PIECING TOGETHER THE CARBON JIGSAW

Land Business Insights

STRUTT & PARKER

BNP PARIBAS GROUP

PIECING TOGETHER THE CARBON JIGSAW

How land managers can start their journey towards measuring and improving their carbon footprint, while running resilient and successful businesses.

Contents

FOREWORD

It is now widely agreed that the climate change and biodiversity crisis facing the world is one of the most urgent issues of our time.

The effects of climate change are already being felt here in the UK, with rainfall patterns changing and extreme weather events such as heatwaves and droughts becoming more common.

Met Office data shows average global temperatures have risen by more than 1°C since the 1850s, with 2015, 2016, 2017 and 2018 the hottest years ever recorded. Since 1998, the UK has seen seven of the ten wettest years on record. Heatwaves, like that of summer 2018, are now 30-times more likely to happen due to climate change.

The government has legally committed to the UK becoming net zero in terms of carbon emissions by 2050. This has significant implications for farms and estates because of the current level of greenhouse gas emissions associated with agriculture.

There is no escaping the fact that reducing the carbon footprint of the agricultural industry will be very challenging. If we follow the route map set out by the Climate Change Committee it will require shifts in land use, which will lead to a structural change in the sector. Landowners are being asked to consider this – and implement other changes in farm management practices – during a period when they are already facing uncertainty because of Brexit and changes to the agricultural policy framework.

It is clear from talking to clients that many are ready to take action to decarbonise their activities, seeing it as part of their personal responsibility to society as custodians of the countryside. There is a growing understanding that decision-making on farms and estates needs to account for the hidden costs of farming, such as emissions and biodiversity loss. The 2020 Farm Practice Survey, carried out by Defra, found most farmers (85%) consider it to be good business practice to undertake action to reduce greenhouse gases and concern for the environment is a strong positive motivator (73%).

However, many understandably have questions about how best to start to navigate this process and balance the need to run a profitable business with the need for change. They want reassurance that emissions such as methane are and will continue to be measured fairly and accurately. They are worried about the risks of the UK achieving its climate targets by 'exporting' emissions to elsewhere in the world by importing food produced to lower standards from countries which may not have the same ambition to reduce their climate impact.

The following articles address the challenge that has been laid down to land managers and how they can start their journey towards measuring and improving their carbon footprint, while running resilient and successful businesses.

Rhodri Thomas
Head of Rural
rhodri.thomas@struttandparker.com
07710 038283

CARBON ACCOUNTING: WHAT, WHY AND HOW?

Legislative changes and the weight of public expectation are putting growing pressure on the agricultural sector to address its carbon footprint.

We look at how carbon accounting can be a valuable starting point to help farm businesses meet the challenges of climate-smart farming, while also improving farm efficiency and profitability.

The agricultural sector finds itself cast as both saint and sinner when it comes to climate change.

The industry is unique in that while it is a significant source of greenhouse gas (GHG) emissions – about 10% of all UK emissions – it also has the potential to help to mitigate climate change by acting as a carbon sink, drawing down carbon dioxide from the atmosphere and locking it up into soil and vegetation.

This means when it comes to carbon accounting, farmers and landowners are being asked to take a twin-track approach:

1) To reduce levels of GHG emissions by **improving productivity** with the aim of producing the same amount of food, or more, using fewer inputs or low-carbon strategies.

2) To increase the amount of carbon being captured and stored (often called sequestered) in soils and plants – sometimes referred to as **carbon farming** – by making land use changes, such as tree and hedgerow planting and peatland restoration.

With climate change rising rapidly up the government's agenda, it will become increasingly important for landowners to show how they are taking action to reduce emissions and increase carbon sequestration.

Carbon accounting is the principal way to do this and it is expected to form a major part of future agriculture policy, possibly becoming mandatory for farm businesses, either through regulation or as part of meeting farm assurance obligations.

In Scotland, it is starting to form an increasingly important part of the agricultural policy framework. Grants of £500 per farm are already available from the Farm Advisory Service to pay for an accredited adviser to carry out a carbon audit and having such an audit is a requirement of the Beef Efficiency Scheme (BES). Meanwhile, the pilot Sustainable Agriculture Capital Grant Scheme, which provided grants for Scottish farmers to buy capital equipment that will reduce emissions, offered bonus 'green points' to applicants who have previously carried out a carbon audit.

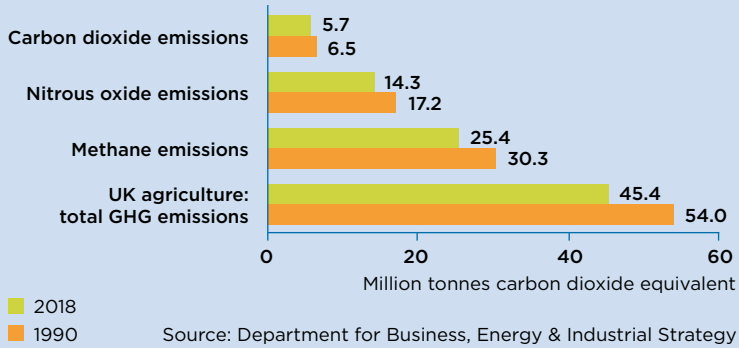
However, carbon audits are about more than being seen to be saving the planet. Evidence shows that taking steps to reduce emissions is also a good a way of improving technical performance and increasing business efficiency. In our experience, farms with a low carbon footprint are generally the most efficient because they are getting more from the inputs they are using. Many of the steps which can be taken to reduce emissions will result in lower costs and improved farm profitability, which will become ever more important as direct payments are phased out. Becoming more efficient increases the sustainability of the business and will make it more resilient to change. It can be helpful to think of a carbon audit as a 'resource use efficiency audit', rather than simply a tool to assess a farm's environmental performance.

Being ahead of the game in terms of carbon accounting could also prove to be a valuable marketing tool, offering consumers reassurance that the products they are consuming are climate-friendly. One of the leading UK producers of cold-pressed rapeseed oil has become the first food product to have been certified as both carbon neutral and plastic neutral, appealing to buyers who are increasingly concerned about climate change.

WHAT ARE THE MAIN GREENHOUSE GAS EMISSIONS FROM AGRICULTURE?

UK agriculture estimated greenhouse gas emissions

UK estimated annual GHG emissions for agriculture, 1990 and 2018



Source: Department for Business, Energy & Industrial Strategy

When compared to total emissions from all sectors, in 2018 (the latest figures available) agriculture was the source of:

- 1.6% of total carbon dioxide emissions – mainly related to fuel use.
- 70% of total nitrous oxide emissions – which are released by use of inorganic fertilisers and when spreading manure to land.
- 40% of total methane emissions – produced by grazing livestock as they digest plant materials and through manure storage.
- 10% of total GHG emissions in the UK.

Over the past decade, emissions from the agriculture sector have been broadly flat, with the fall from 1990 levels being mainly due to the national herd (of cattle and sheep) contracting.

> “IT CAN BE HELPFUL TO THINK OF A CARBON AUDIT AS A ‘RESOURCE USE EFFICIENCY AUDIT’”
>
> LEO PAGE, FARMING CONSULTANT, NEWBURY

CARBON ACCOUNTING – THE BASICS

The mantra “if you can’t measure it, you can’t manage it” will be familiar to anyone running a business.

Carbon accounting is a process which aims to quantify the GHG emissions associated with an individual farm, estate or enterprise, alongside the carbon that is being locked up through sequestration.

The carbon account can be used to help decision-making around three key areas:

- where emissions can be **avoided**;
- where emissions can be **reduced**;
- where unavoidable emissions can be **recovered** through sequestration.

There are a range of free carbon accounting tools or calculators available in the farming sector. The results are typically expressed as tonnes of carbon dioxide equivalent (CO2e) for the whole farm, or for an enterprise in kg of CO2e per kg of output.

