities farmers have explored – such as letting buildings – into new customer-facing trading businesses, large-scale renewable energy projects, or areas such as selling carbon credits and other ecosystem services.

Another area to explore in terms of generating new income streams is unlocking the planning potential of land and buildings. Caroline McDade, Head of Planning, says: "Over the past couple of years, we have seen reforms in the planning system which are already creating new opportunities in rural areas – such as amendments to permitted development rights, giving landowners greater flexibility in the conversion of farm buildings.

"We are also already working with some landowners to generate revenues by helping developers meet their Biodiversity Net Gain (BNG) obligations."

Many farmers will need support when it comes to navigating the changing landscape they face. As advisers, we can offer an objective appraisal of the options on offer, which takes into account your own goals, the farm's economics and your financial and tax position, so you can make an informed choice about the future direction of your business.

‘We are not turning soil over regularly’

Profitable grass-based dairying means lower GHG emissions. **Johann Tasker** reports

FARM FACTS

Woodrow Barton, Brampford Speke, Exeter, Devon

- Farm size: 110ha
- Annual rainfall: 865mm
- Soil type: Clay loam over river gravel

TRANSITION GOALS

- Better understanding of Environmental Land Management scheme
- Reduce carbon footprint
- Securing adequate labour

Transition Farmers Rachel and Richard Risdon have three main goals: reducing their carbon footprint, generating an income from the environment and securing adequate labour for their family farm.

Results show that each litre of Arla milk produced results in greenhouse gas (GHG) emissions equivalent to 1.13kg of carbon dioxide – about half the global average and less than the UK average of 1.25kg/litre.

The dairy processor has set a target of reducing its total farm-based emissions by 30% by 2030. To achieve this, it has suggested targeting a number of measures, including cow digestion, emissions from feed and manure handling.

Some 79% of Arla’s farmland is used to grow grass. Mrs Risdon says: “Being very grass-based ourselves, we are not turning soil over regularly or doing things like that. But there is probably more we could be doing.”

Natural offset

Arla is participating in research to identify how to help farmers quantify and speed up carbon sequestration – taking carbon out of the atmosphere by trees, grass or hedgerows – which will naturally offset some emissions in future.

Grass at Brampford Speke is mainly ryegrass, with as much clover as possible without causing problems with bloat. The spring block-calving herd yields about 4,900 litres a cow and 452kg of milk solids from about 650kg of concentrate.

Cows are grazed rotationally on a New Zealand-style paddock system. They stay in the field for as long as ground conditions and grass growth allow, usually until late November. Once fully housed, cows are self-fed silage – each consuming about 1t from the open clamp face – and a cake-based blend of wheat and sugar beet pulp. All cows are dried off before Christmas.

It is a simple low-cost system, she says. “Our key focus has always been to improve fertility as much as possible because that means more days in milk. If we are drying them off on 18 December, it is no good them not calving until April.”

Quality grass

Cows go back out pretty much on the day they calve in February, with about 3-5kg of concentrate and no silage. “We carry good-quality grass through from autumn to spring to get them out early, and then graze them through the summer,” says Mr Risdon. Reproductive performance is measured as the six-week in-calf rate – a key driver of profitability in spring block-calving herds. “The first year we were here, it was 48%. The next year it was 73%. Last year, it was 85%.”

Good planning is the secret to farm business success, suggests Mrs Risdon. “We spend a lot of time on our herd health plan – what we are going to do and how we are going to mitigate any issues we had last year. It is about making those important changes.”

A wall planner in the dairy office ensures proposed changes can be written up as soon as it becomes apparent they are needed – with vaccinations shifted forwards or backwards, for example – to ensure things happen at the optimum time.

Like many dairy herds, the biggest challenges are around lameness and mastitis. Pneumonia is not so much of an issue, with no cases in youngstock for the past few years, with five-week-old calves going outdoors on milk.

Rewarding producers

In terms of further reducing their carbon footprint, the couple are keen to learn more about the government’s forthcoming Environmental Land Management scheme, which will reward producers who deliver public goods on their farms.

These public goods include the delivery of better air and water quality, higher animal welfare standards and measures to reduce flooding. Defra says this will help the UK reach net-zero emissions by 2050, while boosting farmers’ productivity.

A more immediate concern is the availability of farm labour – or, rather, the lack of it. As on so many farms at the moment, staff recruitment and retention is a major worry, says Mrs Risdon.

“One issue here for us is accommodation,” she explains. “We only have a one-bedroom flat available for staff. We have good job applicants – it is just managing expectations. We are also close to Exeter, which is extortionately expensive, so to find affordable employee accommodation nearby is really hard.” ■

EMILY FLEUR

Accounting for arable greenhouse gas emissions

The market in carbon credits for emission reduction and sequestration is in its infancy. Striking claims are made for the potential to lock carbon away in soil and increase farmers' income. But how much carbon can we realistically store through better soil husbandry, and will it make much difference to farmers' bottom line?

Bayer has launched a Europe-wide Carbon Initiative to find out. It involves 27 farmers from seven countries, including five in the UK who are collectively contributing 500 hectares of land. Food processors and retailers are expected to join the project later to develop ways to reward farmers for practices that reduce greenhouse gas emissions.

Sequester carbon and reduce emissions

"Lots is talked about carbon sequestration in soil, but now we are looking to substantiate these claims and understand what we can realistically achieve," says Bayer's Nick Duncan. "Bayer is looking to work with farmers to develop a robust method to account for greenhouse gas reductions and look at ways to turn this into an income stream."

The programme is set to run for three years. Initially, the baseline of current in soil carbon content will be determined. The participating farmers will then implement changes to farming practices like using cover crops and tillage reduction, the impact of which will be monitored during the project.

To support these operations, Bayer will develop a digital tool which will allow farmers to claim rewards based on accurate and verified data. This digital Monitoring, Reporting and Verification (MRV) solution builds on Bayer's industry-leading digital farming platform Climate FieldView™.

"It's an exciting project but still very much in its early stages," says Mr Duncan. "Each of the five farmers in the UK is providing about 20 ha to the project for us to learn more. Sequestration is what we hear talked about most, but emissions reduction, particularly nitrous oxide (N_2O) following fertiliser applications is important too."

Open-minded about benefits

Farm Manager Simon Beddows at Coppid Farming Enterprises near Reading is one of the five UK farmers involved in the Carbon Initiative. "We have to be open-minded about how we develop as a business. We want to diversify but continue to focus on our core activity of producing food.

"During the project, we want to learn if carbon sequestration can become a viable income stream and what implications that has for farm management."

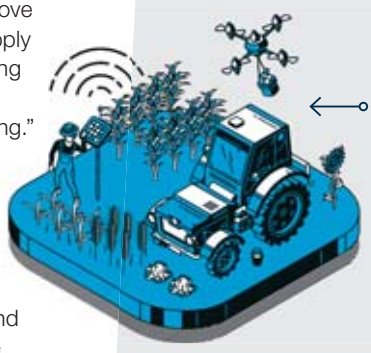
Mr Beddows also thinks it will help improve the image of farming down the food supply chain. "If we can show that we are locking carbon in the soil that will make a huge difference to how people perceive farming."

The European launch of the initiative is part of the company's Global Carbon Initiative which launched in the U.S. and Brazil in July 2020. Alex Teillet, Head of New Business Models at Bayer Crop Science for Europe, Middle East and Africa, sums up: "Our vision is that in the future, food retailers or food processors will be able to work with confidence on effective carbon reduction projects involving their partner farms from their specific supply chains. At the same time farmers, as primary producers of a stable and longer food value chain, shall be rewarded in a transparent and fair way – for their effective carbon reductions conducted through their farming practices everywhere in the world."

