

TOWARDS NET

**ZERO**

CREATING  
A LOW  
CARBON  
RURAL  
ECONOMY



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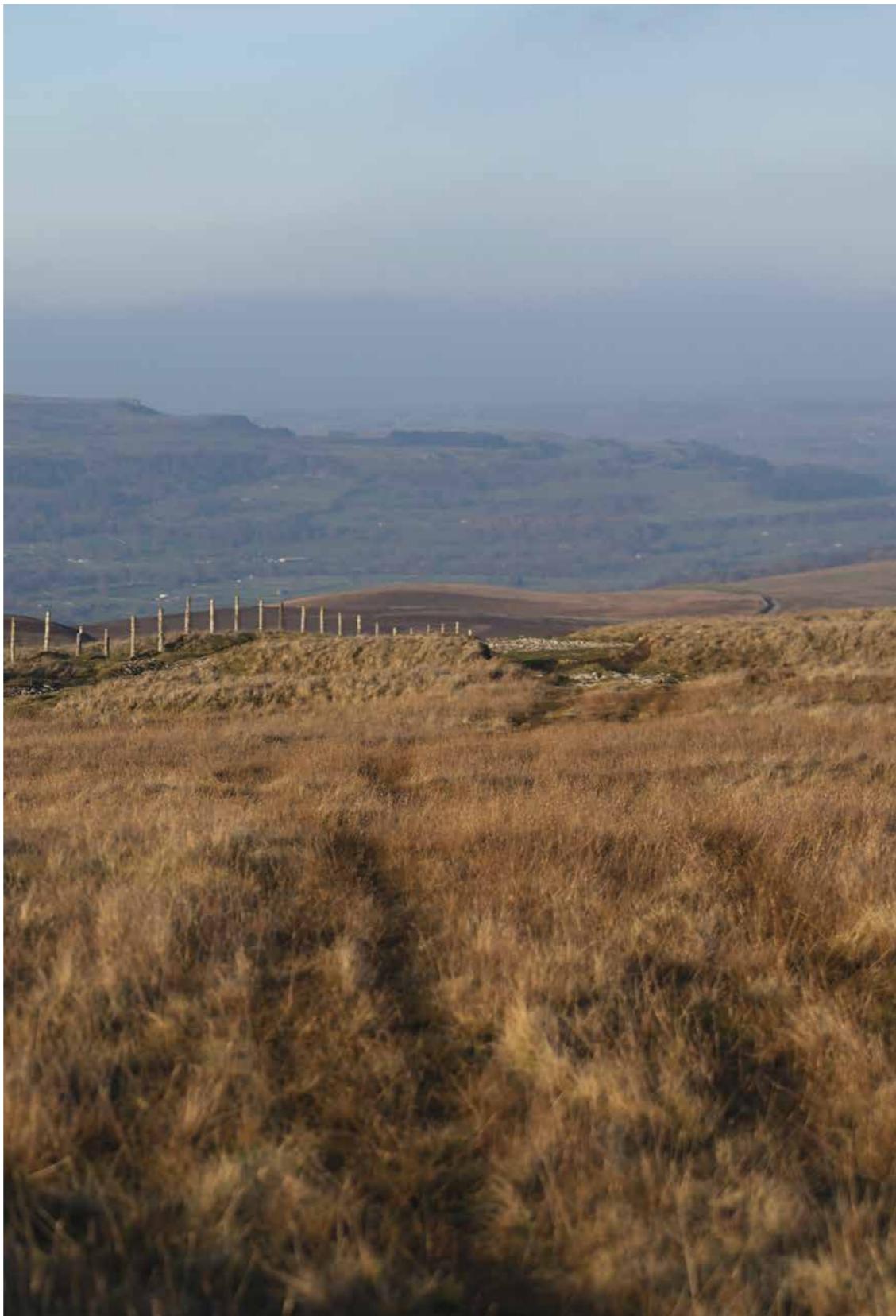
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## THE CLA

Founded in 1907, the CLA is the membership organisation for owners of land, property and businesses in rural England and Wales. We exist to champion, protect and enhance our rural economy, environment and way of life.

Our aim is to unlock the potential of the rural economy by promoting innovative ideas to a national audience and providing practical support to members. We do this so our members can feed the country, create jobs and prosperity, invest in communities and protect the environment for future generations.

Together, CLA members own and manage around half the rural land in England and Wales and more than 250 different types of businesses. The work they undertake in the best interests of the land has a positive effect on wildlife and the natural environment, and their diverse and successful businesses are the heart of rural communities.

The CLA's formal, incorporated name is the Country Land and Business Association Limited, and its registered office is at 16 Belgrave Square, London SW1X 8PQ.

**Working towards a low carbon rural economy**  
Landowners are on the front line in the fight against climate change and CLA members are already taking great steps to reduce their emissions.

But with the UK having legislated to become carbon neutral by 2050, and growing public concern over the climate emergency, it has never been more important to learn from one another as we seek to create a low carbon countryside.

At the CLA, we are engaging with our members – who are farmers, land managers and rural business owners – to help them provide innovative ways to create an environmentally-friendly, but still profitable rural economy.

With thanks to the CLA reporting team – Mike Ashton, Robert Dangerfield, Henk Geertsema, Kim John, Lee Murphy and Mike Sims – we are able to share a range of engaging case studies, which we hope will be both thought-provoking and inspiring.



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## FOREWORD

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### MARK TUFNELL

If you speak to anyone living in an urban environment, they will tell you that enjoying nature was one of the few benefits of the Covid-19 restrictions. Birdsong was amongst the loudest of noises in major cities, and through their daily walks, many people rediscovered the large, tree-filled parks that had so often been ignored before. The roads were free from cars, the skies were free from planes, and for a few short months, the natural world breathed more easily.

Studies show that the global drop in carbon emissions in 2020 was approximately 6.4%. To put that figure into context, for the world to meet the Paris Agreement target of keeping global warming below 1.5°C, global emissions will need to fall by 7.6% every year this decade. It is rather sobering that the massive changes precipitated by Covid-19, even if they were replicated every year, would still not be enough to meet that goal.

Most people can see that there is something strange going on with the weather, and nobody notices this more than landowners. Droughts and floods have become annual experiences, and the predictability of the seasons that for so long was a mainstay of agricultural life now scarcely exists.

There is no escaping the fact that agriculture contributes significantly to global emissions of greenhouse gases. We can argue that feeding a hungry and growing population will inevitably come at some environmental cost, and we can argue further that other sectors such as transport and energy bear the greatest responsibility in decarbonisation. The Climate Change Committee has recognised that agriculture is a "hard to treat sector", but many of us feel strongly that we can do more to reduce our emissions and indeed help offset the emissions of others.

This is why landowners are so well-placed to act in the fight against climate change. We have the space to plant trees and hedgerows and house renewable energy production; we have the power to manage our soils and restore our peatlands; we have the vision to develop new markets with the private, public and voluntary sectors that will incentivise the 'greening' of business. Indeed, with a new agricultural policy for England now being implemented, and with Wales following closely behind, financial assistance is available to help landowners and farmers adopt climate-friendly land management practices.

I speak to CLA members who tell me that they want to do more to mitigate climate change, as well as reverse biodiversity decline but don't know where to start.

*Towards Net Zero: Creating a low carbon rural economy* is designed to help landowners further their own environmental journey. This collection of case studies highlights the ambitions, the difficulties and ultimately the rewards available to CLA members who are already undertaking action to mitigate climate change.

Whether you own a smallholding or a large estate, I hope you find something to inspire you to grasp the opportunities available for change.



**Mark Tufnell**  
CLA President



## PARTNER'S FOREWORD

### CLIMATE CHANGE AND THE 21ST-CENTURY LANDOWNER



**James Farrell, Head of Knight Frank's Rural Consultancy team, examines the challenges and opportunities that climate change brings to estates, farms, rural businesses and their advisers.**

The recent update from the Intergovernmental Panel on Climate Change (IPCC) on the world's progress, or lack of it, in combating rising carbon emissions made for fairly bleak reading, so it will be interesting to see what progress is made following the discussions at COP26.

As a business, Knight Frank accepts the science and is committed to reducing its carbon footprint. We have recently pledged to achieve net zero across our UK business by 2027 and globally by 2030. But, as advisers to a wide range of rural businesses, we naturally come across varying attitudes and opinions on the issue.

Three things, however, are abundantly clear. Firstly, climate change and other environmental, social and corporate governance (ESG) related matters are firmly at the heart of UK Government policy and will remain there for the foreseeable future. Secondly, statistics show that the UK's climate is changing, whatever the cause. Finally, the public discourse on climate change will become increasingly heated.

All of these factors will have a profound impact on rural businesses and future land use over the long term and cannot be ignored. Our job as 21st-century advisers is to help our clients understand and adapt to these new opportunities and challenges. The pace of change can be daunting. Our latest client rural sentiment survey reveals that 20% of respondents feel that ESG is something everybody talks about, but nobody explains.

I would like to share a few thoughts on the three factors mentioned that are specifically relevant to climate change.

#### The policy landscape

Brexit has enabled the Government to start sweeping away the subsidy safety net of the Common Agricultural Policy (CAP) and replace it with schemes that reward the provision of 'public services' such as flood mitigation, carbon sequestration and habitat creation. This shift will be challenging for many, not just in financial terms but also in the way it will ask fundamental questions about the role of the landowner and farmer. Answering those questions while working out what 'services' your business can 'sell' will be crucial.