The main carbon calculator tools are not new – some have been around for a decade or more, although are continually being updated – and they all differ slightly in terms of what they measure. The decision about which tool to use will depend on what the farmer wants to achieve from a carbon audit.

Three of the most popular are:

Agrecalc (Agricultural Resource Efficiency Calculator): This is most familiar in Scotland where it is used to carry out the carbon audits eligible for funding through the Farm Advisory Service, but is also suitable for use in the rest of the UK.

It has an easy-to-use inputting process and takes into account technical issues around livestock productivity. An update has improved the recording of soil sequestration, looking at the impact of different tillage crops and cover crops used.

Cool Farm Tool: This calculator is used by lots of supply chain organisations as it is quick

CASE STUDIES

Farm A is a 305ha predominantly arable business growing winter wheat and a small quantity of spring-sown niche crops. The farm also has a small area of woodland and permanent grass. An audit using the Farm Carbon Calculator showed that it currently emits almost 900t/CO2e a year and is only sequestering a little over 60t/CO2e, resulting in a carbon balance of 822 t/CO2e. Most of the sequestration is done by the hedges and soils under them. The biggest source of emissions – almost half – is from the use of granular urea fertiliser (350t/CO2e). Fuel use is the next most significant source of emissions.

What next?

If the farm is not considering a major change to its system, the audit raises the question of whether it should be looking to use an alternative product or one with a urease inhibitor to reduce emissions. Another possibility is to only complete one pass with urea, or to use variable rate spreading technology to improve the efficiency of application. Where there are parts of the field which are not profitable then alternative land uses, such as planting trees or establishing uncultivated margins, could be considered.

Farm B is a 150ha farm growing a mix of feed winter wheat, spring barley, winter oilseed rape and winter barley. It was audited using the Agrecalc tool. The farm’s total emissions are 335t/CO2e, which translates to a farm carbon footprint, excluding sequestration, of 0.15 kg/CO2e/kg output. Presenting emissions in this way enables direct comparisons to be made with the performance of other farms or enterprises. Fertiliser-related emissions account for 65% of total emissions, followed by fuel at 18%. These percentages are typical for an arable farm growing cereals.

What next?

The results highlight that the farm’s emissions are slightly lower than average, but that there is still scope to reduce overall emissions by further reducing the farm’s reliance on purchased fertiliser and making better use of organic manure, which should also improve soil structure. The audit also highlights scope to identify inefficiencies in fuel use by taking steps to record fuel use per tractor and activity.

In both examples, the process quickly highlights where attention should be focused in terms of asking questions about resource efficiency to reduce emissions.

and easy to use, with results clearly displayed in graphs. It shows the carbon footprint of each enterprise, rather than the whole farm.

Farm Carbon Calculator: This is slightly less technically-focused than Agrecalc, in that there are no questions around livestock mortality and fertility. However, it does take an in-depth approach to carbon sequestration and provides a live pie chart of emissions as you input data, which helps to highlight what impact making changes could have on a farm's carbon footprint.

DATA REQUIREMENTS

The tools are designed to factor in emissions across the whole range of activities on a farm. They may ask for information on:

- Use of fuels, electricity and contractors
- Use of aggregates, metals, wood and plastics
- Cropping types, yields, fertiliser and sprays and manure applications
- Livestock numbers, purchased feed, growth rates and mortality
- Buildings and machinery
- Water and waste
- Distribution and processing

Gathering the data can be the most challenging stage of producing an audit, so working with an advisor who has experience of the process will be helpful when it comes to finding the right data and sense-checking it. The more accurate the information entered, the more meaningful the results will be.

Some of the figures needed are straightforward and will be easily found in farm records. Others require answers – for example, an estimate of annual tyre wear – that can be trickier, which is where working with someone with experience can help. Technical advice is also helpful in terms of working out what actions to take once you have the results.

Some land managers may find value in carrying out a carbon audit annually to help monitor performance and demonstrate progress. A carbon audit is an important first step in assessing a baseline which helps with informed decision-making on long-term land use and environmental strategy.

THE LEGISLATIVE CONTEXT

Summer 2019 marked a milestone in global efforts to address the issue of climate change, when the UK government became the first major economy in the world to pass laws to end its contribution to global warming by 2050.

It updated the Climate Change Act 2008 to commit the UK to bringing all GHG emissions to net zero by 2050, compared with a previous target of making an 80% reduction from 1990 levels.

This followed a recommendation by the Climate Change Committee (CCC) that a net-zero GHG target for 2050 would be required to deliver on the terms of the 2016 Paris Agreement. This commits the UK, along with nearly 200 other countries, to holding the increase in global average temperature to well below 2C, if not 1.5C.

Net zero means that the UK's total GHG emissions – including emissions of carbon dioxide, methane and nitrous oxide – must be equal to or less than the emissions the UK removes from the environment. This can be achieved by a combination of emission reductions and by balancing any remaining emissions by removing them from the atmosphere. It is accepted that not every farm will be able to become net-zero, but the sector is expected to make significant progress in reducing emissions, with some estates, in particular, likely to play a big part in this process through carbon sequestration.

Other government strategies with an impact on agriculture and land use are:

- **The 25 Year Environment Plan** which sets out an aim to 'be the first generation to leave the environment in a better state than we inherited it.'

The plan contains commitments to recognise good practices that build up and bolster natural assets, such as soil, water and biodiversity, while also taking account of the negative effects of a range of current land uses and activities.

- The **Clean Air Strategy** which targets the reduction of ammonia alongside other damaging air pollutants to improve air quality. Ammonia is a problem as it damages sensitive natural habitats and contributes to pollution in urban areas. Agriculture accounts for 88% of ammonia emissions, which come from three main sources: livestock manure and urine and the use of nitrogen fertiliser.

The strategy sets out plans requiring:

– Covering of slurry and digestate stores from 2027.

– The spreading of slurries and digestate using low-emission spreading equipment from 2025.

– The possibility of extending environmental permitting to the dairy and intensive beef sectors from 2025.

- As part of the **Industrial Strategy**, the Department for Business, Energy and Industrial Strategy (BEIS) is allocating £90m worth of investment to transform food and farming, including reducing GHG emissions and improving resilience, through measures such as as artificial intelligence, robotics, remote monitoring and data science.
- There is also a **Clean Growth Strategy** focused on increasing economic growth, but with decreased emissions.
- The **Environment Act** was passed in November 2021 – the first dedicated environment act for nearly 30 years. If implemented well, so that it delivers its intended outcomes, it could be game changing.

It includes a 2030 target to halt species decline and a target to tackle air pollution from particulate matter (PM2.5). Crucially, there is now a legal targets framework covering nature, water, air and waste.

SUPPLY-SIDE MARKET DRIVERS

Many of the farming sector's biggest customers are seeking to reduce their carbon footprint, as they react to public and legislative pressure, signing up to a range of environmental commitments.

Almost every major retailer already demands some form of carbon auditing from their direct farmer-suppliers and there is an expectation that this trend will continue to grow.

For example, Tesco has an overall net zero target by 2050, but is looking to reduce GHG emissions from agricultural activities associated with its business by 15% by 2030.

It has been working with its liquid milk suppliers in Tesco's Sustainable Dairy Group (TSDG) for some time to reduce farm emissions. Strategies include optimising the application of nitrogen fertiliser, focusing on animal health, improving energy efficiency and building soil organic matter.