We are working with farmers to decarbonise the food chain

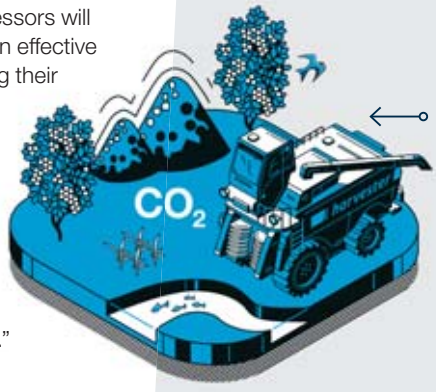
Carbon Farming Programme

We will work together with farmers, experts from companies in the food value chain, academia and governments in our Carbon Farming Programme to co-create and test climate smart solutions



Digital Farming

The aim is to create a reliable and accurate digital Monitor Reporting and Verification solution for farmers that will build on Bayer's industry leading digital farming platform Climate FieldView™



Decarbonisation

The ambition is to help decarbonise the European Food Systems, and generating co-benefits for all, with a positive impact on biodiversity, soil health and climate change

For more information visit **cropscience.bayer.com/sustainability**

‘It’s vital we look at new enterprises’

Bridging the income gap as farm payment schemes are phased out is a key priority for Essex producer Kit Speakman. **Johann Tasker** reports

Transition farmer Kit Speakman says his business is at a crossroads – due to the loss of the Basic Payment Scheme (BPS) and a Countryside Stewardship (CS) agreement, which expires next year.

Extending to some 275ha, Little Braxted Hall Farm is a mixed arable, beef and sheep enterprise adjacent to the River Blackwater and A12 dual-carriageway, midway between Colchester and Chelmsford, Essex.

“It is vital for us to look at new enterprises because we are losing the basic payment and we will soon be out of stewardship, too,” says Mr Speakman, who farms with wife Trudy. “It’s a big chunk of money to lose over the next three or four years.”

Not due to be fully up and running in 2024, Defra’s new Environmental Land Management scheme is unlikely to make up even half the lost revenue, he adds. This means alternative income streams are important.

Mr Speakman says he has three main goals to make the farm more sustainable: replacing lost income as BPS is phased out; creating a fully integrated, profitable farm business; and widening the rotation by introducing more grass.

Integrated business

Already highly diversified, the farm includes 21 high-specification offices rented to a range of businesses, more than 5ha of fishing lakes and 24ha of cricket bat willow trees – grown for JS Wright & Sons, the world’s largest supplier of cricket bat willow.

“The land isn’t the highest quality – and when we bought the farm in 1995 we were keen and conscious that we would have to diversify,” says Mr Speakman. “Today, diversification is probably even more important than it was then.”

On the arable side, a six-year rotation includes land let for sweetcorn and potatoes grown on contract for crisping. Other crops include milling wheat and barley, with stubble turnips grown for cattle after each cereal crop where possible.

“It’s poor land so we have a wide rotation – which the spud boys like because one-in-six is better than five,” says Mr Speakman. “We need the cattle muck and import chicken manure to increase our P and K levels, which we have done quite successfully.”

About two-thirds of the land can be irrigated, with a large abstraction licence for the lakes helping to bolster yields. As well as arable land, grassland is irrigated to make more silage or autumn grazing for cattle when needed.

Maximising value

“It is all about adding value – we try to maximise every asset we have. The lakes provide irrigation, fishing and we have a lake-source heat pump, too. The lakes also have an amenity value, so they are earning an income three or four times over”.

A keen conservationist, Mr Speakman has won numerous awards from the Essex Agricultural Society. The farm has been in a CS scheme for almost 20 years – although the agreement is due to expire in December 2022.

Some 300 head of cattle are grazed on stewardship land, growing herbal leys, with 100 outwintered to save on housing – fed on stubble turnips, forage rape, straw and minerals. Others are bedded in straw yards to produce farmyard manure, which then goes back on to the fields.

“It’s cheaper to outwinter than it is to house – it takes the pressure off buildings, too. We’re lucky to have the right soil type to do that, although the weather during the past two years has been a challenge for outwintered stock.”

Optimising grass

The grass-based system uses native breeds – particularly Herefords. “They’re a great breed

TRANSITION GOALS

- Bridging income gap after stewardship
- Creating fully integrated farm business
- Increasing grass and widening rotation

PHOTOGRAPHY: MAG/COLIN MILLER

The farm business includes land let for sweetcorn and potatoes, 24ha of cricket bat willow trees and a 300-head Hereford herd

– quiet, easy to feed and they fatten on nothing. They don't even moan when they're hungry. But it is a job to get enough of them, so we do Angus beef too."

It's a switch from producing barley beef in years gone by, when barley was cheap, adds Mr Speakman. "I generally think barley is worth selling when the price is more than £125/t, but its probably worth feeding if the price is lower."

A big goal is to increase the amount of grass in the rotation, primarily for beef but also because it grows well and can be irrigated, if necessary. "It's a good crop for the sort of land we have, and it makes sense to grow more of it."

The aim is to produce perennial ryegrass for seed. It will also fit well into the existing arable rotation, overseen by farm contractor Robert Mann. It will be drilled in spring, undersown with barley and then grazed after the barley is combined.

The idea is that the grass seed will be harvested the following June, with the residue of the crop being silaged for the cattle as a by-product. He is well-versed in optimising complementary enterprises across the farm.

"We undersow a lot of grass already, and our stubble turnips into standing barley. Then we round-bale the straw and leave the bales in the field and strip graze – it cuts down the workload and makes everything easier." ■

CARBON STATUS 'IS MAJOR SELLING POINT'

Climate change mitigation is a big business opportunity, believes Kit Speakman, who says the farm's office lets are almost carbon neutral.

The office buildings are heated from the farm's lake-source heat pump. Electricity is supplied by 640kWh of roof- and field-based solar panels, which also run a neighbouring coldstore via a power-purchase agreement.

"When we converted the offices, they were using a lot of electricity off the grid. Now this is minimal. It is a major selling point for us and a major attraction for businesses who choose to locate here."

An on-site gym with shower, indoor tennis court and picnic area enhance the experience for tenants. So, too, do three charging points for electric vehicles – soon to be linked to the solar panels.

"We are keen to measure our carbon footprint. I just wish we had done it 20 years ago when we joined Countryside Stewardship. Then we would be able to see the progress we have made."

CRICKET BAT WILLOW 'IS MOST PROFITABLE'

Willow, grown for cricket bats, is the most lucrative crop on the farm, says Kit Speakman – using marginal land that would otherwise be largely unproductive.

He sells about 120 trees a year for cricket bats – growing his own young willow sets and selling them to other growers, too. Trees have a lifespan of 15-20 years and must be well looked after to be made into grade-one cricket bats.

Grass around the trees is grazed by a flock of 120 pedigree Easycare ewes. "They need minimal shepherding or veterinary supervision, and they don't need shearing because they shed their fleece naturally in the summer and they lamb outside," he says.

Good health status means the flock hasn't been wormed for almost a decade, with no foot-rot for the past four years. The flock lambs at about 150% weaned, with lambs finished on grass and marketed at 22-24kg deadweight.

In total, there are about 25ha of willow trees. "It's all along the river and it is no-input grassland. There is no manure, no nitrogen, no nothing – just permanent grassland with cricket bat willows which graze sheep under."

He adds: "There are four revenue streams on this land, and it's all floodplain. We get the BPS money, income from the sheep and the income from the willow trees. It's some of the most profitable land on the farm."

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CARBON FARMING: GROWING A NET ZERO FUTURE WITH MISCANTHUS

The first dedicated independent study into the Miscanthus carbon life cycle shows that the crop is net carbon negative, capturing net 2.35 tonnes CO2e per hectare, per year in the soil at the very least.

