Food, Farming & Countryside Commission

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Natural Capital Markets

What farmers and policy makers need to know

Middlesex University London

Centre for Enterprise, Environment and Development Research (CEEDR)

Food, Farming & Countryside Commission

Financing the future

Farmers are facing a volatile and uncertain future. From changes to the Common Agriculture Policy, post Brexit, to the impacts of climate change and a nature crisis, let alone the turbulent geopolitics affecting global food markets – all of these are having a substantial impact on the farming operating context.

The introduction of ELMs in England and [their own sustainable land management schemes] in Wales and Scotland and Northern Ireland is having far reaching effects on many farmers' balance sheets. The shift towards payments for the provision and management of 'public goods' – those ecosystem services that are not normally paid for in the marketplace – have the potential to make a positive impact on the climate and nature crisis. But these environmental land management schemes do not fill the gap left by CAP; and it is no surprise therefore that farmers are now starting to look closely at the emerging 'natural capital' markets.

There is significant public value to be gained from managing natural resources well. Farmers are central to supporting nature's recovery, protecting waterways, planting trees and hedgerows, restoring sensitive habitats and much more. The carbon they sequester will help meet net zero targets, alongside producing healthy food, more sustainably.

Encouraging businesses and private finance to help pay farmers for their work is a hot topic, and the mechanisms or vehicles are growing fast. But how are farmers' interests protected in such a novel and emergent market? And what are the questions facing farmers as they seek to navigate this new area and the risks inherent in farm-level financial considerations.

The Food, Farming and Countryside Commission (FFCC) commissioned Middlesex University to produce this report in order to understand and explain some of the opportunities and risks from a farmer's perspective, and to signpost appropriate ways ahead.

It sets out to explain a complex landscape and the barriers that are currently preventing significant levels of take-up from farmers – particularly smaller farmers. It concludes that the pressing challenge is to find a balance between public and private finance. In this context the government's Nature Markets Framework is a welcome first step. But there is much detail to work through to develop rigorous standards, to ensure risks and rewards are shared equally and to build a thriving farming sector.

We are grateful to Professor Fergus Lyon and Dr Amy Burnett, who have led this research over the last few months, and for the support of The Prince's Countryside Fund. We are also indebted to the contributors to this report and thankful for their willingness to offer time, expertise and unique perspectives.

Sue Pritchard
Chief Executive
Food, Farming and Countryside Commission

The project team and acknowledgements

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Farmers and land managers can be paid for enhancing natural capital – what we define as natural assets like soil, woodland, wildlife habitats and water.

How can farmers and land managers get paid for enhancing the natural world and how can farmers assess what these market opportunities are? This report is dedicated to exploring these issues as well as focusing on the opportunities and risks of accessing private sector funding for environmental services alongside existing government schemes.

Pioneering farmers are exploring opportunities such as carbon trading, offsetting the impacts of house building on nature and improving water quality in rivers. This raises many questions for farmers and in particular how smaller businesses can benefit from these opportunities.

Farmers and land managers can be paid for enhancing natural capital – what we define as natural assets like soil, woodland, wildlife habitats and water. Some say that natural assets should not have a monetary price put on them at all, while others look at financial opportunities that reward stewards of the land for meeting the wider environmental outcomes that benefit nature and society. While these might be exciting opportunities for some farmers to build resilience, they are not rescue packages to replace reduced levels of government payments.

Many farmers and land managers may prefer to rely on government schemes that can be better regulated than some private environmental payment schemes and often there are greater degrees of trust and certainty when payments are made by government compared with newer, private markets.

There are many different private agri-environmental schemes to choose from, each with their own measurement approach. Farmers can enter into private markets that are not yet being robustly regulated and it is no wonder that these markets have been described as akin to being a 'wild west'. Farmers and land managers need advice to ensure that long-term contracts meet their business objectives and to unpack the small print of legal clauses. Policy-makers and government across the UK are themselves still working out the finer details of how government schemes will complement private natural capital investment.

Opportunities for farmers to get paid by private markets to improve their contribution to the environment also have to be seen in a wider context where produce buyers and banks are beginning to ask farmers to report on their carbon emissions and nature impacts. For some farmers there is a natural capital premium paid on their produce to incentivise improvements to how they run their business in ways that benefit nature. However, as this becomes the norm within supply chains there is a risk that farmers may not yet be prepared for when such an expectation becomes conditional or mandatory.

There is therefore a need for the right advice to help farmers and land managers, particularly those operating at a smaller scale where they may not have a large

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amount of land to put into different schemes. For smaller farmers in particular, this can mean the financial benefit and the effort involved in learning about new schemes needs to be done in ways that complement already busy working lives of the farming community. There are further constraints facing tenant farmers and a recognised need to work closely with landlords to avoid being excluded from these opportunities.