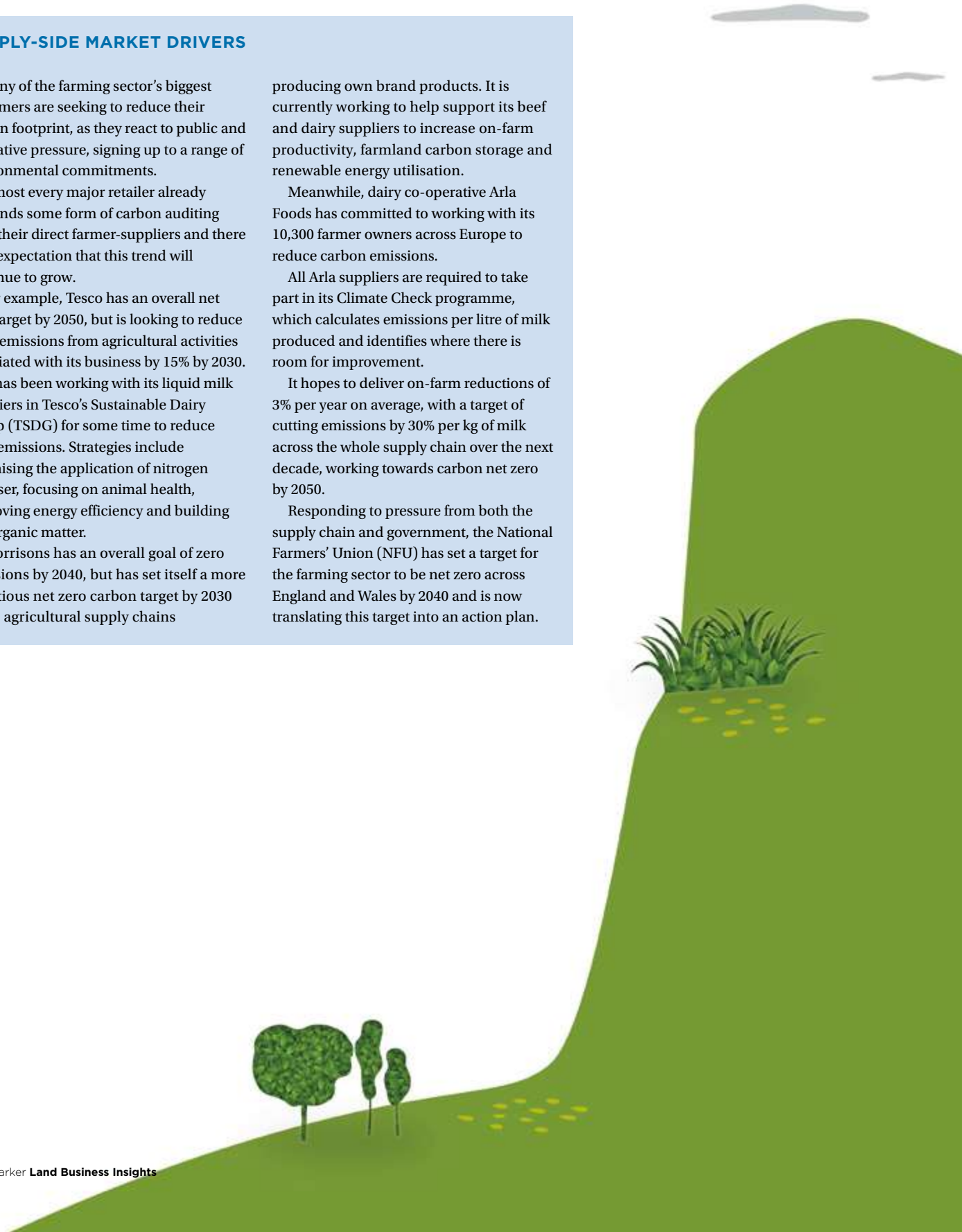
Morrisons has an overall goal of zero emissions by 2040, but has set itself a more ambitious net zero carbon target by 2030 for its agricultural supply chains producing own brand products. It is currently working to help support its beef and dairy suppliers to increase on-farm productivity, farmland carbon storage and renewable energy utilisation.

Meanwhile, dairy co-operative Arla Foods has committed to working with its 10,300 farmer owners across Europe to reduce carbon emissions.

All Arla suppliers are required to take part in its Climate Check programme, which calculates emissions per litre of milk produced and identifies where there is room for improvement.

It hopes to deliver on-farm reductions of 3% per year on average, with a target of cutting emissions by 30% per kg of milk across the whole supply chain over the next decade, working towards carbon net zero by 2050.

Responding to pressure from both the supply chain and government, the National Farmers' Union (NFU) has set a target for the farming sector to be net zero across England and Wales by 2040 and is now translating this target into an action plan.



LOW-CARBON FARMING: PRACTICAL WAYS TO REDUCE GREENHOUSE GAS EMISSIONS

Reducing a farm or estate's carbon footprint is a long-term process and, although it can feel somewhat overwhelming, there can be some quick wins. We examine some of the main principles

There is arguably a simple answer to the question of what individual farmers should do to start their journey towards reducing their carbon footprint: Focus on improving technical performance.

Much of the public debate about how agriculture can reduce emissions has focused on the Climate Change Committee's recommendations for changes to land use (see *Recommendations on land use – at a glance* on the facing page). While this is significant at the macro level, and land use changes will be required to meet net zero targets, it is unlikely to be the starting point for most farmers in terms of how they approach the topic.

Land use change is not a decision to be rushed, so for many the focus will understandably be on improving technical performance to raise productivity.

Improved productivity allows farmers to dilute their emissions per tonne of crop, kilo of meat or litre of milk produced, demonstrating they are using their resources more efficiently. By doing this they may identify where there is potential for land to be freed up for alternative uses which are known to increase carbon sequestration, such as woodland or bioenergy crops.

The use of renewable energy sources is likely to be another central plank in any strategy to reduce agriculture's emissions, securing savings through reduced electricity costs, while potentially generating new revenues for the business.

By making small improvements in technical performance across the board, farmers can become more efficient and reduce costs, while also helping the environment. Addressing emissions is undoubtedly a challenge for the agriculture sector as a whole, but it is one that also offers opportunities.

REDUCING AND AVOIDING RURAL EMISSIONS

It is sensible to make changes to any farming system gradually to determine which practices are having the biggest impact and to protect margins. Factors other than climate change will also need to be considered when changing farming systems, such as the impact on animal welfare, pollution and biodiversity. But examples of practical measures that farmers can take to reduce greenhouse gases by sector include:

ARABLE

Improve soil health

Soil is a farmer's most valuable resource, and increasing the amount of soil organic matter improves its fertility, structure and water-holding capacity, which can have a positive impact on yields and its carbon sequestration potential. Soil Organic Carbon (SOC) is the carbon component of soil organic matter.

When soil is cultivated it causes the release of carbon dioxide into the air as soil organic matter oxidises. Reducing the amount of soil disturbance and moving towards lower-tillage systems can reduce this flow of carbon from the soil, but it will not suit all situations. Where it does, wider benefits can include reduced establishment costs, less soil erosion and increased biodiversity.

The most obvious way to increase soil organic matter is through regular additions of organic fertilisers such as compost and farmyard manure. Increased use of cover crops, grass leys and generally introducing greater crop diversity will also help to build up organic matter and improve soil structure. Many of these strategies form part of regenerative agriculture, a farming system gaining traction in the UK which is based on the principle of implementing practices which regenerate the natural resources that have been depleted through intensification of agricultural systems. This helps reduce reliance on artificial fertilisers.

The starting point for measures to improve soil health should be soil testing so you understand your baseline.

Improve fertiliser use

The bulk of greenhouse gas emissions from arable farming systems come from the use of inorganic fertilisers, so after improving soil health and fertility, optimising fertiliser applications to cut the amount needed without reducing yields can have a significant positive impact.

Most farmers achieve a nitrogen use efficiency of around 60%, but 80% is achievable – mainly through more scientific matching of the crop's need with applications, taking action to reduce losses (through volatilisation[1] and nitrification[2]), and applying the right rate at the right time accurately. This involves more targeted application of fertilisers in line with crop requirements and taking into account the previous and following crop.