The study substantiates the two known simultaneous carbon cycles of Miscanthus, where the above ground biomass grows each year and recycles all the carbon that's been produced through planting, harvesting and burning the crop for renewable electricity, and at the same time, the underground rhizome and decaying leaf litter fixes and stores carbon each year as it grows.

The results are crucial for farmers looking at carbon farming opportunities, and for the rapidly emerging bioeconomy, because there has been a lack of evidence-based research into carbon sequestration capabilities of crops, until now, according to the firm releasing the research, Miscanthus specialist, Terravesta, in collaboration with the University of Honenheim, and the international research project, GRACE (GRowing Advanced industrial Crops on marginal lands for biorEfineries).

The carbon sequestration research was conducted by Jan Lask, from the University of Hohenheim, and the study separately considers the carbon relative to the growing crop in the field, attributable to the land, under net carbon capture, and the carbon associated with the biomass and its uses, under crop Biomass.

"The results are conservative, and in reality, the carbon sequestration potential may be higher, and it will change from site to site," says Mr Lask.

"We looked at the above ground and below ground carbon life cycles separately, and calculated the carbon stored in the biomass and in the rhizome, and we also measured the Miscanthus leaf litter that decomposes over time and becomes incorporated into the soil, contributing to the soil carbon," adds Mr Lask.

Miscanthus is already established on over 7,000 hectares of less productive land and counting in the UK, and is thought to have the potential to contribute significantly to the UK's 2050 net zero target. It's said to be a scalable solution that's operational now, beneficial to the environment and profitable for farmers.

Dr Jason Kam, Terravesta research and development manager, outlines the reasons for conducting the study. "There has been a lack of understanding on how carbon is evaluated, and many unsubstantiated figures used. The need to resolve this will be crucial in delivering the industrial, economic and societal changes needed to build a sustainable future.

"Depending on the use of the biomass, the study indicates that biomass carbon is either stored, through Bioenergy with Carbon Capture Storage (BECCS) or in emerging uses such as building materials, and this carbon storage is in addition to the below ground storage figure net 2.35 tonnes of CO2e per hectare, per year. Or the carbon is released, via power generation, in which case the use process is carbon neutral, with the released CO2e being reabsorbed by the crop for the next crop. Essentially, the above ground biomass is replacing fossil fuels in its use and recycling the carbon emitted in this process, while the crop is storing additional carbon underground," says Dr Kam.

"We believe that the carbon element of the Miscanthus supply chain is likely to have high importance to the participants in different contexts, and 'ownership' of that carbon will be a critical motivator between potential grower, potential off-taker and all in between," says Dr Kam.

According to Terravesta science and technology director, Dr Michael Squance, the benefits to farmers growing the crop are ever developing. "The carbon life cycle figures in this study are a worst-case scenario and with new uses and markets emerging, the carbon position will only strengthen.

"What's more, Terravesta has developed the Harvest Hub – a new information management system that is helping us to capture more sustainability data for farmers, which will then be used to validate the Miscanthus carbon position and provide the grower with an annual carbon statement," adds Dr Squance.

How livestock farmers can reduce greenhouse gas emissions

Innovation and good management can combat climate change. **Johann Tasker** reports

Adapting farming practices can help livestock producers reduce their carbon footprint, increasing profitability as well as the environmental credentials of British meat.

Improving productivity by utilising better animal genetics, reseeding with more productive grass varieties and finishing livestock faster all have benefits, farmers attending an online seminar were told last month.

The seminar was hosted by the NFU as part of the Countryside COP initiative – a cross-industry partnership highlighting ways farming can help the UK meet its climate change target and reach net zero.

Hill farmer Richard Findlay rears beef and sheep across 100ha of in-bye land and 500ha of moorland at Quarry Farm, Westerdale, in the North Yorkshire Moors National Park – about 20 miles inland from Whitby.

The 800-ewe flock includes 100 pedigree Suffolks and pedigree Beltex. The remainder are a commercial flock of Cheviot cross Easycare. Older ewes lamb early, with the rest lambing in two groups – late March and mid-April – to spread the workload.

Spreading risk

The beef enterprise was introduced last November. It saw 50 integrated supply chain calves brought on to the farm to utilise extra grass being grown, and to spread business risk by "putting eggs in different baskets", says Mr Findlay.

About 20% of the farm is reseeded annually. Each year, about 16ha of grassland is put into a break crop of kale, stubble turnips or brassicas, before being returned to a high-sugar ryegrass, clover or herbal ley – depending on field and soil type.

The farm's carbon footprint was measured using the AgreCalc calculator – one of a range of easy-to-use online tools developed for assessing and identifying ways to reduce greenhouse gas emissions from agriculture (see "Easy-to-use carbon calculators").

Adopting a range of measures has seen Mr Findlay reduce carbon emissions by more than 38% over the past year – from 32.29kg of carbon dioxide equivalent (CO_2e)/kg of farm output in 2019 to just 19.82kg.

"The Westerdale beef enterprise compares really well with the AgreCalc average," says Poppy Frater, sheep and grassland specialist at SAC Consulting. "It is 46% lower, which means it is doing really well. At 28% lower, the sheep flock also compares well."

Further reductions

Future strategies will include feeding by-products, such as locally sourced brewers' grain, to displace concentrate in the beef ration. Calculations suggest his will help reduce emissions from feed by 75%, said Ms Frater.

Establishing 15ha of herbal leys are expected to see a further 9% reduction in feed emissions. This was largely because herbal leys are less reliant on applications of artificial fertiliser and produce high-quality feed for ewes and lambs.

Producing more lambs by improving farm management to boost ewe fertility would increase overall emissions by 5%. But this would be offset by a 5% reduction in emissions per kg deadweight as flock efficiency is improved.

Ms Frater said: "It is always more challenging when you start with a good baseline. But using a carbon footprinting tool can give you a snapshot of where you are now and help you understand the impact of any future decisions."

While some practices would not make any difference to farm output, others would. At the same time, reducing inputs in other areas would lead to an overall reduction in the carbon dioxide emission per kg of deadweight produced.

Building resilience

Mr Findlay said he first tried herbal leys after the 2018 drought. They were more resilient but also >

MAIN CHANGES THAT REDUCE CARBON FOOTPRINT

- Reseeding grassland with herbal leys
- Improved genetics to raise productivity
- Creep feeding to finish lambs quicker

EASY-TO-USE CARBON CALCULATORS

- AgreCalc: agrecalc.com
- Cool Farm Tool: coolfarmtool.org
- Farm Carbon Toolkit: farmcarbontoolkit.org.uk

PHOTOGRAPHY: LOOP IMAGES LTD /ALAMY STOCK PHOTO, NFU

Richard Findlay has made changes on his farm that have reduced carbon emissions by 38% in the past year

< helped extend the grazing season at both ends of the year – with grass earlier in the spring and later into the autumn.

"Some of the permanent pasture we wouldn't normally reseed were droughted off quite badly, so we took advice about what we could do if drier, hotter summers become the norm."

Creep feeding from day one had improved liveweight gain, helping lambs reach their target weight sooner and enabling them to be marketed earlier, said Mr Findlay. "We get a higher price on the back of it."

Using high-genetic Suffolk rams selected almost purely on weight gain and meat yield meant lambs were now being sold at 10-12 weeks old. "Lamb creep has been a good investment to get the most out of the genetics," said Mr Findlay.