The drive to net zero could be one of the most consequential parts of the Government's climate policy agenda for landowners. Significant reductions in meat consumption and livestock numbers are said to be needed if the Government is to meet its targets. And as we have done, many businesses in the food supply chain, such as processors and retailers, have also set themselves net zero targets that will require their suppliers to reduce their emissions.

But helping others to hit their targets through biodiversity offsetting and creating carbon credits via tree planting or soil carbon

sequestration that can be traded on emerging carbon markets will be a huge opportunity.

#### Climate opportunities

The phasing out of the Basic Payment Scheme (BPS) should already be the catalyst for every business claiming it to take a hard look at all income streams and assess what will remain viable in an unsubsidised world and what would be better replaced by something else.

But given the shift in climate patterns we are experiencing in the UK, that something else might be a crop or enterprise that until relatively recently would have seemed unlikely to do well here. Parts of the country are already being compared to France's premier wine-producing regions, and the number of vineyards, not to mention the quality of English wine, has grown significantly in recent years. Other agricultural and forestry opportunities will surely emerge, as well as leisure opportunities that benefit from warmer temperatures.

Of course, there is a flip side. Warmer temperatures encourage plant and animal diseases as well as invasive species. These will all have to be managed.

#### Reputation

Climate change and the environment are things that younger generations are increasingly concerned about, so much so that direct action in the form of protests and disruption regularly hits the headlines. This generation of consumers will direct its disposable income and support to businesses that share or espouse similar attitudes to its own.

A survey commissioned by the global reputation adviser Transmission Private shows that a country estate's ethical credentials significantly impact its ability to attract visitors, events revenue, and, perhaps something that is less considered, commercial partners.

Of course, this is not something that most landowners are coming to from a standing start. Protecting and improving the environment was a guiding light for many farms and estates long before ESG became a buzz phrase. We mustn't miss the opportunity to highlight the work that has already been done and strive harder to counter some of the

erroneous viewpoints shared, knowingly or mistakenly, by environmental pressure groups.

The climate impact of extensively reared, grass-fed British lamb or beef, for example, is far less than meat from certain other parts of the world, but large swathes of the public do not necessarily know that. We have a good story to tell, and we should share it.

But what makes me excited about the future is that while there are undoubtedly challenges that will need to be faced and overcome, taking the long view on climate change, aided by the best advice, will be a win-win for landowners. The surge in gas prices has shown us that weaning ourselves off fossil fuels makes sound business sense, improving the carbon content of our soils will make them more productive and resilient to climatic volatility, and burnishing our climate credentials puts us in a better place to attract more customers and motivated employees.

It is easy to feel overwhelmed when reading reports like the IPCC's or pondering the many changes facing rural businesses, but I feel that there are grounds to take heart and face the future with a sense of optimism and purpose. The 21st-century multi-disciplinary professional advisers who make up our team at Knight Frank are certainly much better placed to help than ever before.

A handwritten signature in black ink, appearing to read "James Farrell".

**James Farrell**  
**Head of Knight Frank's**  
**Rural Consultancy Team**

The Knight Frank logo, featuring a stylized red 'X' shape composed of four squares, followed by the company name 'Knight Frank' in a bold, sans-serif font.

# IN FOCUS:

**THERE IS SCOPE TO  
REDUCE EMISSIONS BY  
10 MILLION TONNES  
OF CO<sub>2</sub>E\* BY 2050**  
ACROSS ALL AGRICULTURE SECTORS

Agriculture contributes  
**10%** of greenhouse gas emissions



\* CO<sub>2</sub>e – carbon dioxide equivalent, a measurement used to compare all greenhouse gases (carbon dioxide, methane and nitrous oxide) and equate them with a unit of carbon dioxide

## UK CLIMATE CHANGE STATISTICS

Agriculture is the only land sector capable of naturally absorbing and storing carbon

**3.8bn**  
tonnes of CO<sub>2</sub>e\* are stored in forests and woodland

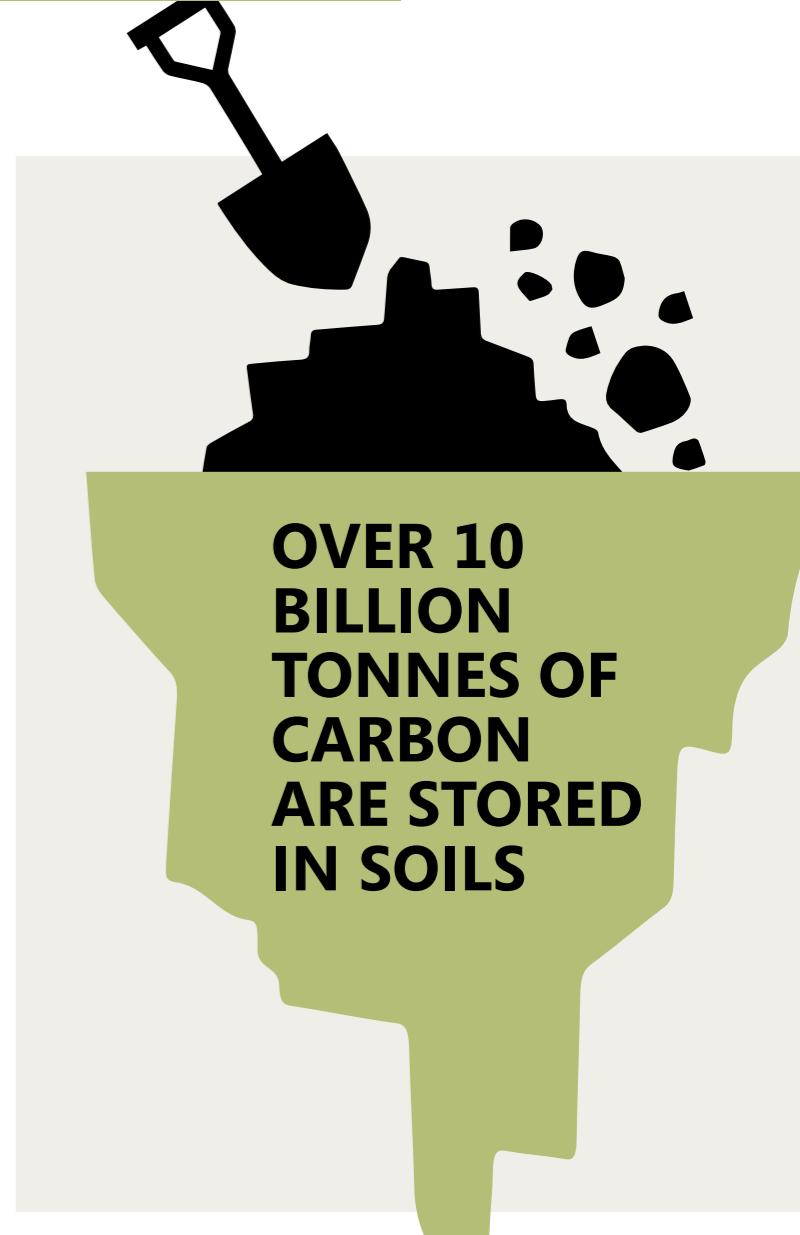
LAND USE AND NEW FORESTRY SEQUESTERED  
**9.8 MILLION TONNES** of CO<sub>2</sub>e\* in 2017

2017

**13%**  
of the UK's land area is covered by trees



**OVER 70%**  
of agricultural land is grassland or rough grazing



# WORKING TOGETHER

**THE DUCHY OF  
CORNWALL IS TACKLING  
THE CHALLENGES OF  
CLIMATE CHANGE BY  
EMBEDDING SUSTAINABLE  
PRACTICES ACROSS THE  
ORGANISATION**

Recognising that climate change is the challenge of our lifetime, The Duchy of Cornwall is committed to achieving net zero across the varied and diverse portfolio of the estate.

The Duchy is a private estate that provides an income to The Duke of Cornwall. Its vision is one of sustainable stewardship, enabling the estate to be passed on with pride to the next generation.

Extending to around 130,000 acres, the estate includes land in 20 counties in England and Wales, from the Isles of Scilly in the south west, across to Kent in the east, and from Dorset to Nottinghamshire.

It encompasses 260 fully-equipped farms and a variety of farm business enterprises of all shapes and sizes, from 10-acre smallholdings to 1,000-acre operations, covering everything from livestock, arable, dairy and fruit to more unique diversified farm systems.

Matthew Morris, Land Steward for the Duchy, says: "You name it, it's probably farmed somewhere on the Duchy." This tremendous diversity presents a significant challenge for the estate on its journey to net zero.