Using precision farming techniques which allow for variable rate application of fertilisers will also help to improve efficiency and reduce wastage. Switching away from urea to fertilisers with a smaller carbon footprint is another possibility. The government consulted on restricting the use of urea fertilisers in 2020.

Timing nutrient application correctly is as important as applying the right amount. Applying fertilisers in warm or wet conditions can increase the level of nitrous oxide emissions significantly.

[1] Volatilisation is the loss of nitrogen as ammonia from the soil into the atmosphere, as it is converted into ammonia gas (NH3). Losses can be as high as 60% of the nitrogen applied, if it is applied in the wrong conditions (such as hot, windy, dry weather, dry soils and application onto plant residues on the soil surface).
[2] Denitrification is the microbial conversion of nitrate and nitrite from fertilisers in anaerobic soil to nitrogen gas and some nitrous oxide.

RECOMMENDATIONS ON LAND USE – AT A GLANCE

The Climate Change Committee (CCC) acts as the government's independent advisor on how to address climate change. In 2018 it published *Land Use: Reducing emissions and preparing for climate change*, which sets out a detailed list of recommendations to drive emission reductions from agriculture. This report was updated in January 2020.

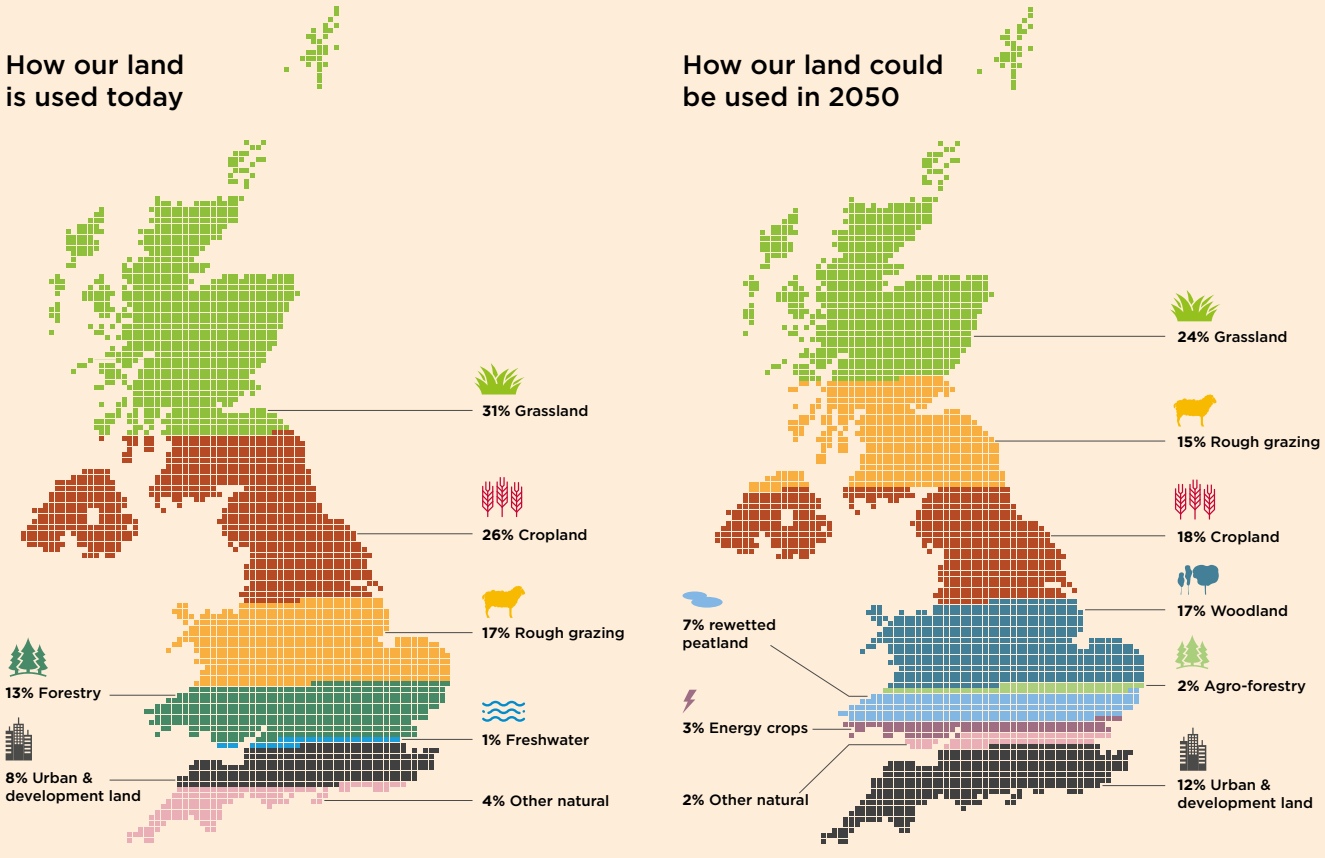
The report concludes that the UK's net zero target cannot be met without significant changes in land use. It says that freeing up agricultural land and converting it to alternative uses, such as trees or energy crops, can help achieve deep emissions reductions. It will also prepare us for the impact of climate change, while preserving food production and land for development.

As part of a coordinated approach, the report also argues for better information for land managers to help encourage low-carbon farming practices – such as 'controlled-release' fertilisers, improving livestock health and slurry acidification.

It also aims to reduce the 13.6m tonnes of food waste produced annually by 20% and, more controversially for some, advocates that consumption of beef, lamb and dairy needs to drop by at least 20% per person, arguing this would be within healthy eating guidelines.

In all of its updates to government, the CCC repeatedly says that much more needs to be done when it comes to meeting these targets.

Between 2008 and 2018, net storage of carbon by agriculture, forestry and land use increased. However, it was largely negated by a 2% increase in emissions so that the combined effect is that emissions by the sector fell by just 2%. This rate of change is not fast enough according to the CCC.



Source: Climate Change Committee

CATTLE AND SHEEP

Improve animal performance

Beef and sheep account for a high level of greenhouse gases from the agricultural sector because of the process of enteric fermentation, where plant material is digested in the digestive tract releasing methane as a by-product.

There is currently debate about how to measure methane's impact on global warming. While methane is characterised as a short-lived greenhouse gas in terms of its atmospheric lifetime (on average 12 years), the climate impacts of methane emissions are not: it takes over 700 years for the temperature change effect of a pulse emission of a tonne of carbon dioxide to rival that of a pulse emission of a tonne of methane.

Some scientists argue that stable methane emissions make no further contribution to warming and should not be penalised. Others make the point that a constant level of emissions may lead to no additional warming beyond current levels, but it does lead to more warming than if the methane was not emitted and current warming has already transformed our planet and its natural systems.

If animals are reared, the best approach to mitigating greenhouse gases in the beef and sheep sector is currently to focus on improving overall animal performance by looking at genetics, feed efficiency, growth rates, fertility and disease control.

For example, selecting animals which can be finished more quickly will cut the amount of methane that animal produces during its lifetime. Focusing on health planning and fertility will maximise the number of calves and lambs reared per animal, which reduces emissions per kg of meat produced.

Improve manure storage and handling

How animal manure is stored and spread can have a significant impact on the amount of methane, ammonia and nitrous oxide it produces. Storing manure heaps on an impermeable base and covering with sheeting helps to reduce losses, as does improved timing of fertiliser applications and avoiding excess application.

DAIRY

Improve forage quality and feeding

High-quality forage is fundamental to a dairy business, underpinning the physical and financial performance of the herd. A focus on improving forage quality, by picking the right grass varieties and through timely operations when silage-making, can encourage intake, boosting yields and reducing the amount of bought-in feed required. Switching from a feed like soya, which has a high carbon footprint, to alternatives with a similar protein content can be another option for reducing emissions, although this will depend on the rest of the ration.