"In all the decisions I have made, I haven't really thought about our carbon footprint, I've thought about our bottom line. The beef calves have done incredibly well too. They have been very consistent, like peas in a pod." ■

COMPARISON OF FARM EMISSIONS

	Westerdale actual (kg CO2e/kg deadweight)	AgreCalc average (kg CO2e/kg deadweight)
Finishing of dairy-beef cross calves	11.71	21.72
Sheep – good hill flock	23.51	32.70

EFFECT OF FARM MANAGEMENT CHANGES ON EMISSIONS AND OUTPUT

		Measures introduced				
	2021	Brewers' grains	Herbal leys	Improved lambing percentage	Total	Compared with 2019
Output (kg deadweight)	32,430	0	0	+1,620	34,050	16,230
Sheep production (emissions kg CO2e/kg deadweight)	23.51	-1.32	-0.32	-1.17	21.25	34.03
Beef production (emissions kg CO2e/kg deadweight)	11.71	-1.32	-0.64	0	9.75	n/a

Source: NFU/SAC/AgreCalc

EXPERT ADVICE AVAILABLE FREE TO FARMERS IN ENGLAND

Farmers looking to overcome the loss of direct payments in England should consider seeking confidential advice which is being made available under the government's Farming Resilience Fund.

Growers and livestock producers must ensure they are resilient without the basic payment, which will be phased out by 2028, says NFU senior business adviser Richard Wordsworth. This includes farmers who believe they are top performers.

A second pair of eyes scrutinising a farm business can sometimes identify opportunities and challenges, which are not always immediately obvious to the grower or livestock producer in question, he suggests.

"In terms of the options and support coming down the tracks from Defra, it is slightly frustrating that a lot of it is still to be published its full guise – especially bearing in mind we are coming to the end of the first year of the transition period.

"But there are options available – including the Sustainable Farming Incentive, which is due to launch next year as the first part of the Environmental Land Management [ELM] scheme, as well as a number of capital grants on the investment side."

Defra has also agreed to fund a veterinary visit to help farmers identify ways to improve animal health and welfare. This, in turn, could help improve livestock enterprise performance and hence farm profitability.

Further work around net zero is expected to be incorporated into the ELM scheme. "It is about encouraging people to start the journey, and getting people to understand carbon calculators and the support they might need."

You can find further details about the Farming Resilience Fund online at bitly.com/future-resilience

Together with farmers our role in agriculture must be a responsible one

We are partnering with farmers to work towards shared objectives – a future for food production which is both sustainable and productive.

Germinal is focusing on the outcomes of innovative plant breeding for forage solutions. These technologies will be vital in achieving net-zero goals and will directly address climate change impact – pollution, nutrient resources and weather stress. It's about more from less, greater crop yield with fewer inputs, all managed efficiently.

We support knowledge share on the ground with farmers who are adopting smarter on-farm strategies. Home grown protein is still the foundation of livestock farming systems and Germinal is committed to developing climate smart products that will help farmers look positively towards a secure food future.

For more information:
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FOCUS ON FEED AND BREEDING TO CUT CATTLE METHANE LEVELS

Pressure on the livestock industry to reduce greenhouse gas emissions has seen much of the focus placed on cutting the carbon footprint of beef and dairy farms.

But while reducing carbon emissions is certainly important, tackling methane emissions could have a more significant role to play in making the dairy, beef and livestock sector more environmentally efficient.

While other sectors mostly emit carbon dioxide, when it comes to UK agriculture carbon dioxide accounts for just 13% of the industry's total emissions, while more than half (56%) are methane and 31% are nitrous oxide.

Unlike carbon dioxide and nitrous oxide, methane is a short-lived greenhouse gas that doesn't accumulate in the atmosphere, so only about half remains after a decade. However, it does have a higher Global Warming potential than carbon dioxide — some 28 times higher — so if emissions are sustained its potential harm to the climate is much more significant.

Reducing methane emissions

While there's no silver bullet when it comes to reducing methane emissions from livestock production, there are measures farmers can take to drive real change.

The good news is we're already seeing results from changes producers have been making; between 1990 and 2017 methane emissions from agriculture decreased by 15%.

But with increased focus on the beef and dairy sectors as the UK strives to achieve net zero emissions by 2040, that doesn't mean we shouldn't keep striving for more improvements.

Lowering dairy emissions

Almost 40% of methane is produced as a result of fermentation in the rumen, so the amount of methane produced on a farm is directly related to feed intake and feed quality.

Improving the quality of cattle diets and reducing crude protein to below 18% can reduce emissions and improve efficiencies in converting protein into milk.

Focusing on genetics and breeding lower methane-emitting cows can also have a significant impact on a herd's environmental sustainability by reducing emissions per kilogram of milk.

Breeding for factors such as better longevity, health and less likelihood of mastitis means lower replacement rates and fewer heifers, which in turn reduces methane emissions.

Meanwhile technology such as genomics can also help identify top-performing animals in a herd, enabling producers to improve overall herd productivity and potentially achieve the same output with fewer animals.

Reducing beef emissions

While the diary sector might have led the way in genetic improvements in recent years, there is growing focus in the beef sector on utilising selective breeding to improve productivity and reduce methane emissions.

Estimated Breeding Values offer beef producers information on specific traits they can use as a focus for breeding, such as improved fertility and health.

Meanwhile breeding for better feed efficiency and daily live weight gains can help lower the number of days from birth to slaughter — all of which can have an environmental impact through long-term methane reductions.

Future-proofing herds

Looking ahead, other technologies are emerging as potential tools for helping reduce methane emissions through cattle diets.

Feed additives such as tannins have the potential to reduce fermentation and the release of methane from digestion, while seaweed, algae and other natural additives could also play a role.

Fast-tracking genetic progress through breeding programmes which are based on microbiomes and ruminants' ability to digest fibre while producing less methane may also soon be an option.

Find the right fit for your business

With so many options available when it comes to mitigating methane emissions, knowing where to start might feel overwhelming – especially as a solution for one business might not be right for another.

If you're not sure which steps to take, seeking advice from a consultant like Promar can help give clarity and ensure you're making the best possible decisions for your business.

At Promar, we have extensive expertise of working with farmers and the supply chain to target and reduce methane emissions, and can offer support to beef and dairy producers to identify and implement methane reduction practices.

‘There is plenty of interest in what we are doing.’

A three-stage plan is helping Andy Bason secure a sustainable future for his farm. **Louise Impey** takes a look at how the programme is benefiting the business and the environment

Reducing carbon emissions is a key goal for Hampshire farm manager Andy Bason, who says doing so will improve profitability as well as benefiting the environment.

Mr Bason has devised a series of short-, medium- and long-term targets as he strives to develop a truly sustainable farm business – which includes 600ha of combinable crops at Newhouse Farm in Northington Down, Alresford.

While flexibility is vital and some timescales may slip, Mr Bason says he is determined to achieve the goals, drawn up under the Resilient and Ready programme delivered by Linking Environment and Farming (Leaf) and Corteva.

The three-year programme offers training, technical support and mentoring for farmers to become more sustainable, build the resilience of their own businesses and gain the skills, confidence and know-how needed to be industry innovators.

PHOTOGRAPHY: LEAF

First-year goal

The immediate priority is a 30% reduction in carbon emissions, coupled with an increase in the “active carbon” component of the farm’s soil, so nutrient cycling works well.

Following the advice of Ian Robertson of Sustainable Soil Management, Mr Bason has already seen soil organic-matter levels rise to more than 6% in some fields by making small incremental changes, and he is hoping to hit a 2% active carbon level. That figure currently stands at 1.48%.

“We haven’t done anything radical,” he explains. “All the crop residues get chopped and put back on the soil, and we’ve used cover cropping for the past five years or so.”

Materials such as sewage sludge and compost aren’t used as soil improvers, with Andy preferring to keep the operation in-house and avoid any contamination. A soil management policy ensures that the team stick to the 30m tramlines and avoid travelling when wet, while cover crops help to maintain soil structure.