**"SUSTAINABILITY RUNS THROUGH EVERYTHING THAT WE DO, AND HAS DONE SO FOR PERHAPS 40 OR 50 YEARS."**

**ANDREW PHILLIPS,  
SUSTAINABILITY LEAD,  
DUCHY OF CORNWALL**

**220,000**  
TONNES CO<sub>2</sub>E (CARBON DIOXIDE EQUIVALENT)  
are emitted across the estate



**"FOR ANY ORGANISATION THAT WISHES TO GO ON THIS JOURNEY, SUSTAINABILITY MUST BE EMBEDDED ACROSS THE ENTIRE ORGANISATION, AND IT MUST FIT IN AND FLOW THROUGH ALL THE OPERATIONS WITHIN THAT ORGANISATION."**

ANDREW PHILLIPS, SUSTAINABILITY LEAD,  
DUCHY OF CORNWALL

#### Towards net zero

The organisation's in-house operations have been net zero for over 15 years. Since 2006, emissions have been offset through a programme that includes tree planting, renewable heating systems and, for example, making electric cars available for staff. However, because almost all Duchy land is let, when considering the wider footprint of these farming operations and that of the supply chain, the challenge of attaining net zero becomes a much greater effort, one that requires the whole team to work together.

Recognising the severity of the climate crisis and the resulting severe weather impacts on its farming tenants, a zero carbon strategy has been launched along with a zero carbon task force, which aims to put the programme work in action across the estate. Early assessments suggest that around 220,000 tonnes of CO<sub>2</sub>e (carbon dioxide equivalent) are emitted across the estate. Emissions

from land use and farming make up a significant proportion of these emissions (known as scope three emissions) and are perhaps the most complicated as this is an area where the Duchy does not have direct control. It is estimated that emissions from the lowland let farms equate to around 140,000 tonnes CO<sub>2</sub>e. Another major consideration is the degraded peatland on Dartmoor, with a further 50,000 tonnes CO<sub>2</sub>e emitted.

Matthew says: "To put this into perspective, just one of our larger let dairy farms has a greater effect on emissions than our entire portfolio of over 500 directly let residential properties. This exemplifies the problem there is within agriculture more generally.

"We are, however, ready for the challenge ahead. Because of the long-standing, good relationships our team has with our farming tenants, we can all work together and ensure that both the Duchy and the farmers are equipped with the knowledge and resources to realise individual sustainability options and aspirations."

The Duchy has identified eight focus farms that will act as exemplars, and will also provide checks and challenges along the way. These farmers, along with many others, are already positively engaging in efforts to improve the emissions from their business activity. By working with them and bringing on board a team of specialists, the Duchy is looking at innovative solutions, new ways of farming, using technology to reduce inputs and actively encouraging a more sustainable and regenerative approach. By planting trees, restoring its peatland and managing its most precious resource – the soil – the estate can sequester carbon and help prevent its release.

Net zero is a key pillar in a much wider journey. Andrew Phillips, who leads on sustainability for the Duchy, says: "Sustainability runs through everything that we do, and has done so for

perhaps 40 or 50 years. For any organisation that wishes to go on this journey, sustainability must be embedded across the entire organisation, and it must fit in and flow through all the operations within that organisation."

#### Natural capital

Across the estate, and running in parallel with its zero carbon strategy, is an ambition to improve natural capital. The aim is to 'find space' for nature, wherever possible, to improve overall biodiversity. The Duchy is presently engaged in undertaking baseline audits of natural capital across the whole estate.

As part of this, the Duchy has recruited ecologists and natural capital advisers. In addition, it has partnered with the Farm Carbon Toolkit and engaged two of its soil specialists who are visiting every farm and conducting a soil health analysis.

This process involves taking scientific and physical measurements of soil health indicators, including organic matter. As well as technical data, the team is also practically engaged, digging holes and counting worms as a further measure of soil health. While healthy soil will sequester carbon, there are many complexities involved; the soil structure, chemistry, organic matter and biology of the soil all need to be just right to make the difference.

The Duchy is also developing a strategy and roadmap for a journey that will see the estate become scope three net zero well ahead of the Government's ambition of 2050. Nevertheless, the team does not underestimate the complex road ahead.

Matthew says: "The journey of change is not straightforward, and a sound framework is essential. Luckily, for our large areas of peatland on Dartmoor and our woodlands, established carbon codes exist, which guide and regulate matters. However, when it comes to soil carbon,

the absence of a soil code is currently a major barrier and risks an unregulated void developing in the carbon market. You are, after all, but one plough away from releasing that sequestered carbon."

The road to net zero represents a long-term shift in land practices. To manage soil carbon, the Duchy recognises the importance of working side by side with tenants to mitigate risks to their businesses and livelihoods.

Net zero is both a challenge and an opportunity. The Duchy as a whole, including the staff team and tenants, is embarking on this journey together to ensure a better future.

**SCOPE ONE AND TWO OPERATIONS ARE DEFINED AS DIRECT EMISSIONS AND EMISSIONS FROM PURCHASED POWER.  
SCOPE THREE EMISSIONS ARE THE RESULT OF ACTIVITIES FROM ASSETS NOT OWNED OR CONTROLLED BY THE REPORTING ORGANISATION.**

# HOUSING: A FLAT PACK FUTURE

## SOLVING THE HOUSING CRISIS CAN GO HAND IN HAND WITH FIGHTING CLIMATE CHANGE THANKS TO AN INNOVATIVE APPROACH TO HOUSE BUILDING

Building flat pack housing off-site has the potential to transform both the energy performance and affordability of new rural developments.

That is the vision at the Barlavington Estate in West Sussex, where owner Sebastian Anstruther is working with architect Bill Dunster to design and build homes that are environmentally and financially sustainable.

Bill, whose company ZED-power specialises in zero-carbon housing, has developed the 'ZED in a box' concept working with a local delivery team. Essentially a kit of parts, it cuts down on build costs and improves energy performance, made in a barn on the 3,000-acre estate.

The 'tiny house' version is 250 square feet, with the supply-only kit costing around £45,000, rising to £80,000 with labour included. The method is now being honed and developed to create bigger, affordable homes of 750 square feet costing between £85,000 to £120,000 for a finished zero-carbon home, depending on specification and availability of grid services. The housing minister visited in the summer of 2021 and said the work could make a "fantastic contribution" to the sector.

Sebastian hopes to build eight affordable rental units and four open-market units on an exception site in a local village, complete with solar panels on all the roofs and the highest standards of

insulation. Made largely of engineered timber, non-combustible insulation and clad in standing seam zinc and local chestnut, the two- and three-bedroom homes would be prefabricated within the barn and then taken to the site for fast assembly with the aim of employing local workers.

Sebastian, whose estate comprises woodland, mixed farming and more than 50 commercial and residential let properties, says: "We would like to demonstrate to other landowners that it's possible to use this way of thinking, this systems approach, to help solve the housing crisis and contribute to climate action.

"An essential part of the equation is energy costs, as people need to be able to afford to live there. They will need little electricity to run, and you will be able to charge your electric car at the same time. We hope the homes will be net carbon positive within 30 years, with a small annual surplus of renewable electricity going to the grid.

"Fuel poverty and cost of living is a real issue as well as affordability both to rent and for the landowner, so it all has to go together as a package."

Sebastian hoped to lodge a planning application by the end of 2021. Bill, who designed the Beddington Zero Energy Development (BedZED), the first large-scale, environmentally-friendly housing scheme in Hackbridge, London, says he is working with the estate to set up training courses for people interested in buying kits. The aim is for communities to "start to solve their own housing and power problems without a high carbon footprint", he says.

Sebastian adds: "We must get the environmental performance of housing right, otherwise you're baking in problems for 100 years.

"We're not developers; we're residents and active participants in our community. We've been here for generations, and it's our home, so it's important we play our part."



Left to right: Andrew Griffith MP, the UK's Net Zero Business Champion, and Sebastian Anstruther



**"WE WOULD LIKE TO DEMONSTRATE TO OTHER LANDOWNERS THAT IT'S POSSIBLE [...] TO HELP SOLVE THE HOUSING CRISIS AND CONTRIBUTE TO CLIMATE ACTION."**

SEBASTIAN ANSTRUTHER,  
BARLAVINGTON ESTATE,  
WEST SUSSEX

# GOING WILD

**THE KNEPP ESTATE IS PROVING THAT REWILDLING CAN MITIGATE CLIMATE CHANGE AND RESTORE NATURE WHILE TURNING A HEALTHY PROFIT**

Rewilding is not an all or nothing concept and can thrive even alongside intensively farmed areas, according to one of its pioneers.

Many will be aware of the rewilding work of Charlie Burrell and Isabella Tree at Knepp, transforming the 3,500-acre estate – which has been in the Burrell family for more than 200 years – into a wildlife sanctuary.

The benefits of rewilding for climate action are palpable – dramatic increases in wildlife and biodiversity, successful breeding of rare species, river restoration, flood mitigation, wetland creation, natural habitat and soil regeneration. But how does Knepp make conservation pay, and is it feasible for everyone?

Knepp struggled to make a profit for years when it was intensively farmed because it sits on heavy clay not conducive to modern methods. Having taken over from his grandparents in 1983, Charlie found it impossible to compete with larger, industrialised farms on better soils.

However, following a meeting with Dutch ecologist Dr Frans Vera, author of *Grazing Ecology and Forest History*, Charlie had a change of heart.

Frans Vera's theories explain the importance of large, free-roaming herbivores in the ecosystem, and how they drive the creation of new habitats. Return them to the landscape – in the right numbers – and nature responds in miraculous ways. Soils recover, vegetation becomes more complex and biodiversity rockets.