There are many opportunities for farmers to work together in a cooperative way to empower them to have more bargaining power, such as through farm clusters. Our case studies and illustrations from the interviews we have carried out for this research show how this might be done, and the challenges and opportunities facing farmers in different areas.

This report aims to introduce farmers and landowners to natural capital markets, identify questions they should be considering and be a resource for advisors of these businesses. We provide some 'jargon buster' definitions to explain various terms. We aim to help unpack the risks and opportunities associated with such markets and provide clarity on the different ways farmers and landowners might get involved in them. We also set out an agenda for shaping policy debates around this area, paying particular attention to the differences in each UK nation and what is unique or potential best practice emerging from these countries that can support transparent, fair, and financially and socially rewarding payments for natural capital that complement grant funding from government.

KEY FINDINGS

- Many farmers want to act on natural capital but are being delayed by uncertainty and are waiting for tried and tested models to be available. Those farmers new to the topic require suitable advice to avoid putting their businesses at risk.
- Private sector payments for nature can be an important contribution but they are not a silver bullet for all farms, and farmers need to consider how they form part of a broader resilient business model.
- Those paying farmers for nature need to collaborate and work with government and non-governmental organisations to develop rigorous standards and avoid accusations of greenwashing.
- Farmers need to identify and then find ways of mitigating the risks to help them think about the right questions to ask when presented with opportunities.
- Lessons from pioneers in this sector (such as farmer-led groups) should be encouraged by greater communication to farmers of how these can be replicated and consider which types of farmers are best suited to different types of market opportunities.
- Payments from the private sector are only for additional benefits to the environment so farmers need rigorous and standardised baselines to demonstrate what they are adding.
- Less attention is given to paying farmers for ongoing maintenance of healthy natural capital stocks.

Types of nature-based solutions and markets

We identify the following key natural capital market opportunities:

	OPPORTUNITIES	SUITABILITY FOR SMALLER HOLDINGS	POTENTIAL INCOME PER HA	LEVEL OF UNCERTAINTY
Carbon (offset credits)	Payments can be made for carbon sequestration (eg, woodland creation) or emission avoidance (eg, peatland restoration) through carbon offset credits.	✓	££	???
Carbon (insetting)	Payments from within the supply chain can be made for verified emission reduction, often called carbon certificates, and considered as carbon insetting. Payments for reducing fertiliser use, avoiding intensive cultivations and planting cover crops help farmers transition to regenerative agriculture.	✓✓	£	?
Biodiversity (offsets)	Building developers pay farmers to create habitats to offset damage created by new builds (eg, Biodiversity Net Gain). Includes sponsorship from businesses for wildlife projects.	✓	£££	??
Insetting biodiversity (value-added marketing)	Selling farm produce with a premium in recognition of benefits to the environment. Can be valuable for those selling direct to consumers.	✓✓✓	£	?
Water quality and nutrient neutrality	Water companies pay farmers for reducing phosphate and nitrate. One-year contracts for changing practices. Long term contracts for reed beds or taking land out of production.	✓✓	££	?
Diversification, leisure and recreation	Offering nature-based diversification for tourist and local community eg, rural stays, field sports, wildlife watching.	✓✓✓	££	?

QUESTIONS TO GUIDE FARM DECISIONS ABOUT MARKET OPPORTUNITIES

While there are clearly many different routes to being paid to improve nature on farms, understanding how to navigate them is a key issue for farmers. To help with this, we have prepared a set of questions that can help guide decisions by farmers and their advisors about whether or not different schemes are suitable and the things that they should consider when thinking about signing up for different schemes. These include what natural assets they may have to sell, legal considerations, succession and taxation and being able to receive different payments on the same parcel of land. Informed decisions require careful consideration and advice.

1. What are the potential assets that your farm could enhance or create? This requires looking at opportunities available on your land that meet your business objectives. This can include carbon offsets, biodiversity offsets, water quality, selling environmental benefits attached to your produce, or selling nature for recreation. It also requires looking at the scale needed and having agreements with landlords if tenant farming.

2. What length of contract? The different activities range from six-month contracts for over-winter cover crops to decades-long contracts for creating wildlife habitats and generations for nutrient neutrality offsetting. There are therefore questions about what a farmer can commit to and what happens at the end of the contract.

3. What additional natural capital will you be creating? Farmers need to show future positive change and so cannot be rewarded for existing good practice. There can be restrictions if a farmer is already enhancing their natural capital, as payment for ecosystem services must ensure complete additionality of their payments to avoid accusations of greenwashing. Those farmers already doing good work in creating and maintaining natural capital need public funds to support this work and develop good baselines to show where they can create new benefits.