Fertiliser use has come down by 18% over 10 years, thanks to rotational changes, soil health gains and small deductions in applications. Fuel use has fallen by 40%, from 82 litres/ha to 50 litres/ha.

With these changes and the presence of 70ha of woodlands, the farm is already carbon negative. Having done a carbon footprinting exercise >

FARM FACTS

- 800ha main farm
- 600ha cropped
- 70ha woodland
- 40ha overwinter stubble
- Winter wheat, spring barley, spring beans, oats, linseed and oilseed rape
- Cover crops before spring crops
- New contract-farming agreement of neighbouring 400ha

MORRISONS: REACH NET ZERO BY WORKING TOGETHER

FOR MORE INFORMATION:
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Head of Agriculture
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At Morrisons, we're British farming's biggest direct supermarket customer, buying 100% British fresh meat, milk and eggs. We know the effort that farmers already go to in making food we're all proud of - and how much our customers value this.

In recognition of the climate challenge we're all facing, and in support of the NFU's Net Zero target, we set an ambition this year to reach a 'net zero' carbon position in our UK direct agriculture supply by 2030. We know this is hugely challenging but we're determined to play our part: British farmers are and can be part of the climate solution - and we want to help make that happen.

We're investing a significant amount of time, money and resource, working with some of the best brains in the industry to find the innovations - and champion the every day best practice - that can help take emissions as low as they will go and sequestration as high as it can get. We're also setting up the School of Sustainable Food and Farming at Harper Adams University along with the NFU and McDonalds to help set all farmers on the same path to deliver a Net Zero farming industry.

We've got project farms including two beef farms in Cumbria and Northamptonshire we're working with to get to 'net zero'. We intend to share proven blueprints to give a pragmatic and budgeted approach which farmers can visit online and in person, to example how net zero could be reached.

We don't expect every farm we work with to be net zero, but know that some farms may even be carbon sinks, storing more carbon in their soils, plants and trees that can be used to offset emissions on other farms in the supply chain.

Our work means that eventually we should be able to get products from net zero farms onto our shelves for customers - but as importantly, that by 2030 all the farms we work with will be part of a net zero industry.

We think British farmers can be part of the climate solution. We're working with our direct farm suppliers to be net zero by 2030.

TRANSITION GOALS

- 30% cut in carbon emissions
- Establish 10ha of agroforestry
- Establish 10ha of woodland

< with the Farm Carbon Toolkit, Mr Bason is now looking to keep it this way and make further strides, rather than sell carbon credits.

Newhouse Farm switched to min-till in 2000 and is now "pushing towards no-till", only using cultivations strategically. Cover crop mixes of oats, linseed and phacelia are grown, before being rolled flat in January in a frost.

"We need to get the biomass knocked down early," he says. "Then we use glyphosate just ahead of drilling."

10-year goal

His medium-term goals are to introduce agroforestry to a 10ha block of cropped land, which, with the help of some wildflowers, will boost beneficial insect numbers and reduce the use of pesticides. He also intends to try to sell 30% of the farm's produce direct to consumers.

"We already have direct sales of pork and lamb from the farm and have started to sell flour to local mills," he reveals. "There is good demand and plenty of interest in what we are doing."

The trees will be planted this autumn and will predominantly be apple trees, with the possibility of some walnut and pear trees, too. With eight 4m strips across the block, there will 300 trees in total.

Mr Bason's plan is to produce Newhouse Farm apple juice, which could go out with the pork and lamb boxes. He also hopes he will be able to set up and launch a community project, letting locals come and pick apples and enjoy the resource.

He attended an agroforestry course, so is aware of the ongoing tree maintenance commitment once they are established. "We have already set up a plum orchard, so we know what's involved."

Having investigated possible funding sources, the business is footing the bill for the trees at about £5,500 and the farm team will plant them. Wildflowers will also be planted in the strips, so that insect numbers go up and insecticides can be eliminated. "Our pesticide use is coming down all the time," he says. "This will help take it even further."

30-year goal

Longer term, the business is developing a 10ha wood, with the aim of leaving a legacy of carbon capture and a place for wildlife.

Land-use change can be a difficult subject, acknowledges Mr Bason. But farm owner Ian Cammack has been keen to press ahead and a suitable site has been identified.

Three less-productive fields will be used for the project, so it has already produced its last combinable crop. With plenty of deciduous woodlands around, Mr Bason received help from Kirsty Brannan, farm conservation and woodland adviser at seed supplier Oakbank, to decide where conservation efforts would make the most difference.

As a result, he will also be planting new hedges and linking up woodlands, providing more habitat and increasing the amount of carbon capture in woody biomass.

Creating the new wood will involve planting 20,000 trees – 80% will be native species and 20% non-native. To encourage wildlife, there will be a pond in the middle and some rides and glades established.

High deer pressure means it will have to be fenced, explains Mr Bason. "We've also had to look carefully at making sure that it will be climate-proof by selecting the right species and the right mix."

Funding for the new wood has been secured from the Forestry Commission's Woodland Creation Planning Grant.

Mr Bason accepts that taking land out of production isn't right for every business, especially where it is likely to span generations. A new contract-farming agreement with a neighbour has recently added 400ha to his responsibilities, so productive arable farming is still very much on his agenda.

"We've looked at nature-based solutions, as we know we have to adapt and change to survive," he concludes. "I've had help to cut through some of the noise and am now in a position to do some of the things that should work here and allow us to deliver public goods." ■

'IT WILL BE INTERESTING TO SEE NEWHOUSE FARM IN 30 YEARS'

Alice Midmer, demonstration and innovation manager at Linking Environment and Farming, reveals that the organisation will be celebrating its 30-year anniversary this year, so seeing what Newhouse Farm might look like in another 30 years is an interesting exercise.

"If you ask farmers how they want to leave their land, the answer is usually that they want it to be in a better state.

"By focusing on Mr Bason's one-, 10- and 30-year goals, together we've come up with an ambitious plan that works for soils, air, water, biodiversity and the wider landscape, while still producing safe and nutritious food."

PROGRESS TO DATE

- 18% reduction in fertiliser
- 40% reduction in fuel
- 10ha of agroforestry this autumn
- Site earmarked for 10ha wood

How hedges can boost farm income – as well as wildlife

Hedgerows could soon be the source of significant revenue following the creation of a verified carbon code. **Mike Abram** reports

Carbon markets could unlock a £60m revenue stream for farmers willing to manage their hedgerows to help mitigate climate change.

Hedgerows sequester carbon at more than twice the rate of woodland, says Joe Stanley, head of training and partnerships at the Game and Wildlife Conservation Trust (GWCT). Initial estimates suggest the existing hedge network is worth more than £60m in potential carbon credits.

"That's obviously a resource that would be valuable for farmers to tap into – especially where they don't have woodland or peatlands, or cannot, or do not want to, alter their land management practices," says Mr Stanley.

Managing hedges more effectively for carbon storage could easily increase revenue, as well as giving extra wildlife and environmental benefits, he adds. Increasing hedge dimensions can double carbon storage capacity, depending on previous management, says the GWCT. Allowing a 2x1.5m hedge to double in size could store up to 11.7t carbon/km, it suggests.

With carbon prices in the regulated EU Emissions Trading System hitting €60/t (£51/t) in early September, such an increase could be worth more than £700/km on top of the carbon value currently stored in a hedge of that size.

How are carbon credits calculated?

Unlocking that higher value is likely to require the development of independently verified hedgerow carbon credits that can be confidently traded in a properly regulated market – rather than through lower value voluntary schemes.