The science is still developing as to the effectiveness of reducing methane production from cows through changes in the diet. There is some evidence that the inclusion of some legumes, such as white clover, in forage might have an impact on reducing the amount of methane. Agricultural scientists at the University of California reported in 2019 that they had found that a certain species of red algae seaweed reduced emissions for dairy cows by more than 50%. Meanwhile, researchers from Penn State University have reported they saw emissions reduce 16-36% when they added the compound 3-Nitrooxypropanol (3-NOP) to a dairy diet, with the product acting as an inhibitor to the enzyme that causes methane production.

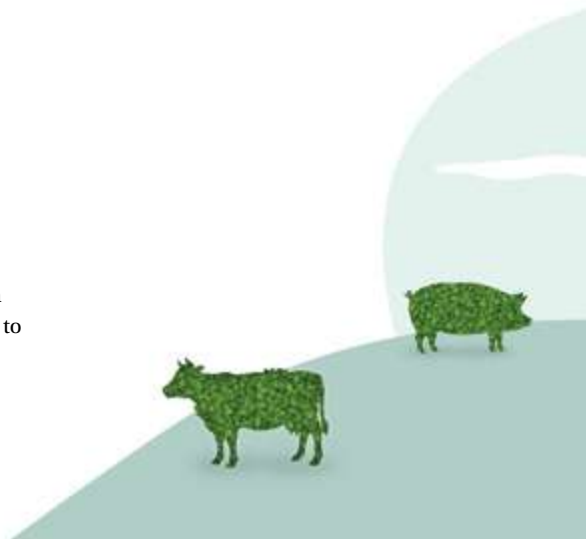
Improve manure handling

Timely application of slurry – using low-emission spreaders such as trailing shoe and injection systems – has been shown to significantly reduce emissions of nitrous oxide. Having slurry and muck storage systems which minimise ammonia losses into the atmosphere is also important. Grant funding is available for slurry store covers, through the Countryside Stewardship Scheme, which also keep rainfall out of the store, reducing the quantity of slurry that needs to be stored and spread.

Improve nutrient use

As in the arable sector, targeting and applying manures and fertilisers in line with crop requirements is a good strategy to help to reduce fertiliser use and improve yields.

> "LOW-CARBON FARMING REQUIRES YOU TO BE FLEXIBLE AND TO BE WILLING TO ALTER PLANS DURING THE SEASON AS THINGS CHANGE"
>
> PAUL DENNISON, FARMING CONSULTANT, NORTHALLERTON



PIG AND POULTRY

Improve energy efficiency

The pig and poultry sectors have a lower carbon footprint than beef or sheep, but there is still scope to reduce emissions. Such systems often have a high energy requirement associated with heating and ventilation systems so renewable energy options are already common. Further gains can be achieved by investing in the performance of buildings through insulation and more efficient lighting.

ENERGY

Improve energy efficiency

Reducing energy usage and increasing energy efficiency is a central policy aim across all types of property, so looking at energy consumption across the whole farm and estate is important. Assess energy use in domestic, rented and business premises to identify areas for savings, especially in larger, older properties. It is generally cheaper to save energy than generate it.

Increase renewable energy production

Further investment in renewable energy may be worth considering, particularly where on-site consumption of electricity is high. While renewable energy subsidies have almost disappeared for new installations, the technology has advanced greatly over the past decade, so costs in many areas – notably solar – have fallen considerably.

IS GRANT SUPPORT AVAILABLE?

England: Farming Investment Fund schemes.

The Farming Investment Fund offers farmers and contractors in England grant support to help them invest in new farming technology and equipment which will make their businesses more productive and enhance environmental performance. There are two strands to the scheme – the Farming Equipment and Technology Fund (FETF) which is for smaller investments and the Farming Transformation Fund (FTF) for larger investments.

The FETF offers grants of between £2,000 and £25,000 to support farmers who want to invest in specific pieces of agricultural equipment. There is a list of 119 eligible items to choose from including rainwater harvesting tanks, slurry application equipment, variable rate controllers for sprayers and fertiliser spreaders and direct drills. The FTF offers grants of between £35,000 and £500,000 to help people to improve productivity, profitability and enhance environmental sustainability. One of its key themes is water management.

Scotland: Sustainable Agriculture Capital Grant Scheme.

A pilot Sustainable Agriculture Capital Grant Scheme was announced in September 2020 offering farmers in Scotland grants of up to £20,000 to buy equipment that will help to reduce greenhouse gas emissions and support sustainable land use.

Capital items supported by the scheme included a range of livestock handling systems, weighing equipment, EID devices, calving detectors, precision-farming equipment, low-emission slurry application systems, slurry store covers and very flexible tractor tyres.

The funding provided by government was based on standard costs for such items.

Applications closed on 11 October 2020.

KEY FACTS

It is estimated that UK soils currently store about 10bn t of carbon, which is roughly equal to 80 years of current annual UK greenhouse gas emissions. However, degradation has led to most arable soils having already lost 40 to 60% of their organic carbon.

Adoption of low-carbon farming practices could deliver an annual emissions reduction of up to 9 $MtCO_2e$ according to the Climate Change Committee, with the NFU suggesting that the savings could be even bigger at 11.5 $MtCO_2e$/year.

FROM CARBON TO CASH: INCENTIVISING CARBON SEQUESTRATION

Land managers will need support to help transition to alternative land uses. We look at where new revenue streams and opportunities are emerging for low-carbon farming

The question of how to make carbon farming more financially viable has been puzzling policymakers for some time.

The Climate Change Committee (CCC) has recommended that to meet the net zero target, 22% of land needs to be released out of traditional agricultural production into long-term carbon sequestration – recognising a range of market mechanisms will be required to stimulate anything near that level of land use change.

Schemes that allow landowners to generate new revenue streams through carbon farming are, however, starting to emerge.

Public funding is already available to incentivise woodland creation and peatland restoration, and Defra is working on plans for the Environmental Land Management (ELM) scheme which will reward farmers for implementing a range of environmental options, some of which could involve carbon sequestration.

There is also an expectation that private investment in environmental measures that help to mitigate climate change will become an increasingly significant market.

Current examples of private sector carbon buyers in the UK include high street retail chains, national transport operators and infrastructure developers and there are also some international initiatives emerging that give an indication of the direction of travel.

While there are currently only a handful of ways for UK farmers and landowners to earn money directly from generating carbon credits, it is a market which is expected to develop relatively rapidly. However, landowners are advised to take advice on the consequences for farming economics, the effect on the capital value of land and property, tax and land tenure issues before entering into any agreement.

> “NEW REVENUE STREAMS THROUGH CARBON FARMING ARE STARTING TO EMERGE”

WOODLAND AND FORESTRY

Goal: The government has committed to increasing tree planting to at least 30,000 ha per year to 2050 across the UK.

The £50m Woodland Carbon Guarantee Scheme was introduced in England in 2019 to accelerate woodland creation by developing the domestic market for woodland carbon. The scheme pays landowners who create new woodland for the carbon credits they generate over a 35-year period. The price paid is established through a reverse auction process.

To be eligible, woodlands must be registered with the Woodland Carbon Code (WCC) which provides a British standard for woodland projects and the carbon sequestered in them. There have been several rounds of the Woodland Carbon Guarantee scheme to date. The first auction was held Jan/Feb 2020 and 18 contracts were offered for the creation of a total of 182ha of new woodland. The average price paid was £24.11/tC02e. The price dropped to £19.71/tC02e in the second auction (June 2020), moving to £17.31/tC02e in the third (October 2020).

However, it bounced back to £20.32/tC02e in the fourth auction (August 2021), when 19 contracts were offered for the creation of 331ha of new woodland.

Carbon credits can be sold on the open market. The price is unfixed and can vary widely – they are currently trading at £10-25/tC02e.