4. How soon do you want to act when there is uncertainty? Some farmers may want to wait until markets are more mature, while others may want to act sooner and get payments for their sustainable activities. Many farmers are cautious about selling their carbon (or other services) as produce buyers may require them to use their land to capture carbon in future.

5. Do you want to join with other farmers to create economies of scale? Small farms are limited by time and resources, and so can benefit from joining farmer cluster groups or cooperatives that can help provide safe opportunities. This can also be a way of reducing signing-up fees that can exclude smaller businesses.

6. What are the unintended consequences that might arise? Farmers need to be aware of the risks of a contract for one type of natural capital affecting other opportunities. Tax implications also need to be considered. There is also the risk of taking land out of one use, affecting the viability of other parts of their business.

7. How will you know your baseline and measure impacts? Measurement is crucial and having a good baseline is necessary and costly. There is a risk that existing baselines may not be rigorous enough for future private payment for ecosystem services. New technology can reduce the costs of measuring soil carbon and biodiversity with opportunities for farmers to tap into the interest of volunteers wanting to help. There is a risk that smaller farms will be disproportionally affected by the fixed costs of measurement.

SETTING A POLICY AGENDA

Government can play a key role in shaping and maturing the current markets in the following ways:

Shaping what can be sold – Good government targets on greenhouse gas emissions, biodiversity loss and water quality are the main drivers creating opportunities in these markets. Creating legislative certainty in these areas will be crucial. Government payments to farmers such as Environmental Land Management Schemes in England, Glastir in Wales, the Agri-Environment and Climate Scheme in Scotland and the Environmental Farming Scheme in Northern Ireland can complement the private sector involvement but can also crowd out innovation if not well designed.

Supporting the maintenance of existing natural capital – As private sector payments for nature-based solutions are focused on the additionality of newly created natural capital, there is a need for existing public sector payments to reward farmers who have been investing in natural capital themselves, and who may therefore be excluded from some payments for environmental services. This will also avoid perverse incentives for farmers to delay actions or undertake practices that reduce their baseline level of natural capital.

Creating more certainty in markets – Government can play a convening and enabling role to help develop common standards, methods of measurement and a national ledger to ensure no double payments. There needs to be more attention given to ensuring trade standards are kept and avoid mis-selling of carbon/nature credits. Professional advisors are crucial, but this may require more standards and professional indemnity insurance. At an early stage of the market, government grants can drive the innovation needed and encourage healthy competition amongst those wanting to pay farmers.

Encouraging cooperation – There are benefits of cooperation in developing payments for ecosystem services that are more inclusive for smaller farms. Grant support can help these initiatives get established while also ensuring they do not become grant dependent. Collaboration also opens opportunities for devolved budgets to reach landscape-scale clusters of farmers.

Governance of the balance of land use – Natural capital markets are creating changing land use that can have community impacts. These may need to be considered by planners where they affect the livelihoods of others.

Including natural capital in definitions of agriculture – The new opportunities challenge the official definition of 'agriculture' with restrictive interpretations creating unintended disincentives for tenant farmers (concerned about breaking the terms of their lease), and multigenerational farming enterprises (concerned about the loss of tax relief).

Measurement – The integrity of the market relies on measurement, but there remains uncertainty about what should be measured and how. There is a need for standards and support for those farmers measuring their baseline. Support should ensure these baselines are rigorous enough to be accepted by future private sector payments for ecosystem services.

CONCLUSION

The slow development of the natural capital markets is surprising as there is interest from both the public sector and private sector (as seekers/buyers) and farmers (as providers/producers). It is taking time to resolve some of the issues related to land for the delivery of nature-based solutions.

The slow development of the natural capital markets is surprising as there is interest from both the public sector and private sector (as seekers/buyers) and farmers (as providers/producers). There are lots of initiatives but still limited opportunities for small farmers that are presented as simple offers with common standards.

Natural capital is a new market area. It is taking time to resolve some of the issues related to land for the delivery of nature-based problems. There is significant work under way and knowledge is building – this document is part of that process in helping farmers understand the opportunities and risks. It is not a market for everyone and is by no means a silver bullet to address challenging economic – and climatic – conditions facing farmers, but it is worth everyone considering the options and how they fit with their business.

There needs to be coordination of the market to ensure that standards are set and there are no double payments for the same parcel of land. Cooperation and coordination are also needed to create economies of scale. There also needs to be careful integration of public sector support focused on where the private sector is not willing to pay, such as on maintaining existing natural capital stocks. Farmers must decide whether to wait for the uncertainty to decline to take the plunge now and benefit from income streams that can assist in their transition to sustainability.

1. Introduction

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1.1 Opportunities for paying farmers for nature

As custodians of farmland and its natural resources, farmers and other land managers are well-placed to make a central contribution to tackling climate change and biodiversity loss. Farmers can create opportunities to be paid for providing solutions by the private sector, public sector and the general public. Alongside the production of food, farmers are managing soils, woodlands, spaces for wildlife and water supplies. We refer to these as the natural capital of farms.