That's why the GWCT is developing a Hedgerow Carbon Code. The code – which could be ready next year following a £81,561 government grant – aims to become the industry standard for hedgerow carbon credits. To achieve this, the GWCT is devising a new matrix to calculate the carbon content of any given hedge – according to the plant species it contains – as well as its height, width and length, both above and below ground. Calculations will be made using a mixture of physical measurements and remote sensing tools, says Mr Stanley. The code will also provide advice on the best techniques to manage hedges for carbon.

The NFU is getting in on the act, too. It hopes to develop and submit a "growing larger hedgerows" proposal to Defra for support under the government's forthcoming Environmental Land Management (ELM) scheme for England.

The union says this could cover enhanced hedge management, restoration and the planting of new hedges and shelterbelts, linked to farmer reward payments for public goods based upon an actual or "shadow" carbon price. >

PHOTOGRAPHY: TIM SCRIVENER, NFU

CASE STUDY: DANIEL BLENKIRON, NORTH YORKSHIRE

Poultry and arable grower Daniel Blenkiron, who farms at Romanby, near Northallerton, North Yorkshire, says hedges have multiple benefits.

Mr Blenkiron has planted a 300m hedge around his poultry unit to provide site security, natural screening and to promote wildlife. But the ultimate goal is to store carbon and achieve net-zero status across the farm, he adds.

The recently planted hedgerow comprises 70% hawthorn, 10% spindle, 10% hazel and 10% dog rose. Two hollies were also planted every 10m.

The mix of species provides a range of wildlife benefits – including feed, says Mr Blenkiron, who recently won a further 100m of hedgerow plants in an NFU competition.

"We've been managing hedges for a number of years under Countryside Stewardship – but also creating new hedgerows, too. But it's also about taking carbon dioxide out of the atmosphere and storing carbon in the ground."

EXPERT TIPS FOR BETTER HEDGEROW MANAGEMENT

Farmers interested in generating income from hedgerow carbon sequestration should start by assessing the quantity and condition of each hedge on the farm, says Suffolk hedge layer Richard Negus of RR Countryside Services.

The same assessment should be undertaken by farmers who simply want to manage hedgerows better for wildlife, says Mr Negus. The ultimate aim is to develop a 10-year management plan, he adds.

Managing those hedges will depend on condition, but if a hedge, especially blackthorn or hawthorn, is deteriorating with lots of gaps, laying is an option, he says, but don't be scared to coppice it because you maintain the root system and it will come back better. "It focuses the attention on growing back where you have cut it."

Dead hedging – covering the coppiced stumps with cut material – will protect regrowth from hares and deer browsing, while providing some habitat and windbreak for wildlife and a home for beneficial insects.

Where you're gapping up an old hedge or putting in a new one, look at what species are growing successfully locally. "It's also worth putting a sign up to explain why you've done it to avoid potential social media criticism."

Trimming established hedges to the same height each year should be avoided, says Mr Negus. Varying the cut will benefit wildlife and improve carbon sequestration potential, as well as strengthening the hedge, he adds.

"The flail is a brilliant piece of kit, provided it is sharp. If you can alter the height of the cut so you are trimming rather than flailing, then it enables the hedge to grow back and knit together to become thicker and stronger.

"That's better for wildlife and avoids a hedge becoming a great big lollipop. If you can lessen the number of cuts you do on a hedge, so not every year, to let it grow a little, that's also helpful – and will be good for carbon."

< Natural capital

But it's not just the carbon storage potential that means best practice hedgerow management is important, says Suffolk hedge layer Richard Negus of RR Countryside Services, which offers practical hedgerow and woodland management advice. "As well as increasing your natural capital, hedgerows are increasingly well understood for what they add for wildlife and biodiversity," he says. "Research is also showing benefits for cleaner air and water quality."

Trials hosted by EJ Barker and Sons at Lodge Farm, Westhorpe, Suffolk, suggest a well-managed hedge can reduce nitrate run-off. Income is possible from water companies paying for the cleaner water going into the system.

"The root system of a well-managed hedge acts as a filter," says Mr Negus. "Providing cleaner water is something farmers are likely to be more and more assessed on."

Hedges are also a source of firewood, which can provide a financial benefit, he says. "We've just done a management plan for one farm with 44km of hedges that will have enough firewood to fuel six holiday lets on the farm for two to three seasons."

But there's no one-size-fits-all approach to hedge management, Mr Negus stresses. "A hedge in East Anglia can be markedly different from one in Cumberland or Northumberland. How you manage it is going to be quite different."

That could make it difficult for there to be prescriptive plans for managing hedges for carbon, he cautions. "Not only will they have different species and growth rates, but secondly managing purely for carbon is not necessarily the best thing for wildlife."

While a grey partridge might like nesting in a 4-6m thick, dense hedge cut in a triangle shape, for example, turtle doves prefer straggly, tall hedges, explains Mr Negus. The two hedge types are quite different, he adds.

"A partridge-friendly hedge might have the best carbon capture potential because of the large surface area, [but] I can see potentially just managing hedges for carbon as a bad thing." You have to strike the right balance. ■

APP GIVES HELPING HAND WITH HEDGEROW MANAGEMENT

A free app is helping farmers by providing instant hedgerow management advice.

The app asks six questions to determine the stage a hedgerow is at in its lifecycle. It then recommends the most suitable management technique – which might include more sensitive trimming, non-intervention or rejuvenation.

"We designed it specifically for farmers and land managers," says Megan Gimber, habitat project officer at the People's Trust for Endangered Species (PTES). "It's quick and simple to use and gives instant advice.

"Whatever condition a hedge is in, it can be brought back to good health."

The app is part of the Close the Gap multi-partner project, a year-long programme focused on achieving bigger, healthier, better-connected hedgerows funded by the government's Green Recovery Challenge Fund.

For more details, visit Healthy Hedgerows at bitly.com/hedgerows-survey

HEDGEROWS ARE 'SHOP WINDOW' FOR GOOD FARMING

The hedgerow is recognised globally as a quintessential part of the British countryside, says Jake Fiennes, director of conservation at the Holkham estate in north Norfolk.

A major attribute in terms of biodiversity and natural capital, hedgerows should be something farmers are proud to maintain for another reason too, he says.

"More than anything else, they are our showroom – our shop window – to demonstrate that we are great custodians of the countryside – and they should be managed accordingly."

Management techniques differ across the UK – from the hedge banks of Cornwall to the coppicing and laying of hedges in the Midlands. But Mr Fiennes says leaving hedges to grow wild can also bring big benefits.

Coppicing a hedge may seem brutal – but it brings multiple benefits in the short to medium term, he explains. Leaving hedges to grow leggy will benefit other species, and cutting them annually can be just as good.

"The important thing to remember is that no single way is right. Managing hedges in multiple ways is key to maintaining their benefit to the wider environment – both across our individual farms and across the countryside."

UK HEDGEROWS IN NUMBERS

- 800,000km length
- 52% actively managed
- 4.8m tonnes carbon stored

Source: NFU

Opening up access to sustainable farming education

Harper Adams University

Harper Adams University has long been at the forefront of research and education spanning the entire food supply chain. It strives to educate future professionals and to share knowledge with the sector where possible.

But now, efforts to share knowledge in support of a sustainable food supply chain are ramping up several gears – with a venture that seeks to open up access to teaching and research to the wider industry, backed by key partners.

With supermarket chain Morrisons, food service outlet McDonalds and the National Farmers Union on board, the School of Sustainable Food and Farming is bringing together all of the latest thinking and learning on farming using sustainable methods.

COURSES

Benefitting from the experience and knowledge already used to educate undergraduate, postgraduate and research students, and adding cutting edge research and industry input, virtual courses will be developed to cover topics including growing crops to sequester carbon, the potential of green energy on farms, and recognising the proper price of carbon. In addition, on-the-farm learning will offer real-world practice. The courses will be run by the UK's leading experts in agronomy, veterinary practice and nutrition.