John Clegg & Co, Strutt & Parker's forestry arm, can advise land managers considering tree planting on the WCC and also act as a project developer.

PEATLAND RESTORATION:

Goal: The CCC has called for the restoration of at least 50% of upland peatland and 25% of lowland peat to reduce peatland emissions by 5 MtCO2e by 2050.

Peatland is set to play an increasingly prominent role in tackling climate change because in healthy condition it is among the most carbon-rich ecosystems on earth.

Healthy peatlands are effective carbon sinks because they capture carbon dioxide from the atmosphere through photosynthesis, which is then locked up long term because the plant does not fully decompose in the waterlogged conditions. About 12% of UK land area is estimated to be peatland, but much of this is currently in a degraded state because of historic and current management practices. According to the UK Centre for Ecology and Hydrology, peatlands are currently a net source of greenhouse gas emissions because of the way they have been managed, and eroding or degraded peat can emit up to 39 tonnes of CO2e per hectare per year, so much more than a hectare of woodland can absorb. A significant barrier to peatland restoration is financial, with current public funding being both limited and competitive.

The Peatland Code is a certification scheme for UK peatland projects wanting to generate a new income stream by selling the carbon benefits that will result from restoration. A public register of all Peatland Code projects is online, allowing companies seeking to mitigate their own carbon emissions to purchase them. The funding received from the sale of carbon credits will depend on the extent of damage prior to restoration, the size of the project and the length of the management agreement. Peatland restoration also brings wider ecosystem service benefits such as greater biodiversity, cleaner water and reduced flood risk, which can be another unique selling point for a project. Peatland carbon credits are currently trading from £15/tCO2e to highs of £25/tCO2e. Over 20 of the Strutt & Parker team have had professional training on the Peatland Code and can help design restoration projects and make applications to the Code.

CLIMATESEED

Environmental credit trading platform

ClimateSeed is a social business which helps companies and organisations scale up their efforts to fight climate change by connecting them with sustainable project developers who are looking for funding.

Launched in 2018 by Strutt & Parker's parent company BNP Paribas, ClimateSeed is a platform which allows companies to buy high-quality carbon credits by contributing to voluntary carbon emission reduction projects.

The projects on the platform are also designed to tie in with the Sustainable Development Goals of the United Nations so, as well as supporting climate change, companies using it are also helping to support local communities.

As a social business, ClimateSeed reinvests 100% of its profits back into environmental programmes.

ENVIRONMENTAL LAND MANAGEMENT (ELM) SCHEME:

Goal: Delivery of a range of public goods, including carbon-rich habitats to help mitigate against climate change.

The Environmental Land Management (ELM) scheme, which Defra hopes to roll out nationally between 2022 and 2024, is still in pilot stage.

The scheme is founded on the principle of public money for public goods and one of the public goods that farmers will be rewarded for is the 'mitigation of and adaption to climate change.'

Defra has committed to a three-level scheme with the top level (landscape recovery) focused on paying for long term (20 years +) land-use change projects that will make a substantial contribution to its net zero target such as tree planting, woodland improvement, peatland restoration and creation of coastal habitats. Eligibility for such funding will be project specific, with payments determined through negotiated agreement, rather than offering set payment rates. The lower level of the scheme will be the Sustainable Farming Inventive (SFI) which will pay farmers to manage their land in an environmentally sustainable way. The scheme is made up from a set of standards and farmers will be able to choose from a range of actions, some of which are designed to reduce greenhouse gas emissions or improve soil condition and carbon storage by adding organic matter.

In Wales, the aim is to introduce a Sustainable Farming Scheme where farmers will be rewarded for environmental outcomes not paid for by the market, such as better air quality, reducing carbon emissions and improving soil quality.

Plans in Scotland are less developed, but its post-Brexit policy is expected to see a shift in payments away from production towards environmental outcomes. Scotland already has a proven track record in terms of tree planting, accounting for the majority of new plantings in recent years because of a more effective policy framework.

PRIVATE SECTOR INVESTMENT:

Goal: To connect companies seeking to take environmental action with landowners who can provide environmental services.

This could be an exciting area with blue-chip companies already exploring opportunities to work with landowners to reduce carbon emissions and secure better environmental outcomes.

Unilever recently announced that its brands will collectively invest €1 billion in a new dedicated Climate & Nature Fund, which will fund landscape restoration, reforestation, carbon sequestration, wildlife protection and water preservation projects. It builds on projects that are already underway, such as Ben & Jerry's initiative to reduce emissions from dairy farms. Since 2015 the ice-cream company has been paying a self-imposed internal tax of $10 per metric ton of carbon it produces which it then uses to work with farmers to develop and implement carbon reducing strategies. This internal rate has been dwarfed by some property developers who are charging themselves £60 - 95/tC02e, which is much closer to the likely price of carbon in the near future.

Scotland-based craft beer and bar business BrewDog is going beyond carbon neutrality, becoming one of the first businesses to be carbon negative across all parts of its business. Since August 2020 it has now removed twice as much carbon from the atmosphere than it emits by driving down emissions in its own supply chain and engaging with carbon removal projects.

It has bought a large area of land in Speyside in Scotland to create an eco-hotel, distillery and outdoor centre, while establishing one of the biggest native woodland and peatland restoration projects in the UK.

USING CARBON AS A MARKETING TOOL:

Goal: To meet consumer demand for climate-friendly food and drink products.

A handful of food manufacturers, including Quaker and Walkers, experimented with including the carbon footprint of their products on packaging in the late 2000s, but this was phased out due to lack of interest.

However, market research company Kantar now points to growing evidence that consumers are making food and drink choices to support the environment. A 2019 YouGov study of more than 9,000 consumers, across the USA, UK, Italy, Canada, Spain, the Netherlands and Sweden, found that 66% of consumers said they would feel more positive about companies that can demonstrate they are making efforts to reduce the carbon footprint of their products.

This is prompting a number of businesses – both large and small – to seek a marketing advantage by advertising the low carbon credentials of their products. In 2020, the Arbikie distillery, based on the East Coast of Scotland, announced it had created a 'climate positive' gin, with a carbon footprint of -1.54 kg CO2e per 700ml bottle. The product has a lower carbon footprint than traditional gin by using peas, which require no inorganic fertiliser, as its base. Suffolk-based brewer Adnams has also been selling a carbon neutral draught beer for more than a decade.

At the moment, plant-based food manufacturers are leading the way in terms of trying to add value by promoting their products as climate friendly. Quorn, which makes meat alternatives, now publishes 'Farm to Shop' carbon footprint data, certified by the Carbon Trust, for its top 30 selling products.

SOIL CARBON:

Goal: To increase the amount of carbon sequestered in the soil by increasing levels of soil organic matter

Soil carbon sequestration is a complex subject, as it is difficult to calculate how much carbon is stored in the soil and how long it is stored for as it varies widely depending on a range of factors. However, schemes are now emerging in the UK for generating carbon credits from regenerative agriculture practices, with payments of around £20-£30 per tonne of C02e on offer, resulting in an income of £50-£90 income per hectare per year.

Regulation of these new markets is still being developed, with funding awarded in July 2021 to a consortium to develop a soil carbon code that would allow for verified soil carbon credits to be traded in a similar way to the woodland and peatland carbon codes.