Traditionally, much payment for ecosystem services (PES) has been provided by public money from government (Countryside Stewardship/Environmental Land Management Schemes (ELMS) in England, Glastir in Wales, the Agri-Environment and Climate Scheme in Scotland and the Environmental Farming Scheme in Northern Ireland). However, there are concerns over the extent to which the private sector payments for natural capital will complement the public sector programmes. In some cases, private finance can be 'blended' with public finance, in other cases this approach will not work or perhaps farmers may wish to benefit exclusively from private sector payments. This report aims to help farmers, land managers, advisors and policy-makers navigate this complex funding landscape.

There is an opportunity for farmers to take advantage of emerging natural capital markets. Many farmers are facing significant economic pressures with reductions in area payments, rapidly rising inflation, and rising costs of farm inputs. They may be considering longer-term changes to their business through diversification and retirement and there are many questions and risks associated with how those markets are developing, the nature (and measurement/certification) of the 'products', and whether there will be equal access for small farms. There are also several associated risks of not considering nature in farm management decision-making, which vary in their potential impacts on farm businesses and their natural assets.

It tends to be larger-scale commercial farms that are moving into carbon and nature-based markets quicker than the smaller ones, partly because larger estates can take the risks of the 'first mover'. At the heart of this project is a desire to understand more about the nature of demand and supply in natural capital markets in the UK and how smaller farms and tenants can make sense of these new markets in terms of their own business models. The Rock Review[1] assessed opportunities and constraints for tenant farmers to engage in natural capital markets and argued that government needs to develop a clear roadmap on how

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private ecosystem markets develop. For instance, the expectations for how buyers and suppliers of land for natural capital projects engage in these markets and that delivery is rewarded fairly and transparently. The report highlights these markets must support tenant farmers so that they are not disadvantaged and recognised for any activities they do to improve the natural capital assets of the landowner

At a time of declining income support from the public sector, there are expectations that private businesses will want to pay farmers for the environmental benefits and natural capital that they can provide. There are high expectations and claims of reaching the holy grail of having increased incomes for farmers while protecting nature. However, these opportunities have yet to materialise for most farmers and there is concern that these unregulated markets could be a source of greenwash by businesses looking to offset their own negative impacts on climate and biodiversity. As banks and large farm produce buyers are set to increase reporting on natural capital themselves, we may find that these requirements to measure natural capital are passed on to farmers. So, the need to ensure farmers are paid for their natural capital has never been so important.

In the early days of these markets, there remain lots of questions about what this means for different types of farmers and land managers regarding what they can deliver, accessing opportunities and having fair contracts. Various tensions over the 'financialisation of nature' have been reported, and concerns were raised in the National Food Strategy, and independent review of the food system commissioned by the UK government in 2019, about taking land away from food production – an even more critical issue since the Ukrainian war. In addition, public and privately funded schemes involve a cultural shift for many farmers.

This report examines these emerging markets and the implications for smaller farms such as those requiring the labour input of one or two people[2]. We focus predominantly on private sector sources paying for ecosystem services, while recognising the huge amounts of attention currently being given to public agri-environmental funding and other support. We examine how these markets can increase farm income (now and in the future) and how they can reduce costs. With the diversity of farm types in the UK, we do not provide specific recommendations to farmers and their advisors but rather a set of guiding questions that can be used to inform their decisions and avoid unintended consequences.

We also identify a range of policy issues that need to be addressed if the financing of natural capital is to benefit all types of farmers. Not all approaches to paying for ecosystem services and natural capital will be relevant to all farms, but the design of initiatives and the enabling policy context need to ensure they are not excluded.

1.2 Objectives

This UK-wide, 12-month project (February 2022 – February 2023) investigated natural capital markets and what opportunities and risks these present to farmers and landholders, small and large. It had the objective to enable all farmers to benefit financially from the natural capital 'revolution', and access newly emergent natural capital markets and investment. In addition, the findings will be shared and interpreted with farmer networks across the UK in a way that informs better on-farm planning and current actions.