**"GIVING NATURE THE SPACE TO PERFORM IS THE DIRECTION OF TRAVEL, IT'S HOW WE'RE GOING TO SECURE A SUSTAINABLE FUTURE FOR OUR GRANDCHILDREN."**

CHARLIE BURRELL, KNEPP ESTATE, WEST SUSSEX



Neil Hulme

**The value of the carbon sequestered was £14.5m over 50 years, based on £5 a tonne**



Charlie says: "We're now making much more profit from tourism than we were on thousands of acres of arable and dairy; it's extraordinary. In farming, we're used to low margins, but we're seeing a 20%-plus margin, which is a different world."

"I was sceptical about tourism to start with, but we had no idea it would grow like this."

#### A rewilding journey

The journey began in 2000 when the dairy herds and farm machinery were sold. In 2002, Knepp received Countryside Stewardship funding to restore the Repton Park in the middle of the estate – 350 acres that had been under the plough since the Second World War. The restoration project made Charlie and Isabella look at the land differently and consider the possibility of rolling out nature conservation across the whole estate.

Human management took a back seat, and nature did the driving, a process now known as rewilding. In 2010, the Knepp Wildland project received Higher Level Stewardship funding, and Charlie says Knepp is now a leading light in the conservation movement, informing national policy on climate change mitigation and ecosystem services and galvanising a new approach to land management.

Oak, birch, field maple, crab apple, ash and wild service have naturally regenerated using thorny scrub – hawthorn, blackthorn, dogrose, gorse and brambles – as their nursery. Internal fencing has been removed, the old agricultural drainage systems destroyed, ditches have silted up and, with water now sitting on the Sussex clay, new wetlands have appeared. Free-roaming herbivores wander the estate, with hardy breeds such as old English Longhorn cattle, Exmoor ponies and Tamworth pigs that can survive outside all year round without supplementary feeding and artificial shelter. Fallow and red deer were added to the small number of roe deer already on the land.

The only real intervention has been culling the herds to keep stocking densities low. This produces

75 tonnes (in live weight) a year of sustainable, ethical, pasture-fed organic beef, venison and pork. With so few inputs, profits are significantly high. By selling to retail, revenues from Knepp's 'Wild Range' meat are forecast to grow from £120,000 last year to £250,000 this year. They are aiming for £500,000 in 2022.

Other income streams include its tourism business, which turns over £800,000 a year through safari tours and glamping, which showcase to visitors how Knepp's work is making a difference.

#### The climate impact

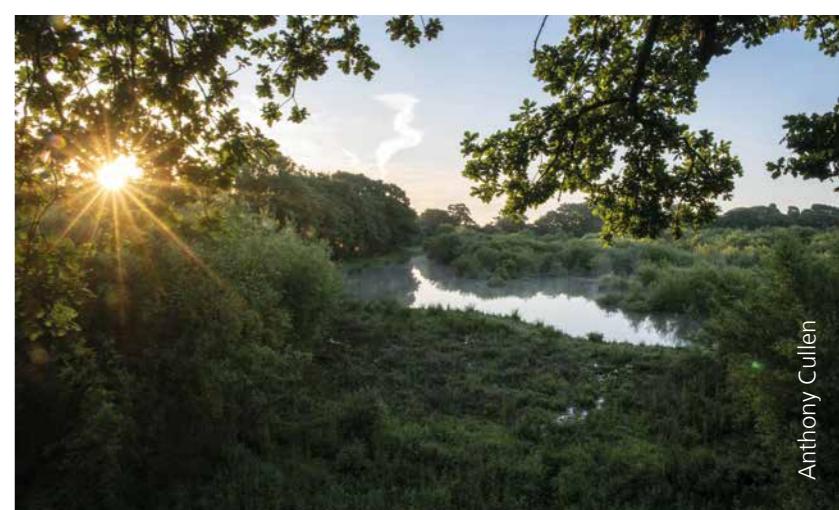
Charlie says: "A study by Bournemouth University, commissioned by Defra, calculated that the value of the carbon sequestered here was £14.5m over 50 years, based on £5 a tonne."

"We have lots of scientists doing studies here, from Oxford, Cranfield, Exeter, St Mary's University London, on everything from natural capital and carbon capture to soils and insects. It's really exciting."

"New treescapes and habitats are being formed, we have 10 times more Purple Emperor butterflies here than anywhere else in the UK, and we're learning and re-learning. Life breeds life breeds life."

Asked if it is possible for farms up and down the country to start rewilding, Charlie says: "Even intensive farms can think carefully about bleeding space for nature back into their landscapes. We shouldn't spare land just for food production and not for life. To think of the wheat belt in England entirely without nature is bonkers. Studies show that having areas of nature around our crops improves yields and soil function, and provides a buffer against flooding, drought and extreme weather events."

"Farmers and landowners are coming up with interesting initiatives to change our landscapes for the better, whether that's rewilding, wildflower meadows, increasing hedgerow and tree cover or restoring natural water systems."



Anthony Cullen

#### Advice for rewilding

Charlie's advice for other CLA members considering rewilding is to go and see it in action. He says:

**"TO BUILD YOUR VISION YOU NEED TO VISIT PLACES AND COME UP WITH YOUR OWN IDEAS. FIND PEOPLE IN YOUR LANDSCAPE IN YOUR AREA. THERE ARE EXTRAORDINARY PEOPLE WITH DEEP KNOWLEDGE DOING EXTRAORDINARY THINGS EVERYWHERE."**

"I feel very positive about it. We have lots of landowners visit us every year who between them have hundreds of thousands of acres, and they're excited by new ideas, possibilities and futures. There are lots of unknowns, but we need to embrace that. Giving nature the space to perform is the direction of travel, it's how we're going to secure a sustainable future for our grandchildren."

Knepp's future plans include allowing the Repton Park restoration to become 'scruffier' by reducing deer numbers, introducing beavers and perhaps one day bison, and working with neighbouring landowners to form nature corridors.

Climate action will remain at the heart of the work. "Animals and plants need to be able to respond to rising temperatures by moving through the landscape to reach suitable habitats. If we fail to create nature recovery networks, if we do nothing, we could see 50% of our existing species die off."

# TRANSFORMING OUR SOIL

**WHEN THE MAYHEW FAMILY  
UNDERTOOK AN AMBITIOUS  
DIVERSIFICATION PLAN THAT  
INCLUDED ARABLE REVERSION  
TO GRASSLAND, IT TRANSFORMED  
THEIR THINKING ABOUT SOILS  
AND FARMING METHODS**

The Mayhew family has farmed in Woodton, Norfolk, since the mid-1940s, starting with a small suckler cow herd, chickens for egg production and pig rearing, as well as farming over 500 acres of arable land.

While on a family holiday in 2016, Rebecca and Stuart Mayhew spent time on a friend's dairy unit in Scotland and fell in love with the idea of having their own herd of Jersey cattle.

When additional land near to their farm became available, the Mayhew family seized the opportunity and purchased it. Rebecca, who is a land agent and auctioneer, decided to take the plunge into a major diversification project at Old Hall Farm, with Jersey cattle at the forefront of their plans. Improving the land for the environment was an abiding principle from the outset.

Rebecca says: "The idea for the business came out of a love for Jersey cows, and everything we do is influenced by this. We use simple artisan processes for all of our products and believe in quality over quantity. The cows have led us to look at life, farming and food production so differently."

The farm is now a cow with calf dairy, with a farm shop, butchery and café selling their beef and pork as well as raw milk, milkshakes, cream, butter, yoghurt and ice cream produced by their grass-fed Jersey cows. The cows are allowed to keep their calves with them rather than weaning at birth.



## "IMPROVING THE LAND FOR THE ENVIRONMENT WAS AN ABIDING PRINCIPLE FROM THE OUTSET."

REBECCA MAYHEW, WOODTON, NORFOLK

They usually stay for six to eight months, but this can be longer depending on the cow and calf pair.

### From arable to grassland

Early in the project, Rebecca and Stuart studied the ingredients in the feed they were using for their cows and decided a different approach was needed. "The more you start reading, the more you realise that pasture-fed is much better," says Rebecca. "There is better nutrient density in the final product for humans, and it is much better for the planet, so we started putting down species-rich pasture for the cows."

The Mayhews set about converting the majority of their arable fields to grassland using no sprays or fertilisers. Initially, they used the Countryside Stewardship scheme as a way to help pay for the pasture needed for the cows. But as a predominantly traditional arable farm, they found reverting their fields to grass more difficult than they had anticipated.

"It turns out that growing grass is harder than you would think," says Rebecca. "When we started, we realised that our soils, despite us always applying a lot of muck on them, were not as healthy as they needed to be, and certainly not as healthy as they are now. There was a point when we were watching the farm contractors going up and down a field and saw the top soil blowing away. It was then we decided this practice should end.



"We end up as farmers growing monocultures that are entirely dependent on a level of chemicals. If you take those away – the soil doesn't like it as it's addicted to it. The soil cannot function without it."

The Mayhews have given considerable thought to the water management of their soil with the primary aim of retaining more moisture. "For every extra percentage of organic matter in soil, each acre can hold an extra inch of water," says Rebecca. "If you've got bare soils, the rain just bounces off and runs away, and if you've got cover crops, it will just absorb in. If you sequester more carbon and increase soil organic matter, you'll become a more resilient farmer."