Courses will include undergraduate programmes to train new sustainable farmers; short courses and apprenticeships to upskill the current farming workforce; and research posts.

The school will also act as a hub for sharing the latest thinking and learning on sustainable farming, and will be involved in policy engagement - to ensure the farming sector gets the support and advice it needs.

Professor Michael Lee, Deputy Vice Chancellor at Harper Adams University said: "The way Britain - and the world - farms is changing, and the future is upon us. We need to recognise that, and to understand that the future sustainable production of our food is critical.

On-farm learning at Harper Adams University

PIONEERING

"It is time for modern agricultural institutions to develop the systems we need to support this production for the 21st century."

Minette Batters, President of the National Farmers Union said: " By launching the School of Sustainable Food and Farming, the UK is taking a huge stride forward and leading the world. It will help train our farmers - both established and new - on how to face into and resolve the problems of the future by farming in a more sustainable and environmentally beneficial way."

Sophie Throup, Head of Agriculture at Morrisons, said: "What we're doing is unique. It's the first time the NFU, restaurants, supermarkets and universities have come together to act with one voice for the greater good. It will play an important part in helping all of our farmers to get to Net Zero Agri by 2030, but Morrisons also wanted to help create a legacy for all of UK farming."

"It is time for modern agricultural institutions to develop the systems we need to support this production for the 21st century."

PARTNER PERSPECTIVE

A deeper insight into Carbon

TerraMap

As an industry, UK farming is in a unique and enviable position to make positive changes to carbon levels, which most other industries are not able to do.

Matt Ward
(Services Leader)

Matt Ward, Hutchinsons Services Manager, shares his views on how growers can embrace this opportunity.

It's crucial that we move away from seeing carbon foot printing as a burden or simply a tick-box exercise and see that it is beneficial – as a proxy measurement for efficiency and profitability of a farm as well as simply a measure of waste.

It's clear that there are benefits to having a negative carbon balance such as lower input costs. A reduced carbon footprint can be achieved through the use of technologies resulting in more efficient fertiliser use, better soil management or considering the energy used in the business, so it's a win-win on all levels.

But to manage Carbon it has to be measured – and this can now be done using TerraMap Carbon the first ever carbon mapping service to provide the most accurate baseline measurement of both organic and active carbon in the soil and is now available to UK farmers.

TerraMap Carbon is available as a standard or premium service. The standard service maps a total of 17 micronutrients soil type & pH layers that now also includes total organic carbon in terms of % carbon and tonnes/ha.

The premium service maps 27 layers which includes a wider range of micronutrients than those in the standard service, and also cation exchange, and now both total organic and active carbon percentage and tonnes/ha – that is the % of carbon that's active in the soil.

Results from Terramap Carbon can be used to create carbon maps within Omnia which aligns field carbon measurements against the carbon costs of different machinery operations for that field incorporating detailed calculations for power, width, work rate and fuel, all of which are generated using data from the Farm Carbon Toolkit.

Active Carbon map

Organic Carbon map

It is possible to create different rotation scenario's from types of cropping and variety to stewardship and management practices and see the projected CO^2 impact and financial performance for each scenario.

For example, it might be more beneficial to put more land into ELMs and sequester more carbon this way than to replace or change machinery.

You have to measure Carbon to manage it

TerraMap Carbon is the only carbon mapping service in the UK that maps total organic and active carbon levels in the soil

Carbon is a proxy measurement for farm efficiency and profitability

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‘We need to be thinking about the global picture’

Farmers must be recognised for their key role in mitigating greenhouse gas emissions, says Natural England chairman Tony Juniper. **Johann Tasker** catches up with him

Q How do we engage more farmers in the fight against climate change?

I think many in the farming community are becoming more aware of the big challenges we all face – of nature decline, biodiversity loss and the climate change issue. And, of course, national bodies like the NFU are very much bringing the farmers’ voice to the fore on all of this.

The NFU has set some really ambitious targets, including the idea of being net zero by 2040 across agriculture. This is something, then, that is really getting a lot of profile and attention – as it is across the whole of society.

The big issues, really, are about what we do about climate change, and how we make progress in moving forward. There are lots of answers to that. Some of it is about policy and the way in which government will incentivise and encourage people to go in the right direction.

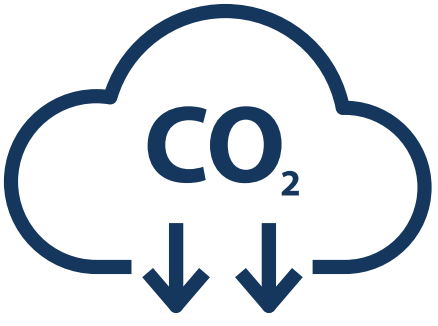
Some of it, though, is about business opportunities and the extent to which there are some new ways of creating businesses based upon this transition.

And then part of it is around building partnerships and how we can work together – between suppliers and producers and between the public and people who provide their food to be able to create those new conditions.

So it’s multi-layered, but I think these questions are important for everybody in the agricultural sector because they are important questions for everyone.

Q You’ve mentioned the NFU’s ambition for farming to be net zero by 2040. Is that enough for UK agriculture, or does farming need to be better than that?

Well, better than net zero and being carbon-negative would be good – and in some cases that will be possible. But every country across the entire world now needs to go on this journey, and taking responsibility for what we can do here is a really important part of the picture.



But, of course, what we don’t want to be doing is importing massive greenhouse gas emissions from outside of the UK. So we do need to be simultaneously thinking about our global footprint and how we can be working with countries which are supplying us.

Some of the figures recently coming from Brazil, showing the scale of deforestation in the Amazon with vast greenhouse gas emissions linked with that [are huge]. So displacing our footprint, from here to there, really wouldn’t be a sensible thing to do.

We need to be thinking about the global picture as well as the national picture. But it is clear that the more we can do here to show leadership and take control of our own opportunities, the more that is going to shape the view of others.

Q You’ve called for a national land use strategy. What do you mean by that?

Well, it is becoming more evident – and has been evident for some time – that in a small country like ours, there are many stresses and strains on the limited amount of land we have. England alone is home to 55 million people.

So we have a relatively small amount of land >

PHOTOGRAPHY: JASON BYE, LOOKER STUDIO/ADOBE STOCK

< compared with some countries – and that land needs to feed us, we need room for housing, for infrastructure, for industry and businesses, and we need to extract natural resources and grow natural resources like wood.

We also need to catch carbon from the atmosphere to look after and increase our biodiversity and provide beautiful places for people to enjoy and have recreation. And, of course, we need to accommodate industries like tourism, too.

So how do we do all of that in a place which is constrained for space? In the end it comes down to having a strategy that optimises everything so we don't just finish up having these endless binary discussions about what land is for.

You know, should we have wild land or food production? Should we have housing or greenbelt? Should we have beautiful landscapes or wind turbines? The reality is that we need all of it. And the question is, how do we fit it all in?

The answer is that it requires some integrated thinking across different government departments, across different sectors and industries. Eminently, I think it is doable, but does require an element of planning and an overarching strategy. Hopefully, that will come as we go forward.

We've got new planning legislation coming later this year and, hopefully, it will take some steps in this direction.

Q Do government ministers listen when you suggest this kind of thing?

Ministers do listen. We have been having good conversations between departments about some of the ambitions we have for local nature recovery strategies coming through the Environment Bill, with measures that will come later through the Planning Bill.

Can we really make these two things compatible? Well, certainly that would seem to be the case. And if we try to do that, then I think we'll get more beneficial outcomes than having these things running in parallel without an integrated approach.