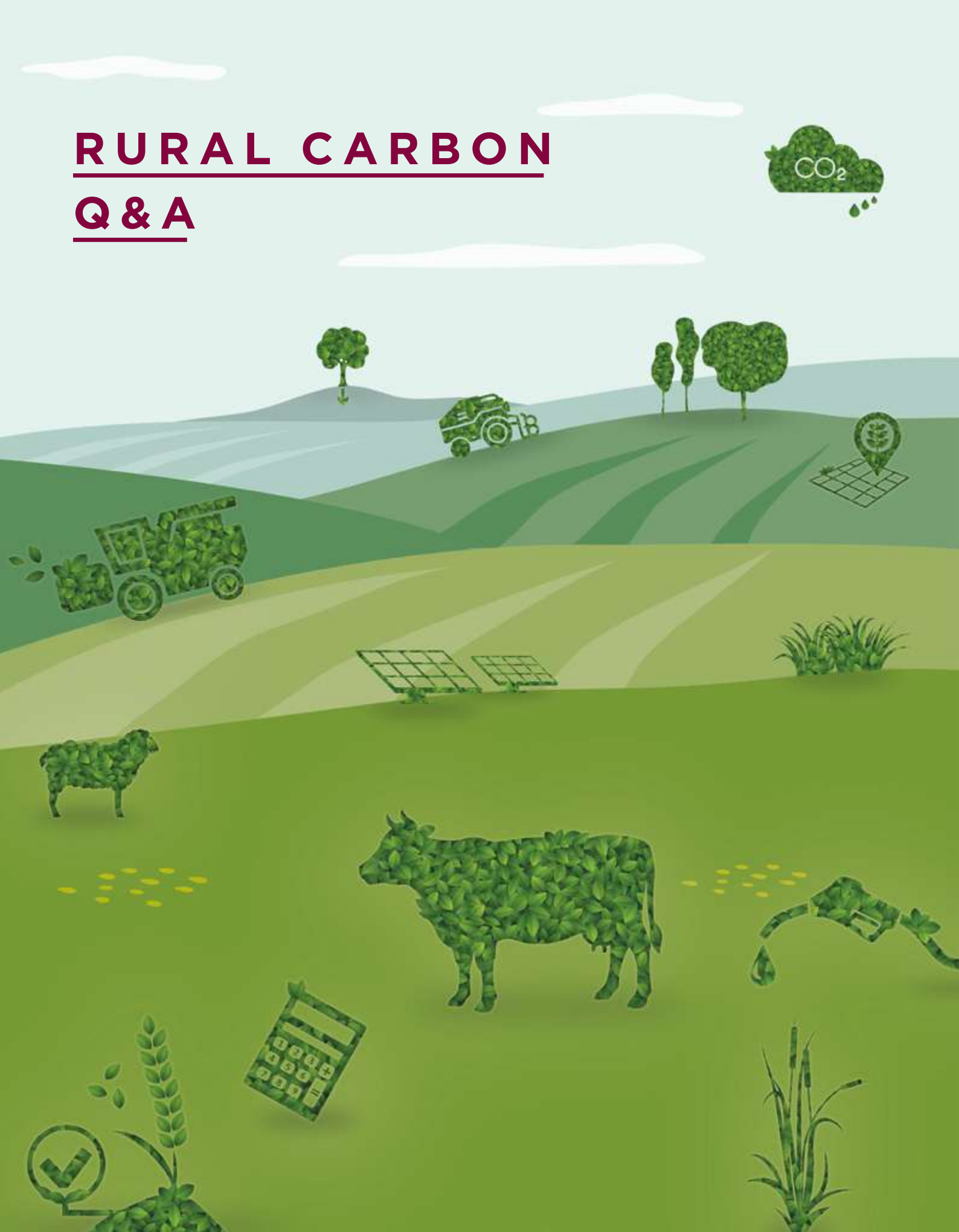
> "WE DO EXPECT THE PRICE OF CARBON TO INCREASE SIGNIFICANTLY"
>
> JASON BEEDELL, RURAL RESEARCH DIRECTOR

WHAT ARE CARBON CREDITS WORTH?

The prices currently being paid for carbon credits are highly variable and the market is changing rapidly as demand continues to increase, especially for nature-based projects. There is currently a trend for European buyers to buy a mix of credits - lower cost ones at £1-10/tCO2e from restoration and planting projects in the developing world and much higher value ones at £25-35/ tCO2e from European projects, so they feel they have contributed locally. However, Climateseed (see panel on p16) says there is a strong demand for UK credits. Over time, we expect the price to increase significantly to at least £70/ tCO2e, which is the level many scientists say is needed to reduce global climate change.

Meanwhile, a private sector-led taskforce has been launched by former head of the Bank of England Mark Carney to build a market infrastructure for the growing carbon offset market. It is recognised that there will be a surge in demand for offsets as companies increasingly look to decarbonise, but progress towards net zero will be stalled without a well-functioning voluntary carbon market. The Taskforce on Scaling Voluntary Carbon Markets, which pulls together more than 40 experts from across the financial sector, including BNP Paribas, has been challenged to scale voluntary carbon markets, allowing a global price for carbon to emerge.

RURAL CARBON Q&A



JASON BEEDELL, RURAL RESEARCH DIRECTOR AT STRUTT & PARKER, ANSWERS SOME COMMON QUESTIONS SURROUNDING CARBON ACCOUNTING

Are you aware of any work underway nationally to ensure there is a consistency of approach in assessing what carbon is being emitted and sequestered?

The methodology used by carbon calculators is now well-established and the data used to calculate the effects of different land uses and management practices is improving all the time. Internet-based carbon calculators are potentially powerful tools which help people, organisations and communities to understand their energy use, identify trends and motivate them to reduce carbon emissions, assuming that robust information is fed into them in the first place. A British Standards Institute (BSI) standard on natural capital accounting for organisations was launched in 2021. It specifies good practice for preparing natural capital accounts; the ones Strutt & Parker produces with eftec comply with the standard.

Is it likely carbon accounting and valuing natural capital will have an impact on land prices in the future?

It seems likely that carbon accounting and natural capital will become more of a consideration, but as one of a whole range of factors affecting farmland values.

There are already many reasons why people buy land – many of which are not directly related to its ongoing profitability – but if markets develop for businesses to reduce and offset their emissions, this could offer another reason for people to invest.

An example scenario is where a large corporate business looking to offset its emissions could be in the market to buy carbon credits. Alternatively, farmers producing high value crops who want to show that they are 'carbon neutral' may want to use or buy other land as a carbon store. This could be done by buying land for tree planting or entering into a long-term agreement with another land manager. Both will affect the value of the land.

Our forestry and farm agency teams have already seen large increases in interest for purchasing land for tree planting (see John Clegg & Co's Forest Market Report 2021 for details on the price of planting land).

How do you calculate the carbon levels of soil and what are the costs associated with soil sampling?

Soil carbon levels can be obtained through a standard test available through most laboratories (Granta/NRM etc.). The test requires 300g of soil and costs around £12-15 per sample, although costs are falling for some sampling services. A number of samples will be needed to assess variation across a field.

We recommend that regular sampling is done, to a scientific protocol, to help build up a picture of what is happening to organic matter and carbon levels across a farm. It should be noted that there can be a huge variation between samples taken just centimetres apart, so monitoring soil carbon over time is not easy. But it can be helpful, as a starting point, to take samples from a couple of fields every year to begin building a picture of what is happening to carbon levels.

What happens if a farmer is unable to meet the terms of a carbon agreement?

Contracts between buyers and sellers are usually agreements for a long period of time (30 years or more). If a woodland was to suffer from a fire or storm during that period the seller would still have to provide the same amount of carbon sequestration as per the terms of the contract. This could mean replanting the woodland or buying credits from another source. The WCC has a centralised buffer account to which all sellers have to contribute 20% of each project's carbon credits. This is used as insurance if ever trees in a verified scheme are damaged.

Is there a risk of double counting carbon? For instance, a tenant and landlord submitting a return for the same farm.

There is a risk of double-counting, particularly in the landlord/tenant sector where both parties may be interested in utilising green resources. In reality, where a carbon calculator is only being used to measure and monitor the carbon balance, then there are no real consequences if double counting does take place. Where it becomes an issue is where someone is selling carbon credits or completing an annual return as part of a scheme. If a farmer has sold all their carbon credits to another emitter for offsetting purposes, they will not be able to use the 'sold sequestration' against their own emissions.