The first 18 months of drilling were a little hit and miss, but now, the soils are working better – they hold the moisture, and the land is functioning far better. "The land is much more resilient; it's got the memo."

### Nutritious soil

Old Hall Farm now consists of around 300 acres of grassland, 100 acres of nectar-rich species and wild bird foods and 100 acres of arable, 50 of which they crop each year and the other 50 is left as enhanced over wintered stubble.

"As an industry, we were more in touch with the soil 80 years ago than we are now. We need to turn the clock back," says Rebecca. "If you look at the natural world, the most successful, tallest thing is a tree. If you go down to our fields, see the hedgerows, and study the soil around them, you can see it's full of carbon and full of organic matter. It's aerated, it's healthy and it's full of roots. If you watch the cows in a field, it will be the first place they go as it's full of nutrients."

"The fantastic thing about cows, in my view, is that they are self-medicating. If you give them 27 different species of grass and herbs, all of which are beneficial in different ways, they will pick out what they need. Some will be anti-worming,



others good for vitamin levels and iron levels – the cows know what they need."

### The future

The Mayhews hope to partner with the Norfolk Wildlife Trust and Norfolk County Council to plant more trees on the farm, but the potential financial benefit of doing so through future Environment Land Management schemes is not a driving factor.

"We are very much working our business model towards not taking any money (through Government-supported schemes)," Rebecca explains. "We cannot rely on Government to solve any climate or farming-related problems, and we are working towards being subsidy free. The land will sustain us, the business and the mortgage so that we won't need that cheque."

**"IF YOU GO DOWN TO OUR FIELDS, SEE THE HEDGEROWS, AND STUDY THE SOIL AROUND THEM, YOU CAN SEE IT'S FULL OF CARBON AND ORGANIC MATTER."**

REBECCA MAYHEW, WOODTON, NORFOLK

# ORGANIC FARMING

**A DECISION TO GO  
FULLY ORGANIC IN 2014  
ALONG WITH A FOCUS  
ON IMPROVING SOIL  
HEALTH IS SUPPORTING  
A SUSTAINABLE AND  
FINANCIALLY VIABLE  
BUSINESS IN DORSET**

Sophie Alexander's decision to run her 1,000-acre mixed farm in Dorset as a fully organic enterprise is paying dividends as a financially viable business that prioritises soil and livestock health as well as biodiversity regeneration.

Hemsworth Farm has been fully organic since 2014. "Our focus is achieving optimal production rather than maximum production," Sophie says. In 2018, Sophie decided to establish an organic dairy herd to not only help plug the forthcoming Basic Payment Scheme gap but also kick-start the farm's ecological engine. In April 2020, a herd of 300 Viking Red heifers was introduced to the farm.

Sophie is working in partnership with Oliver Chedgy, who started Roaming Diary and share farms an organic dairy herd with Tim May at the Kingsclere Estate in Berkshire. Oliver uses a fully mobile milking parlour that moves around the farm with the herd at Kingsclere, but Sophie opted for a static parlour due to the smaller size of Hemsworth.



**300 Viking Reds were introduced to Sophie's**

# **1,000-ACRE MIXED FARM IN APRIL 2020**



**"BUILDING  
OPTIMUM SOIL  
QUALITY IS THE  
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OF WHETHER  
YOU ARE USING  
ARTIFICIAL  
INPUTS."**

SOPHIE ALEXANDER, HEMSWORTH FARM, DORSET

#### **An organic herd**

Viking Reds were selected for their high health traits, which optimise longevity, management efficiency and minimal use of antibiotics. They also produce high constituents, which compensate for lower yields, and are extensively grazed with little added concentrate food. All the food is grown either on the farm or locally.

The cows live outdoors 24/7, minimising the implications of slurry management. With the threat of climate change, one of the biggest problems could be a lack of shelter from temperature extremes and rainfall. Building more livestock housing is expensive and carbon intensive, therefore more trees and hedges will be planted to provide shelter belts and areas of silvopasture.

Hemsworth is chalk ground with no steep gradients, which allows out wintering without

severe poaching or runoff. The cows are moved to fresh grazing twice a day throughout the year, and on a four-year rotation, crops will be planted on the grazed land.

Viking Reds also have high fertility, are spring block calved and are milked once a day, which results in reduced metabolic stresses and any related health complications.

The dairy is in its first year of operation, and Sophie says there are more unknowns than knowns. She says: "It is a constant balancing act to find the 'sweet spot' between cow numbers, milk yields and producing high-quality forage while improving soil and nature.

"At the same time, we are working to reduce fuel and water use and minimise the undesirable necessity of using silage wrap and other plastics.

"It is a continuous process of learning and adjustment to improve all health traits, pre-empt problems and improve our skills to manage the grazing platform of diverse herbal leys."

#### **Soil focus**

When Sophie started farming at Hemsworth in 2011, she focused on prioritising soil improvement and ensuring the farm was a financially viable enterprise.

"Building optimum soil quality is the beginning and end of any sustainable farming enterprise, regardless of whether you are using artificial inputs." Continuing to prioritise soil health is an area of focus for Sophie in moving towards net zero in an arable system for a variety of reasons, including active soil biology to improve disease resistance in crops and soil fertility, as well as soils that are more resilient to weather extremes.

"Resilience, particularly financial resilience, is a primary focus for me because otherwise none of the other land management and infrastructure improvements would be affordable," she says. However, the farm's role in contributing to net zero deliverables is also a key consideration.

#### **Measuring the carbon footprint**

Hemsworth has committed to calculate and monitor its carbon footprint using the Farm Carbon Toolkit. After establishing a baseline, the toolkit will model scenarios and changes so that carbon targets are part of the decision-making process.

Sophie is awaiting the results from the farm's calculations to provide direct comparisons, but she believes the high percentage of legumes in the three- to four-year grazing part of the rotation can remove 250kg N/ha naturally from the atmosphere, which means there is no reliance on CO<sub>2</sub>-intensive synthetic fertilisers to maintain soil fertility. Nutrient leaching is minimised by capture with continuous plant cover and improved soil organic matter content combined with the varied rooting depth and architecture of the different plants in the grazing sward.

The grazing system implemented at Hemsworth feeds soil organisms, invertebrates and birds and other wildlife. The cover crops and leys grazed by the cows create varied habitats for pollinators and a wide variety of other flora and fauna.

With the data, Sophie will compare the farm's carbon footprint from before and after the herd was established.

She says: "Emissions are bound to have increased but so will have the farm's ability to sequester carbon and enhance ecosystems and wildlife. By not using chemical inputs, the farm reduces the use of water on arable crops and the lack of chemicals means no sodium is added to the soil and organisms delivering ecosystem services are not killed."

All the water used for washing down the dairy parlour and the covered collecting yard is stored and treated with enzymes that reduce ammonia emissions. The storage capacity for the dirty water is sufficient for six months and, when applied to fields, it is done with an umbilical system to

minimise volatilisation. Harsh chemicals are not used in the cleaning process in the parlour except for the bulk tank and milking plant. All housing and foot and teat cleaning treatments are carried out with probiotic products derived from soil organisms with no polluting effect in the water system or fields.

#### **Sympathetic food production**

Sophie's rationale of running an organic farm is to avoid using ecocide chemicals or add greenhouse gas emissions with artificial fertiliser.

"No system has all the answers and all food production leaves an ecological as well as a carbon footprint," she says. "I want to tread as lightly as possible by reducing carbon emissions and improving sequestration while producing nutritious, delicious food. At the same time, I want to achieve a viable financial return on investment to help fund continual habitat improvements for nature."

As a result of the substantial wildlife growth at the farm, Sophie is working with Dorset Wildlife Trust on a six-year biodiversity study with independent ecologists monitoring specific species, and early results are very encouraging.

For Sophie, the rewards of managing an organic mixed farm system far outweigh the challenges. However, she acknowledges that the system does not suit everyone.

"A decade ago, I was asked what the single biggest threat was to my farm system, and at the time I said disease. But now, I'd have to say it is climate change."

# A RESTORATION GAME

**ROBERT AND HELEN BROWN HAVE RESTORED DEGRADED PEATLAND THAT RESULTED IN MORE EFFECTIVE CARBON CAPTURE AND AN ENRICHED HABITAT ATTRACTING WILDLIFE AND THREATENED BIRD SPECIES**

Robert and Helen Brown purchased Howesyre Farm in Bishopdale in 2009 and subsequently acquired additional land. With a combination of freehold and rented shooting rights, Howesyre covers 5,000 acres in the Yorkshire Dales.

Historically, the freehold land was used as a stock farm, which led to the degradation of large swathes of peatland. Both Robert and Helen are as keen on shooting as they are about conservation and set about restoring the peatland to its former state along with gamekeeper Stuart Dent.

Peatland is a real powerhouse when it comes to carbon storage. In the UK, where peatland covers just over 12% of the landmass, it is estimated there are over 3bn tonnes of carbon stored.

However, damaged peatlands through human activity are a major source of greenhouse gas emissions, releasing around 6% of all global CO<sub>2</sub> emissions.

In the UK, the net benefits, in terms of climate change emissions alone, of restoring 55% of peatlands to near natural conditions are estimated to have a value of approximately £45bn to £51bn over the next 100 years.