Q Recent weeks have seen the opening of applications for the Landscape Recovery element of the Environmental Land Management scheme. It seems aimed at larger landowners. Is there a role for smaller family farms?

At Natural England, we hope that it will unlock opportunities for groups of landowners, farmers and smallholders who want to come together and making applications jointly – not just people with very substantial landholdings.

That is definitely one of the opportunities Defra envisages for the scheme – and, hopefully, we will see more of that. We have already seen clusters of farmers working together and we hope to take that to the next stage by bringing people together to make the most of that idea.

Q It has been suggested that Landscape Recovery is about creating nature reserves rather than sustainable farming. How would you respond to that?

There is a spectrum across these different schemes The Sustainable Farming Incentive will support agriculture to achieve greener outcomes. Then there will be the Local Nature Recovery scheme, which will be akin in some ways to what we do now with Countryside Stewardship.

And then there is this newer approach – Landscape Recovery – which is about changing land use to embrace nature recovery at larger scale. It is about restoring natural processes at the scale of landscapes.

Now, whether that turns into something that completely removes food production remains to be seen in terms of the individual projects that come through. But I would have thought that extensive grazing will be integral to a lot of these schemes, which means food production will still be part of the income stream as well as being part of the ecological management.

It's not necessarily a case of removing agriculture completely. Some high-quality livestock products coming from some of these schemes would be one way to create a rounded business – a businesses that doesn't just rely on ecological payments but also produces food.

Q So there is still a role for agriculture in livestock and red meat production?

Yes. Conservation grazing. As we look at the opportunities we have for bringing nature recovery to reality, the role of big herbivores – grazing animals – is absolutely central. Can you align nature recovery with meat production? I would think very much that you can. ■

ABOUT TONY JUNIPER

Tony Juniper was appointed Natural England chairman in 2019. A sustainability adviser and environmentalist, he was previously executive director of Friends of the Earth. He is a fellow of the Institute for Sustainability Leadership at Cambridge University and was made a CBE for services to conservation in 2017.

PARTNER PERSPECTIVE

Farming in the net zero era

Society has entered the era of decarbonisation. The rural sector is both part of the problem and part of the solution to the net zero challenge. This transition is not going to be simple. There are tricky decisions to make, opportunities to be grasped, risks to be avoided and trade-offs to be made. It's time for every business to start implementing change and we've highlighted below some of the key areas of focus.

Our teams are in it for the long haul, ready with our expertise, research and practical advice, to support you as we have been for over 160 years. For further information please contact Andrew Wraith, head of Savills food and farming

Food crops: reducing use of chemical inputs, implementing a more regenerative approach to soil health, shortening supply chains and increasing production efficiencies

Livestock: Improving the health and wellbeing of livestock or adopting less intensive models of livestock management reduces the carbon footprint of dairy and meat

Alternative crops: as supply chains increasingly switch to more sustainable sources, there are opportunities for innovative growers to plant alternative crops to meet the demands of the bioeconomy

Rural property: rural businesses can increase the energy efficiency of buildings and use sustainable materials in new builds

Forestry: managing existing forests in order to optimise growth and planting new trees not only creates important habitats but also sequesters carbon. Agroforestry creates stronger soil structures and crop resilience, sequestering carbon and producing food

Hedgerows: growing the length and width of hedgerows increases biodiversity and carbon sequestration

Renewable energy: Land offers opportunities to diversify into renewables such as solar, wind power, ground sourced heat pumps, hydro power and biomass boilers

Equipment: ensuring machinery is running at optimal efficiencies, investing in new technology and looking at options around sharing equipment

Soils and peatland: managing soil to build soil organic matter sequesters carbon and increases soil fertility. Restoring degraded peatland creates long-term carbon sinks

Waste management: creating circular economies and increasing efficiencies by finding uses for waste streams, for example anaerobic digestion, compost production and insect farms

Vertical farming: diversifying into new production systems which use new technology and fewer inputs, lowers the emissions impact per kilo of food produced

New skillsets: the future of farming will require new thinkers and doers, within innovative land occupation structures to enable collaboration to instigate change

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How to start your journey towards the phase-out of BPS

What do farmers need to do to be ready for upcoming cuts to direct payments? A recent *Farmers Weekly* Transition webinar looked at the options

Farmers Weekly's five-part Transition Summit series takes a closer look at all the issues related to adapting farm businesses to survive and thrive as subsidies change and new environmental schemes are introduced throughout the UK in the different devolved regions.

The first summit looked at getting started on that journey and included a discussion with Defra and farm advisers, as well as a panel of farmers and representatives from the dairy and cereal sectors, about the road ahead.

Here is a flavour of the discussion, which you can also watch in full at **fwi.co.uk/transition-summit-starting-out**

On first steps...

Free advice and support is available through the Future Farm Resilience Fund to help farmers identify how and when they might want to adapt their businesses. "That's being provided by a range of different organisations – 19 at the moment – from land agents and local agricultural co-ops to county councils, as well as some national bodies," explained Defra's director of programme policy and strategy, Jonathan Baker.

While it can seem a daunting proposition to work out the implications for the farm business of the reduction in BPS, Rob Hitch, partner at Dodd & Co, stressed: "It's not complicated – even taking your latest accounts and just looking at the bottom line and then knocking the subsidy off is a starting point."

- You can find the full list of Resilience Fund providers and their contact details at bitly.com/future-resilience

On benchmarking...

Assessing the long-term viability of your farm business is critical, said Derek Carless, AHDB head of farm economics. "We have funding to support farmers across England to help them understand what steps can be taken now and over the next two or three years before the cuts really start to take effect."

For Lanarkshire dairy farmer Jim Baird, benchmarking within a group has been particularly beneficial. Data from farmers within the group has highlighted where improvements can be made in feed, vet and medicine costs. "The true business-minded farmers are saying: 'What's this going to look like in a year's time?' and they're assessing different scenarios," said Mr Baird.

"The group is what makes the benchmarking work," said Suffolk arable farmer Andrew Maddaver, who joined a Groundswell benchmarking group four years ago. "Depreciation, fuel costs, labour – benchmarking allows us to drill into these a lot more and gives us the scope to manage them."

- Get started with the AHDB's Farm Bench tool at ahdb.org.uk/farm-business-review

On succession...

The Lump Sum Exit scheme, which is capped at £100,000, will be available to farmers who want to retire or leave the sector. "It will be an attraction," admitted Mr Hitch. "We can only get more young people coming in by making more opportunity, and that probably does need more people to retire. For some people, it's the right thing to do."

Mr Markham said there may be more innovative ways of gracefully standing aside to allow more young people to get into agriculture. "All of this change is going to provide collaboration and opportunities. Share-farming, as opposed to contract-farming, will help a lot of people."

There's also a human element that needs to be considered, added Linking Environment and Farming chief executive Caroline Drummond. "There's a huge amount of pride associated with farmers who have farmed for many generations, who hold the legacy of the land, the farm, the continuity, the community engagement. You can't just say: 'Right, bye, see you', because there's a whole element of respect and identity as well."

- Find out more about the Lump Sum Exit scheme at bitly.com/lump-sum ■

ADRIAN ILIE825/ADOBE STOCK

TRANSITION SUMMIT SERIES – UPCOMING SESSIONS

Watch the first summit, find out more and register for future sessions at **fwi.co.uk/transition-summit**

- The road to net zero: Thursday 18 November 2021
- The pathway to productivity: Thursday 27 January 2022
- Successful soil: Thursday 17 March 2022
- Benefiting from biodiversity: Thursday 5 May 2022

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SUMMIT SERIES

Webinar #2 The road to net zero

Thursday 18th November 2021 | 5pm – 7pm

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