Anyone intending to sell carbon credits must use a certified registry to register, track and permanently cancel credits. Where land is let, our recommendation would be that no credit sales can be agreed that extend beyond the term of the tenancy (much like an environmental agreement). Logically where land is let, it should be the claimant for the Basic Payment Scheme (BPS) who would be the beneficiary of any carbon credits and responsible for the carbon emissions associated with the land.

Our natural capital account assessments consider all estate assets, and separate out in-hand and tenanted GHG emissions and carbon storage.

How much carbon do different land types sequester?

The rates below represent typical carbon sequestration rates. They may vary significantly depending on the type and condition of the land use. These are the rates used in the 2018 Climate Change Committee report.

For woodland carbon credits, a much lower 'net' rate should be used to calculate potential credits generated, to account for model uncertainty and a buffer in case tree growth is less than expected.

In tCO2e/ha/year (from highest to lowest):

Woodland (coniferous)	@ **13**
Woodland (broadleaf)	@ **5**
Saltmarsh	@ **5**
Peatland (undamaged)	@ **4**
Hedgerow / shrub	@ **0.7**
Heathland	@ **0.7**
Grassland	@ **0.4**
Urban green areas	@ **0.4**
Arable land / combinable crops	@ **0.1**
Urban	@ **0**
Peatland (damaged)	@ **up to -39 (of emissions)**

If you have further questions about carbon accounting or how to measure natural capital, then please get in touch with jason.beedell@struttandparker.com

A GUIDE TO CARBON MARKETS

As an accompaniment to this publication, we have also produced a short guide to carbon markets which gives more detail on the different types of carbon markets and what farmers and landowners might want to consider before selling carbon.

KEY CONTACTS

KEY CONTACTS

RURAL CONSULTANCY

Our nationwide team of land management and farming specialists can assist with all aspects of estate and farm management.

Rhodri Thomas
07710 038283
rhodri.thomas@struttandparker.com

ESTATES & FARM AGENCY

We sell farms, farmland and country and sporting estates throughout the UK.

Matthew Sudlow
01865 366 640
matthew.sudlow@struttandparker.com

FORESTRY & WOODLAND

Our forestry division John Clegg & Co can advise on all aspects of commercial forestry sales and woodland management

woods@johnclegg.co.uk
01315 161724

ENVIRONMENTAL LAND MANAGEMENT

We advise on all aspects of environmental land management including the latest grant schemes, biodiversity net gain, woodland management and peatland restoration.

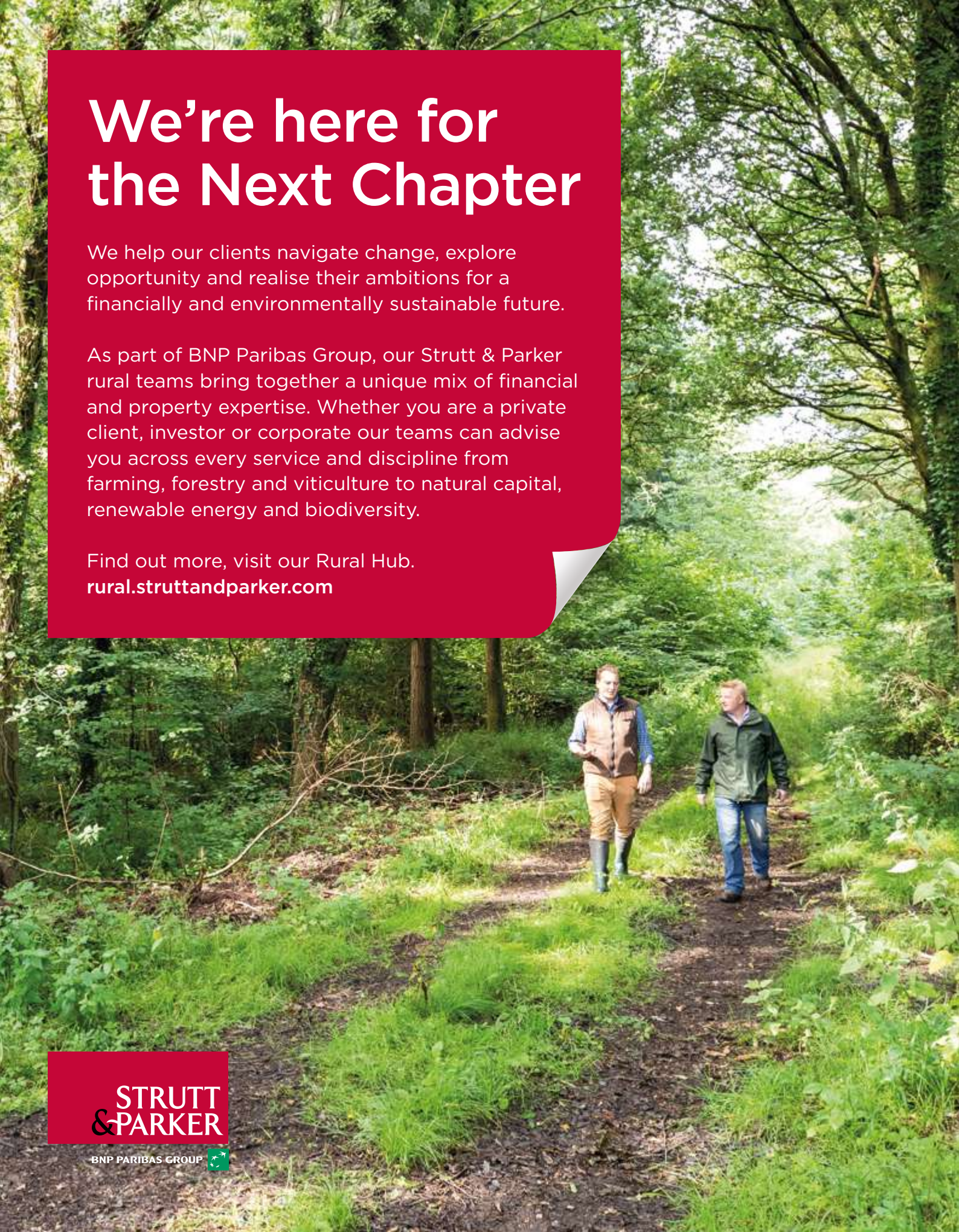
Joel Paterson
Associate Director
07442 855 134

ENERGY

We provide practical and viable energy solutions for our clients' properties.

Lauren Gibson-Green
01223 459492
lauren.gibson.green@struttandparker.com

For a list of all offices, please visit struttandparker.com/offices


We're here for the Next Chapter
We help our clients navigate change, explore opportunity and realise their ambitions for a financially and environmentally sustainable future.
As part of BNP Paribas Group, our Strutt & Parker rural teams bring together a unique mix of financial and property expertise. Whether you are a private client, investor or corporate our teams can advise you across every service and discipline from farming, forestry and viticulture to natural capital, renewable energy and biodiversity.
Find out more, visit our Rural Hub.
rural.struttandparker.com
STRUTT & PARKER
BNP PARIBAS GROUP

February 2022

Please contact your local office to find out more about our rural services or visit our website.

rural.struttandparker.com

Estate & Land Management
We operate across the UK, ensuring that our clients' farms and estates perform in a way that meets their business and personal aspirations.

Farming
Our team offers a complete service, advising on business and technical matters to help farmers make the most of their enterprises.

Estates & Farm Agency
We handle the sale and purchase of some 50,000 acres of farmland, residential and commercial farms, and sporting estates every year.

Energy
We help farms and estates to minimise exposure to energy risks and to generate returns from energy efficiency and energy generation projects.

Forestry
John Clegg & Co, our forestry arm, advises on everything from large-scale commercial forests to small-scale mixed woodland managed for its amenity value.