Robert and Helen believe shooting and conservation can go hand in hand, and for just over a decade, they have embarked on numerous projects to regenerate the environment while developing it to host 18 shoots a year.

While the restoration is critically important, it is not solely about restoring denuded peatland to enhance carbon capture and storage. The active management of this moorland also benefits the area's biodiversity, which in turn, helps sustain the local economy.

#### **Peatland restoration**

Work to restore peat on nearly 1,000 acres was undertaken in conjunction with Yorkshire Peat Partnership and Yorkshire Wildlife Trust. The barren peat was exposed to the elements and polluted the Bishopdale Beck waters – one of the most important salmon spawning tributaries of the River Ure.

Restoration work involved a careful management plan. Old and rank heather was burnt and cut, and steep hag-exposed areas of peat were reseeded and reprofiled. This led to other native grasses and plants such as bilberry, crowberry and blaeberry becoming established – benefiting not only grouse but also wader species.

The mix of vegetation on the moorland now increases water retention and prevents the peat from washing away, making it more effective at capturing carbon. This work to enrich the habitat, including vermin control, has led to a year-on-year increase in bird numbers, particularly red list species.

#### **Tree planting**

Working with the Yorkshire Dales Rivers Trust, Robert and Helen have also planted trees along the Bishopdale Beck to reduce erosion and improve the gravel beds. The Howesyre team also created wetland areas by fencing in some areas to protect it from livestock and rabbits and to benefit wader birds.

Additionally, more than 100,000 native hardwood trees have been planted thanks to funding from the Forestry Commission, Natural England Higher Level Stewardship (HLS) scheme and the Yorkshire Dales Millennium Trust. The Trust estimates that the woodland at Longridge will generate 27,000



saved carbon units (tonnes) over the next century. Trees were strategically planted along river edges, banks and gills to naturally alleviate flooding further downstream.

Robert and Helen have also installed a 60-kilowatt hydro generator in the upper reaches of the dale, which generates electricity for them and the National Grid. They are also teaching children about how shooting and conservation can help regenerate the environment.

**THE WOODLAND AT LONGRIDGE WILL GENERATE 27,000 SAVED CARBON UNITS (TONNES) OVER THE NEXT 100 YEARS**

**THE NET BENEFITS OF RESTORING 55% OF PEATLANDS ARE ESTIMATED TO HAVE A VALUE OF APPROXIMATELY £45BN TO £51BN**



# BRANCHING OUT

ON A LARGE OR SMALL SCALE, TREES ARE A BIG PART OF THE SOLUTION TO CLIMATE CHANGE. FOR CLA MEMBERS THIS COULD MEAN PLANTING HEDGEROWS OR SHELTER BELTS, LOOKING TO OPTIONS FOR AGROFORESTRY OR PLANTING NEW WOODLANDS. A FARM IN SUFFOLK IS PLACING AGROFORESTRY AT THE HEART OF ITS LAND MANAGEMENT.

With the future emphasis on grant-supported farms to provide public goods, and in particular the importance of more trees in our landscape, agroforestry – the practice of combining trees and either crops or livestock – has the potential to provide opportunities to deliver a wide range of benefits for the public and landowner.

In December 2020, John Pawsey planted three fields with 3,500 trees totalling around 50 acres at Shimpling Farm near Bury St Edmunds in Suffolk as part of an agroforestry project.

The Pawsey family has farmed in Suffolk for four generations, and John started farming with his grandfather in 1985. He began converting the farm to organic production in 1999 partly for financial reasons but mainly due to concerns about overworked soils and diminishing biodiversity. He now farms entirely organically on their home farm and for some neighbouring like-minded farmers.

John says his interest in agroforestry was sparked by a fellow Suffolk landowner. "The Organic Research Centre had a farm in Suffolk owned by the late Professor Martin Wolfe who planted his agroforestry system more than 20 years ago," he





## "THE AIM IS TO LEAVE THE SOIL IN GOOD HEART FOR FUTURE GENERATIONS AS WELL AS HAVING A POSITIVE EFFECT ON BIODIVERSITY AND OPERATING AS A CARBON NEGATIVE FARM."

JOHN PAWSEY, SHIMPING FARM, SUFFOLK

says. "I was going to their open days to learn how to farm better organically, and that is when I was exposed to his agroforestry system."

"I was never interested in agroforestry, but every time I went there, I saw the difference it was making to his farm as far as biodiversity was concerned. That, together with the aspect of having a long-term crop running alongside an annual crop, was enormously attractive."

### Planning the project

In planning for his agroforestry project, John carefully considered how and where the trees should be planted. This included what the width of the tree alleys should be for their controlled farming system to work. He opted for crop alleys that are 36 metres wide and tree alleys 4.5 metres wide, sown with a wildflower mix.

John employed a consultant to help plan the project. The consultant carried out in-depth research into the species of trees that would

likely be doing well in 20 years based on historical data. The aim was to bring resilience into the project from a climate change perspective.

The trees planted are species already found on the farm in the nearby Alpheton Wood, a registered site of special scientific interest. The wood is noted for its beautiful collection of oxlips, orchids and other wildflowers. It includes oak, hazel, cherry, goat willow, aspen, holly and wild service, among others.

The idea is for the agroforestry project to mimic the woodland that already exists at the farm and to enhance existing biodiversity.

Alpheton Wood is also undergoing long-term restoration, which started in 2010 with the ancient practice of rotational coppicing. It is fenced to protect the new coppice from deer damage, with the resulting timber providing a sustainable source of fuel used to heat farm buildings, offices, homes and Shimpling Park Barn.

"The Woodland Trust paid for the trees, the guards and the stakes for the agroforestry," John explains. "We have a 12-year agreement with them that means we have to maintain the trees, which is where the real work is. I was very keen to work with someone on this project as it's a learning curve. If you work in partnership with organisations like the Woodland Trust, then you can tap into their expertise."

### Carbon-negative farming

At Shimpling Farm, in further efforts to move towards carbon-negative farming, John reintroduced livestock in 2014 with a flock of New Zealand Romney sheep to recycle nutrients. John challenges his team to use modern technology to control weeds, pests and diseases without the use of pesticides, build fertility naturally using legumes and green manures. The aim is to have a positive effect on biodiversity, operate as a carbon-negative farm and leave the soil in good condition for future generations.

An added benefit of the agroforestry scheme is that the trees planted will provide much-needed shade for the livestock who graze the largely arable fields at the farm.

Harvesting the trees is very much a long game. "First of all, we'll thin the trees that aren't looking good for timber," says John. "Hazel will be coppiced in around 10 to 15 years' time, the cherry will be about every 30 or 40 years, and oak will obviously be a lot longer. It will be an evolving scene as to what is happening down the alleys of trees."

With Environmental Land Management (ELM) schemes central to future agriculture policy, John believes farming will look very different in the future. "ELM is going to bring lots of colour to our businesses, and I think farms that really engage in it are going to look very different to farms that don't. They'll also sound very different and hopefully have lots of different species."

John recommends that any landowner considering agroforestry should first visit an established project to see first-hand what is required. "You have to really want to do it," he says. "You have to be fully involved in the design and how it is going to be managed, and you also have to be extremely enthusiastic about it. I'd also recommend you do it when you're in your 20s or 30s if you can, because that way you're most likely to see the result."

Three fields were planted with

**3,500**

TREES TOTALLING  
AROUND 50 ACRES



# GREENING THE FUTURE

**THE GOVERNMENT HAS COMMITTED TO TRIPLE TREE PLANTING RATES TO 74,100 ACRES PER YEAR, WHICH COULD HELP SEQUESTER AN ADDITIONAL 14 MILLION TONNES OF CO<sub>2</sub> EQUIVALENT EACH YEAR AS PART OF EFFORTS TO REACH NET ZERO.**

These rates are ambitious, but CLA members are committed to help make it happen. Roger Tempest shows us what he is doing at Broughton Hall.

Since becoming custodian of Broughton Hall 30 years ago, Roger Tempest has embarked on an extensive refurbishment programme, expanded its business portfolio and has launched a significant tree planting and nature recovery project to help mitigate the effects of climate change.

The tree planting and nature recovery initiative aims to put nature at the heart of the estate, which not only deliver climate change benefits, but also result in long-term benefits from the environment and local communities.

While it is universally acknowledged that trees are important in tackling climate change, only 13% of land area in the UK is covered by trees, compared to 37% in Europe. In addition to storing carbon, trees can also mitigate the effects of climate change such as flood protection, enhancing soil and helping to reduce pollution.

According to the Woodland Trust, a young woodland with mixed native species can lock up at least 400 tonnes of carbon per hectare.



**It is one of the largest tree planting schemes in England in**

**2021**

Over a five month period, more than

## 230,000 TREES WERE PLANTED

the equivalent of 224 football pitches



**"NATURE IS MEDICINE FOR THE MIND, AND IF ANYTHING, THE PANDEMIC HAS REALLY EMPHASISED THIS."**

ROGER TEMPEST, BROUGHTON HALL, NORTH YORKSHIRE

### The Broughton Sanctuary

The Broughton Sanctuary Nature Recovery project aims to plant more than 395 acres of native woodland as part of a wider natural regeneration plan to re-wild at least one third (more than 1100 acres) of the estate.