The project investigated the following:

How natural capital markets are developing and the current state of emergent practice	*Eg, exploring how these markets are currently developing, the nature of the demand, what objectives these forms of capital have, how natural capital assets are currently being valued, how these markets are accessed, and the role of regulators in overseeing the functioning and fairness of the markets.*
The potential economic and social impact of payments and investments to farmers	*Eg, what role natural capital can play as part of viable farm business plans, understanding the challenges and opportunities for farmers, whether this differs for different farm types, holding sizes or tenure arrangements, how demand from these new markets may impact current farm practices and decision-making at a farm level, potential unintended consequences from commodifying and financialising natural value, and what financial mechanisms or frameworks would help to assist a fair transition for farmers.*
How to ensure access for all farms, especially smaller or tenanted farms and new entrants	*Eg, making coherent information available for all farmers so that smaller farms or those with different tenure arrangements are not disadvantaged, how farmers make the case for investment on their farms by being clear about the benefits they offer, identifying on-farm planning and actions that can be undertaken now as part of farms' readiness to access these markets.*

The project hopes to bring much-needed clarity on what natural capital markets require from farmers and what farmers need to do to access those markets and aims to help promote nature-based, agricultural transitions within this new funding landscape. By taking a UK-wide perspective, the research also explores how different initiatives germinate and diffuse within and throughout the UK, how different nature-based markets are set up and how this can affect which farmers can participate in various schemes.

1.3 Methodology

A key part of this research has been to interview farmers and key informants across the UK working in the sector (including advisors, suppliers of services, supply chain intermediaries and investors[3]) to understand more about the financing of the natural capital sector and how private markets are being accessed, or not, by farmers.

The research team selected farmers who are participating in or have knowledge of different types of payment for ecosystem services and provided a diverse range of farming types, geographic location, size, tenancy/ownership, participation in private and/or government schemes, farmer age and gender. In total, 104 interviews were conducted across England, Wales, Scotland and Northern Ireland, 25 of whom were farmers working across the UK. We sought to be representative of different types of farming businesses and their participation in different nature-based solutions. Ten of the farmers were tenants and we included similar numbers of livestock and arable farmers. Other interviewees included 22 land agents/consultants, 21 policymakers/non-governmental organisations, 15 businesses with agri-food businesses in their supply chains, 12 representatives of accreditation systems/initiatives, and 5 financiers/banks.

The results were used to identify good practice of what works, explore challenges and make recommendations as to how these might be addressed. Workshops and other events were organised to discuss proposed questions that farmers can consider when reflecting on whether to get involved in nature-related private payments (see Section 5, Opportunities and challenges for farmers).

2.

Explaining natural capital and nature-based solutions

2. Explaining natural capital and nature-based solutions

There is a wide range of benefits that farmers can provide to enhance nature, improve water quality and address greenhouse gas emissions. Through making changes, farmers can develop **'nature-based solutions'** for other businesses and for the public good[4].

JARGON BUSTER: Nature-based solutions (NBS) are the activities that use the soil and natural habitats to solve environmental problems, such as water quality, flooding, wildlife loss and greenhouse gas emissions.

Farmers have a range of types of **'capital'** that they draw on. Farmers rely on financial capital to invest in a business. They use their physical capital of machinery and buildings and also rely on the human capital of their skilled and dedicated workforce. Farms also draw on natural assets, which we refer to as 'natural capital'. These assets, through appropriate calculations, can be measured and eventually monetised (see below)[5].

JARGON BUSTER: Natural capital includes a farm's assets of soil, trees, hedges and natural habitats. These are needed to deliver nature-based solutions. Measures of these natural stocks are required to be able to monetise them in natural capital markets.

Soils are the basis of most farming systems (except for hydroponics and other indoor farming approaches) and allow for crop, livestock and bioenergy production. The natural capital of soil can be increased by improving soil quality, such as increasing soil organic matter and reducing erosion/leaching. There can be payment for these ecosystem services by businesses wanting to offset their own carbon emissions and where supply chains value sustainability.

JARGON BUSTER: Payment for ecosystem services allow farmers to be paid for providing nature-based solutions on behalf of other businesses or the government.

Woodland is another form of natural capital that provides us with timber but is also vital for carbon sequestration and capture, and a valuable habitat for nature. The value of this natural capital may depend on the type of trees, location and wildlife benefits when acting as corridors that connect other biodiversity-rich areas. There can be tension between selecting species of trees that maximise commercial value and having a mix of slower-growing trees that maximise biodiversity value.

JARGON BUSTER: Carbon capture and sequestration occur when plants and trees take carbon from the atmosphere and hold it in a growing tree or soil organic matter.

Peatlands are vital natural reservoirs of carbon. They are a part of natural capital and there can be payments for managing these ecosystem services to hold carbon.

Water quality is an element of natural capital, with land able to play a role in reducing flooding. Land can also be managed in ways to minimise the risk of soil nitrates and phosphates affecting waterways. Payment for ecosystem services can pay farmers to tackle water quality issues.

JARGON BUSTER: Nutrient neutrality relates to all development through the planning system that will increase people and nutrient load and requires housing developers to ensure that any increase in nitrates and phosphates that arise when people build and live in new housing is offset by projects with farmers that filter these out or reduce nitrates and phosphates elsewhere in a river system. It only applies in certain areas where there are water quality problems.