Roger says: "In relation to climate change, we all too often look further afield to environmental degradation in Brazil or wherever. However, here in Britain, we have lost places of real wilderness that should be brimming with biodiversity. We saw a real opportunity at the estate to plant more trees and recover habitats to deliver essential long-term environmental and community benefits."

Working in partnership with the White Rose Forest, which is funded by the Government's Nature for Climate Fund, more than 230,000 trees were planted at Broughton Hall over a five-month period, which is the equivalent of 224 football pitches. It makes it one of the largest tree planting schemes in England in 2021.

The Nature for Climate Fund via Trees for Climate is a £12.1m programme of woodland creation for the 2021 planting season led by England's Community Forests.

The trees in Broughton Sanctuary also help to reduce flood risk for communities further down the Aire River Valley, including Leeds city centre. This project is strategically important within the Leeds Flood Alleviation Scheme, led by the Environment Agency and Leeds City Council.

Development of the sanctuary has involved many experts, including Professor Alastair Driver, Matt Taylor, Wayne Scurrah, Richard Preston Garden Design and the in-house team led by Kelly Hollik, in addition to local councils, the Environment Agency and Defra. Work has included restructuring several areas of woodland, installing leaky barriers and land restoration, as well as the creation of up to 110,000 m<sup>3</sup> of storage space for surface water.

Once established, the woodland will also store significant quantities of carbon and help deliver the Government's commitment to achieve net zero carbon emissions in the UK by 2050. Based on the Climate Change Committee's 2014 household carbon emissions, the 988 acres of trees will sequester the carbon equivalent to the emissions of at least 20,000 households per year.

Native species of tree including sessile and pedunculate oaks, beech, alder and aspen, white and goat willow, silver birch, hazel, bird cherry, field maple and rowan have been chosen to boost biodiversity in the sanctuary and to offer maximum resilience to climate change by being in-step with local soil and climate conditions.

Scrub species include hawthorn, blackthorn, hazel and elder. The wildflower grasslands can also effectively capture and store carbon and help with reducing rainfall run-off and preventing topsoil from being washed away; thus, improving the quality of water that ends up in the river, and acting as a natural flood prevention measure.

In addition to planting trees, Roger has also implemented early interventions to further help

nature's recovery on the estate. These include the natural regeneration of trees, scrub and grasslands as well as the creation and restoration of wetland habitats combined with sensitive woodland management. It is hoped that these interventions will contribute to the UK Government target to protect 30% of the country for nature by 2030.

### Farming and rewilding

Around two thirds of the estate's land will still be used for farming, debunking the myth that rewilding and farming is irreconcilable. Roger's view is to effectively manage land for a combination of 'public goods' and low-intensity, high-quality meat or plant production.

Grade three to five land is more suited to natural recovery, and was set aside for this purpose. Fertile land has been reserved for traditional farming such as sheep and dairy in accordance with existing long-term tenancy arrangements. There will be a reduction in grazing sheep on the estate, counterbalanced by an increase in beef cattle. The focus will be on producing a greater variety of high-quality meat.

Over time, and once the trees have been well established, Broughton Sanctuary will introduce proxies for extinct wild herbivore species such as suitable rare breed cattle, pigs and ponies where appropriate. This will re-balance the landscape's natural state while also increasing a habitat conducive to a variety of wild foods.

### Future vision and legacy

Broughton Sanctuary aims to restore nature on the estate as it was a few hundred years ago. This is not only important in creating an environment that can capture and store carbon but is also sympathetic to the local area's natural heritage. This work will start in earnest once the tree guards have been removed.

Roger's approach to the estate's 'greening' stems from his long-held belief in connecting visitors to the estate through the natural environment.

Once established, the 988 acres of trees will sequester the carbon equivalent to the emissions of at least

**20,000 HOUSEHOLDS PER YEAR.**



Many of the activities at Broughton, which Roger manages with his partner Paris Ackrill, are environmentally-focussed and include foraging, tree bathing and wild swimming. "Nature is medicine for the mind, and if anything, the pandemic has really emphasised this," Roger says.

"We feel it is our duty to leave the Broughton Sanctuary in a much healthier condition for generations to come and we aim to demonstrate how we can live in a more fruitful and positive partnership with the land. This is a case where both nature and humanity can be winners."

# HOLISTIC LAND MANAGEMENT

## REGENERATIVE FARMERS AT HILLCREST FARM ARE USING CATTLE AND POULTRY TO IMPROVE SOIL HEALTH AND BIOLOGY, ENCOURAGE WILDLIFE DIVERSITY AND CAPTURE CARBON

First-generation farmers Bracken Morris and Vicky Palmer bought their small farm in Acklam, situated between York and Malton, in September 2017 to pursue their dream of farming.

The couple currently farm 38 acres at the homestead and rent an additional 120 acres. Since moving to the farm, they have instigated some significant changes to their business to farm in a way they believe is right for the soil, the plants, the animals and the environment.

Alongside their beef enterprise, they used to run a grass contracting business and had two tractors. They have since sold both tractors, replacing them with one, and all the grass equipment. This enabled them to significantly reduce their emissions and reinvest funds into a poultry enterprise and an on-farm cold store and butchery.

The couple describe themselves as regenerative farmers who manage their land holistically following the 3LM (Land and Livestock Management for Life) principles as advocated by the Savory Institute. They have been rigorously assessed by the Institute and have also been assessed to attain a 'Land to Market Verified Supplier' status.

### Regenerative farming

They minimise soil disturbance by utilising their direct seed drill to maintain soil integrity and to improve water infiltration. By maintaining living roots, they ensure the soil mycorrhiza is undisturbed, and carbon capture is ongoing. Keeping the soil surface covered and protected means little water is lost to evaporation.

Diversity is a key focus on the farm, and the couple's aim is to focus on soil health by using grazing animals, animal impact and recovery period as their primary tools. Using these in a carefully planned way, in effect mimicking nature, they are regenerating all ecosystems, which, in turn, can help recover soil biology, plant life, insect life as well as promoting diversity within each system.

Their farming practices are very much led by nature, and they are working hard to build resilience in every area. Their livestock are 100% pasture-raised on land that is managed without chemicals and artificial fertilisers. Their goal is to be able to out winter all their stock, which will also help regenerate woodland.

The farm's 23-strong suckler Hereford cow herd and 150 laying chickens can be found grazing, trampling and fertilising the farm's increasingly diverse pastures. The result is outstanding produce that is delicious and nutrient-dense.

Bracken and Vicky believe they are guardians of the land they manage, and farming regeneratively enables them to improve the quality of so much. They spend a lot of time talking with their customers, answering questions about their story, what drives them and how they do it. They know that the customers of regenerative farms are just as an important part of the solution as the farmers, and as a regenerative community, farmers and their customers are the way forward towards net zero.



### LAND AND LIVESTOCK MANAGEMENT FOR LIFE

**Land and Livestock Management for Life (known as 3LM)** is a member of the Savory Network, a network of hubs affiliated with the Savory Institute that advocates the use of holistic management to regenerate soil. Holistic management underpins a global movement to regenerate 2.47 billion acres of grassland by 2025. The organisation aims to equip businesses in the UK and Ireland to achieve their desired quality of life while improving the land for future generations.

# POSITIVE CONTRIBUTIONS

## A FOCUS ON DEVELOPING AN ECO-FRIENDLY AND SELF-SUFFICIENT ENTERPRISE IS AT THE HEART OF CRUMBLEBURY FARM'S OUTBUILDING DIVERSIFICATION INTO AN ENVIRONMENTALLY-SUSTAINABLE EVENTS VENUE AND RESTAURANT

Herefordshire's Whitbourne Estate has been in the Evans family since 1860. Nestled on the estate is Crumplebury Farm, its old outbuildings now transformed into an extraordinary, modern, architecturally-designed event venue. Sitting honestly alongside the farm's old piggery unit, Crumplebury is home to the estate's award-winning restaurant, Green Cow Kitchens.

A key priority for the Evans family is a desire for the estate to reduce its impact on the planet and make positive environmental contributions.

Keeley Evans says: "We strive to tread as lightly as possible on the planet. We care deeply about the environment and are passionate about driving positive change and taking responsibility for our impact."

"We use a biomass heating system that is fuelled by waste wood and brash from our timber operations. We've also just drilled a borehole, which provides all of our water at Crumplebury and the properties that surround it. We aim to move our operations entirely off-grid, and we are looking into solar solutions that will provide all our electricity, including exploring options to add charging points for electric vehicles."

### Fewer miles, less waste

The beef, pork and lamb for Green Cow Kitchens, a fine dining restaurant, come from the home farm, and venison and game come from the woodlands. A kitchen garden supplies not just herbs and vegetables for the restaurant but also cut flowers to brighten the rooms.

The team at Crumplebury celebrates seasonality and showcases the freshest produce grown in the estate woods, fields and kitchen gardens. Keeley says they are keen to expand the kitchen garden further to enable them to grow even more fresh produce, including fruit, and a wider selection of picking flowers.

"I love the idea of collecting eggs from our chickens and quail and having bee farms for honey," says Keeley. "What we can't currently source directly from the estate we source as locally as possible. Fortunately, we're surrounded by some excellent food businesses."