Habitats for wildlife support biodiversity which has value in itself, as well as having value for wider agriculture through the pollination services of insects.

These habitats might be hedgerows, field margins or wildlife-rich grass meadows. These have a particular value when acting as corridors. Payment for these ecosystem services can be made through government environmental programmes, produce buyers wanting to highlight a sustainable 'story' behind their products or through builders and developers needing to offset their impacts.

JARGON BUSTER: Biodiversity net gain (BNG) is an England-wide regulation whereby developers have to replace any biodiversity lost when they develop land. The Environment Act (2021) sets out ways of valuing what biodiversity has been lost and then requires this value, plus a minimum of 10% more, to be recreated either on the development site itself or at another site to 'offset' biodiversity losses arising from development (which becomes mandatory in 2023).

Farmers have a range of types of 'capital' that they draw on. Farmers rely on financial capital to invest in a business. They use their physical capital of machinery and buildings and rely on the human capital of their skilled and dedicated workforce. Farms also draw on natural assets and which we refer to as 'natural capital'.

Land also has a **recreational value** as people enjoy the outside environment, the landscape views, and being around nature. Farmers can be paid for these ecosystem services by providing rural tourism venues and accommodation, renting paddocks for horses, selling field sports, and many other diversifications.

These types of natural capital are hard to separate in practice and are all interconnected. There are also many challenges found when putting a financial value on some of these natural assets with some saying that nature cannot be valued by a marketplace[6]. Others suggest that without a financial price, these valuable assets will not be valued alongside other objectives of society such as the need for good food, good housing and economic growth. Markets for these payments for ecosystem services are now being developed[7]. In the next section, we explore how there are markets for some of these nature-based solutions, as well as some challenges and unintended consequences that can affect farmers and natural assets.

3.

Context and policy

3. Context and policy

The growing interest in natural capital markets has to be seen in the wider context of addressing climate change and biodiversity loss. In June 2019, the UK government passed an amendment to the 2008 Climate Change Act, to set a target of net-zero emissions by 2050, compared with the previous target of at least an 80% reduction by that date. For England, new nature-based policies such as biodiversity net gain (which seeks a minimum 10% uplift in biodiversity arising from new developments) are enshrined in the Environment Act 2021. The UK's devolved nations are responding at different paces and with different policy approaches, such as Wales' Sustainable Farming Scheme, Scotland's **Principles for Responsible Investment in Natural Capital**[8] and Northern Ireland's Soil Health Nutrient Scheme.

Various international agreements on climate and biodiversity, such as the Paris Agreement in 2019, the Sustainable Development Goals (SDGs) and the UN Biodiversity Conference are major drivers affecting national policy, financial markets and consumer attitude for change.

JARGON BUSTER: Net zero is the UK government's ambition for the economy to have reduced greenhouse gas emissions to zero by 2050 in line with the Climate Change Act 2008 (2050 Target Amendment) Order 2019.

With public sector policy aspirations to be net-zero and reduce biodiversity loss, businesses are looking for ways to meet these goals with an expectation that there will be a requirement to do so in future. There is now a requirement for larger businesses to disclose their greenhouse gas emissions following the Task Force on Climate-related Financial Disclosures (**TCFD**). Smaller companies will be affected too if they are within the supply chains of larger companies or are borrowing money from larger banks or finance providers. This is expected to be complemented by the Taskforce on Nature-related Financial Disclosures (**TNFD**) where businesses will increasingly account for their nature-related impacts.

JARGON BUSTER: what are the TCFD and the TNFD?

The Task Force on Climate-related Financial Disclosures (TCFD) was established by the international Financial Stability Board in 2015. The TCFD gives recommendations to companies about the information they should disclose on climate-related impacts so that risks can be considered, and climate change becomes a core business and investment angle globally. This has led to mandatory reporting for larger companies in the UK.

The Taskforce on Nature-related Financial Disclosures (TNFD) is designed to follow a similar route to encourage reporting on biodiversity but is currently in the design stage.

With public sector policy aspirations to be net-zero and reduce biodiversity loss, businesses are looking for ways to meet these goals with an expectation that there will be a requirement to do so in future.

Produce buyers and banks are beginning to ask farmers to report on their carbon emissions where they are in specific premium schemes, and our interviews found that supermarkets are increasingly accelerating biodiversity-related activities even for farmers outside of these specific schemes. It is not known if there will be future payments for behaviour change and reporting, or whether this will be a condition or requirement passed on to all farmers.

There are also specific regulations being developed that require water companies to improve the quality of water entering waterways and oceans, which incentivise them to work with farmers to avoid pollution at source. For example, **Severn Trent Water** indicated that they are investing more than £1 billion over five years to promote the environment and societal benefit. The Environment Act (2021) also legislates for property and infrastructure developers to offset biodiversity loss by creating new habitats under the Biodiversity Net Gain policy.

Natural capital markets also must be seen in the context of a changing support system for UK farmers following Brexit. The Scottish Agri-Environment and Climate Scheme, Northern Ireland's Environmental Farming Scheme and the Welsh Glastir programme are also offering support for low-carbon and nature-supporting farming. In England, there is a more radical process of reducing the Basic Payment Scheme and the development of other initiatives to change payments towards using 'public money for public goods'. Support for natural capital is coming from the public sector through Defra's Environmental Land Management Schemes programme in England with widespread uptake expected for the Sustainable Farming Incentive (SFI), the more selective Local Nature Recovery/Countryside Stewardship Plus and the large-scale Landscape Recovery projects.

Defra is also seeking to develop the natural capital marketplace by supporting innovative initiatives. Under its Natural Environment Investment Readiness Fund (NEIRF), it released competitive grant funding of between £10,000 to £100,000 to support environmental projects across England to help achieve one or more

natural environmental outcomes set out in the 25-Year Environment Plan[9]. Many of these are innovative responses to the issues of biodiversity net gain, carbon and nature markets.

Alongside the public sector, the private sector is looking to enter these markets, which we discuss later. International agreements such as the COP26 Climate Change Conference in Glasgow and the COP15 Biodiversity Conference in Montreal are also key drivers to corral action in this area. However, these meetings failed to agree on actionable targets with the urgency and timescales required. Therefore, complementary action from the private sector to accelerate such action could help to bridge this lacuna.

4.

Natural capital payments from the private sector

4. Natural capital payments from the private sector

In this section, we introduce the different ways farmers can generate income from privately funded schemes that pay for enhanced natural capital outcomes on farms. Private businesses can pay farmers for additional ecosystem services on their land to offset their environmental impacts or they may wish to sponsor farms as part of their wider Corporate Social Responsibility (CSR) or Environmental, Social and Governance (ESG) requirements.

JARGON BUSTER: Environmental, Social and Governance (ESG) is a framework whereby organisations seek to maximise value beyond the financial bottom line and contribute to societal and environmental goals. Often this involves being linked to accredited schemes and standards that can measure performance in realising these objectives. Many investors will screen organisations based on their proven track record on ESG which can help them to demonstrate that investees are not engaging in risky or unethical practices. Increasingly, private and grant funders are asking businesses to demonstrate ESG credentials. It also includes elements of voluntary Corporate Social Responsibility (CSR) where private companies or large corporates contribute towards societal goals through philanthropic activity, ethical decision-making or supporting charities and voluntary organisations.

Carbon and nature-related payments can be key in translating latent desire into support for on-farm environmental outcomes. Some private nature-based schemes reward growers that have a proven nature-positive impact, such as those that pay a premium on nature-related produce. However, as a Scottish farmer recounted during our research, there is a need for a clear financial reward for farms operating on tight margins, particularly in the small farming sector. However, with future policy putting pressure on larger businesses to report on their carbon and nature impacts, farmers in their supply chains may be required to enter into nature-related or carbon activities as a condition or requirement from banks and produce buyers. Ensuring markets develop in such a way to retain farmer autonomy and influence is critical.

There is much uncertainty about the methods used to calculate nature-related and carbon impacts.

We examine the motivations behind different schemes and which types of farms can participate in them and discuss the different forms of measurement that can be expected of a farmer were they to participate – as well as the challenges, complexities and opportunities of doing so. We present the views of the many farmers and key informants we have interviewed during this research to provide accounts of how these markets are, or could, work in practice. We also give examples of how farmers might come across natural capital markets, for instance by a proactive search, through their land agent, banks or their supply chains.

As we will explore throughout this report, there is much uncertainty about the methods used to calculate nature-related and carbon impacts. Interviewees reported that monitoring data was not standardised and often arose from ad hoc visits to their farm from a local conservation charity or volunteers to measure specific species or environmental outcomes. For many land managers we spoke to, there was felt to be an absence of useful tools that can be readily understood and provide robust data on a baseline environmental situation in terms of water, air and carbon. As one land agent suggested: "There is currently no one tool that can provide a full answer on all of these things", and initiatives that seek to streamline reporting tools are not easily translatable to the needs of land agents and farm advisors. While a number of advisory firms are developing their own natural capital accounting methods, these kinds of models only appeal to larger landowners due to the challenges of entering the data. One Welsh farm advisory network said their model was to have a list of approved advisors to conduct natural capital audits supported with government grant funding. In some cases, farmers reported that they did not want to communicate their successes because no one was effectively rewarding them for nature-related activities and reporting now might preclude them from benefiting from future payments.