A significant amount of recycling is undertaken, and the team works hard to reduce and eventually eliminate any food waste going to landfill. For example, the restaurant tasting menus – using seasonal home farm produce – are planned in advance, with all guests pre-booking their tables. Event menus are crafted ahead of the day with precise guest numbers, allowing a well-organised kitchen and minimal food waste.

It's not just food waste that receives attention. Frustrated by the plastic waste in so many hotels, Keeley uses Bramley Products throughout Crumplebury. Bramley, a British company, makes its products with British flowers, herbs and natural essences, refilled as needed into recyclable bottles.

She also plans to plant trees on behalf of her guests to help offset the carbon impact of their visit, and hopes that others will share her passion for mitigating climate change.



**"WE AIM TO MOVE OUR OPERATIONS ENTIRELY OFF-GRID, AND WE ARE LOOKING INTO SOLAR SOLUTIONS THAT WILL PROVIDE ALL OUR ELECTRICITY, INCLUDING EXPLORING OPTIONS TO ADD CHARGING POINTS FOR ELECTRIC VEHICLES."**

KEELEY EVANS,  
WHITBOURNE ESTATE, HEREFORDSHIRE

### Advice for others

"If you're thinking of embarking on a journey like this, be warned that it's not simply another project on the estate," says Keeley. "It is all-encompassing. Work and life become intertwined, and for it to be successful, you have to truly love and be passionate about what you're doing – and of course, it has to make sense financially."

"As well as continuing to reduce our environmental impact, we will consider widening the range of experiences available at Crumplebury. There are so many exciting opportunities ahead."



# COUNTING THE CARBON

A PROJECT TO MEASURE AND ANALYSE CARBON AT THE RHUG ESTATE IS PROVIDING IMPORTANT DATA TO IMPROVE THE UNDERSTANDING AROUND HOW LAND USE INFLUENCES CARBON MANAGEMENT

Two separate but compatible carbon measurement tools are revealing the carbon balance of the Rhug Estate in North Wales and creating a better understanding of the impact of land use.

The estate, which covers 12,500 acres in Denbighshire and a further 8,000 in Gwynedd, comprises a 6,700-acre in-hand organic farm in Denbighshire, the Glynnllifon Estate, near Caernarfon – a 1,500-acre in-hand farming enterprise, and 170 tenancies including let farms, in-hand and let forestry, let cottages, commercial premises and storage.

The estate is measuring and analysing its carbon over three years using the Farm Carbon Calculator (FCC) and AgreCalc. Low Carbon Manager Mared Williams hopes that the results will create a greater understanding of how land management strategy and changing conditions affect the formula and how to manage the balance of the estate as a vital business asset.

"We have made an important start on the main in-hand farm, and we will progress with the second. We will then spread the project to capture the wider diversified businesses, including the customer-facing enterprises.





## "CARBON MANAGEMENT MAY BE THE GREATEST FORCE FOR CHANGE. IT'LL CHANGE FARMING FOREVER."

MARED WILLIAMS,  
LOW CARBON MANAGER, RHUG ESTATE, WALES

"A key part of the work is to use the feedback to modify the strategy. We have already come to a key conclusion that small changes in soil organic matter content have a significant carbon measurement impact." The changes can be natural or anthropogenic, or they can both work together.

The project has identified some vital work channels, Mared explains. One is the identification of emissions hot-spots. "These have been predictable," says Mared. "For example, livestock (6,000 sheep and 500 cattle) account for 80% of our emissions. What we call plant and machinery (including renewables) account for 12%, and crop residues and purchased fertilisers are responsible for 2%. We have learnt that our annual carbon balance amounts to a surplus of around 400 tonnes of CO<sub>2</sub>e."

### Measurement tools

Both of the carbon measurement tools used – FCC and AgreCalc – focus on crops, livestock ground conditions and land type, as well as the performance of different enterprises. "They vary in their focus on habitats – moorland, wetland,

the presence/influence of wild margins, hedgerows and trees," says Mared. Other resources such as the Peatland Carbon Code and the Soil Carbon Code, which is currently in development, can be applied to benchmark results against the most relevant standard.

"This science is still in its early stages. We have been able to factor in all parts of the productive formula – even the use of materials like steel and concrete, fencing materials, vehicles, plant and fuels. These present difficulties where there has been reuse and recycling, but for these, we rely on the system algorithm to account for their supply chain.

"There are still missing links. For example, we need to be able to take better account of our existing mature woodlands."

Graduating from Harper Adams University with a degree in agri business, Mared has just completed a post-graduate certificate in rural property management and is undertaking a masters in rural estate and land management.

### A sustainable vision

Owner Lord Newborough leads the business vision for the estate. Its 6,700-acre farm has been organic for many years, and the estate can generate as much as 6.4MW (megawatts) from ten solar PV sites and 450kW (kilowatts) from two wind turbines. There are also four hydroelectric schemes delivering 250kW and seven ground and air heat pump systems.

The farm business includes a shop and butchery supplying its own high-quality meat and other local meat, as well as a restaurant and drive-through.

An early adopter, Lord Newborough doesn't want to wait for sector-wide or government solutions. "I do think he wants to be a leader in this area," Mared says.

"Thanks to the investment in a wide range of renewables and long-term organic and sustainable

The annual carbon balance of the estate amounts to a surplus of around

400 TONNES OF CO<sub>2</sub>E

### Beyond data

Transforming the data into a realistic commercial value remains a holy grail. Mared says: "Farming already has concepts like CommodityCarbon, which allows farmers to certify carbon credits to third party verification (ISO14064). This enables trading on a platform, and tools like this are providing important first steps. But they are the first steps.

"We've come a long way in a short period of time," Mared concludes. "There are many questions yet to be answered. One issue this does raise is Government's definition of a supportable public good being a benefit to society not rewarded by a functioning market – this may need revision.

"We are seeing the nascence of a market, and it will need nurturing and protecting from misuse. On top of the many complexities of creating new farm support schemes in England and Wales, carbon management may be the greatest force for change. It'll change farming forever."

farm management, we are confident about confirming carbon neutrality.

"We want to understand the potential for our carbon balance surplus. We are focusing on tiny changes in our measurements over many years to fully understand how to improve our carbon management and maximise the surplus benefit."

### Carbon sequestration

"Alongside this, we are equally interested in sequestration capacity. We are using a specialist service provider to test seven different soil samples for organic matter density. We expect to see changes in results over several years, and – accounting for natural factors such as meteorological influences which influence soil structure, oxygen content, friability and density and type of natural life – we are understanding how land use influences carbon management.

"The result is that we can focus on this as a service to society in specific areas. It is also throwing up new assets. For example, the salt marshes on the coastal in-hand farm have an organic process known as blue carbon, which is academically very interesting. The carbon sequestering capacity may be double that on dry land."



## SUMMARY

### TAKING INSPIRATION

Whether you have read this publication cover-to-cover or dipped into it, you will probably be wondering what to take away from these case studies and how the ideas could be applied to your approach to land and business management – or more widely – to address climate change.

These examples of best practice are not just from people with a passion, although that is part of it. There are common themes that can apply to all businesses whatever the starting point, background or motivation to change. The vision and the will to make it happen are needed, but these will not guarantee success on their own. What is clear is that, if you are a land manager, there is no alternative to doing your own research, finding people or organisations with the knowledge and skills that you can learn from, and having the flexibility to deal with the bumps and blocks in the way. As research moves into practice, there will be new ideas and innovations that will continue to drive change and opportunities for land managers.

This publication responds to the challenge that climate mitigation projects are only for people who have time, land and deep pockets. This may be true for some of the more ambitious land use change projects. But these case studies provide many examples of how small changes in farming practices, small-scale tree planting, use of renewable energy, and working with others locally or through supply chains can collectively make a difference.

There is a huge potential for farmers and land managers to contribute to climate action, but in the same way that no two farms are the same, there is no blueprint for how this should be done. These articles provide inspiration and food for thought but also demonstrate some fundamental points.

Climate action has to make economic sense. Saving input costs, improving output, creating market opportunities, or becoming more financially resilient feature in most of our case studies. But it's also noticeable that funding from government schemes, charities or the private sector has underpinned the upfront costs of many of the improvements. This support will continue to be essential to help the rural economy transition to net zero.

There are co-benefits to climate action. The actions taken are often as much about creating improved habitats for wildlife, improving the farming performance through better livestock and soil management, or the social benefits of reduced flooding, better housing and reduced heating bills.

Climate action is becoming an established part of land managers' decision-making. So, when considering a change in farming systems, a new enterprise or a diversification, the impact on climate change will increasingly be taken into account, alongside the economics.

There is clearly more that needs to be done to address climate change across all business sectors. The CLA is working on behalf of our members across farming, forestry and property to maximise opportunities with the necessary government support.

As always, members are welcome to get in touch with their regional advisers or the national team if they need advice or would like to share their experiences with addressing climate change. We look forward to hearing from you.

**Susan Twining**  
**CLA Chief Land Use Policy Adviser**



## CONTACTS

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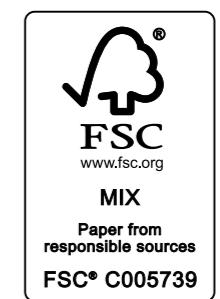
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TOWARDS NET

ZERO

CREATING  
A LOW  
CARBON  
RURAL  
ECONOMY