4.1 Carbon capture offsets

Farmers capturing carbon in trees, peatland and soils can be paid by businesses and individuals wanting to offset their emissions. There are two recognised UK standards for investing in nature-based solutions to generate carbon credits to sell into voluntary carbon markets, the UK Woodland Carbon Code and the UK Peatland Code. Other codes are being developed for hedgerows and soil. Minimum requirements seek to ensure these codes protect participants' interests and are assured to meet offset requirements.

JARGON BUSTER: Offsetting occurs when greenhouse gas emissions or other damaging environmental activity takes place in one location and the impacts are compensated by taking positive action elsewhere. For example, a business may have carbon dioxide emissions and, as part of their strategy to reduce their impacts, they not only reduce emissions through energy efficiency but also decide to pay a farmer or woodland owner for planting trees that will capture carbon from the atmosphere as the trees grow.

Various peer-reviewed voluntary standards exist in the carbon market, such as those by **Verra** and the International Carbon Reduction and Offset Alliance (**ICROA**), which offer certificates that demonstrate carbon sequestration. Over time, the methodology used to calculate certificates has developed but some early initiatives have led to 'phantom credits' that do not represent genuine reductions in carbon emissions. These charges have cast doubt over the integrity of voluntary carbon markets and add fuel to the fire on charges of corporate greenwashing when firms purchase these types of certificates as part of their net-zero strategies.

Mandatory trading schemes, such as the UK Emissions Trading Scheme (UK ETS), which replaced the EU Emission Trading Scheme (ETS) in January 2021, only apply to energy-intensive industries, the power generation sector and aviation. There is much scope for other sectors to become part of a wider carbon trading platform. However, voluntary schemes lack the regulatory drive to encourage widespread take-up and there is a lot of uncertainty in these markets and their overall impact on land use. Many of these schemes require a buffer fund, which acts as a form of insurance in times of uncertainty as to whether the schemes can deliver on the hypothetical carbon payments. This can help to protect farmers from various unplanned events, such as drought, which can affect tree growth and soil health.

JARGON BUSTER: Carbon units are measures of how much carbon has been sequestered, for example from soils, trees, other land uses or carbon capture and storage technologies (measured in tonnes of carbon dioxide equivalent (tCO2e). These units form tradeable exchange commodities as certificated credits or (voluntary) certificates in carbon markets.

Hedgerows can sequester more carbon than trees, but land availability for a large spread of hedgerows may be limited. A proposed Hedgerow Carbon Code is estimated to allow farmers to be able to eventually trade carbon credits in a market, with a **potential value of £60m**. However, one land agent was not advising landowners to participate in carbon market schemes, such as woodland and peatland codes, because the returns based on the current carbon price "aren't tremendously interesting at the moment".

Different types of carbon codes[10]

CODE	DETAILS	DATE INITIATED
UK Woodland Carbon Code	Quality assurance standard for woodland creation projects in the UK.	2011
UK Peatland Code	The voluntary standard for UK peatland projects covering peat soils over 50 cm deep.	V1.2 released May 2022
Soil Carbon Code	Under development. Will measure "climate benefits from soil carbon projects as net carbon abatement" expressed as CO2e (standard unit of measurement). Measurements are likely to include Soil Organic Carbon (SOC) stock increases, reduced SOC stock loss, and green house gas emission reductions.	Draft guidelines produced Feb 2022 (v1) and revised Dec 2022
Hedgerow Carbon Code	Proposed code aims to encourage hedgerow habitat improvements to increase the amount of carbon stored by hedges.	Pilot testing took place in 2022

There is a growing interest in capturing carbon in soils with a Soil Carbon Code being developed. Farmers can enter into agreements (typically lasting 5-10 years) to use regenerative agriculture practices, such as cover cropping and avoiding ploughing, which sequester carbon in soils relatively quickly compared with carbon sequestration in trees. Improved soils have wider benefits in terms of supporting yields and holding water.

Measurement of soil carbon presents particular challenges. However, despite being interested in the topic, a Scottish farmer we interviewed felt that carbon was a buzzword that nobody knows how to measure on a farm. There are different approaches to measuring carbon (such as Loss on Ignition (lol) or Dumas), raising questions about the depth to which soil samples are taken. There is also complexity around sampling approaches, such as sampling at the same spot year-on-year and the benefits of taking a combined sample from different soil cores across a parcel of land.

While carbon can be quickly sequestered in soils, it can be easily lost when the land is ploughed or cultivated. Regenerative farmers interviewed have had to invest in no-till drills and create cover crops to support the soils. Cover crop seed can cost up to £80 a hectare (plus sowing costs).

Payments for sequestering soil carbon are often based on assurances that there is no other funding for the same activity (the issue of 'additionality'). Interviewees reported that where a farm has moved into regenerative agriculture using their own funds, there can be restrictions on carbon payments as the buyer of carbon certificates cannot be assured of the additionality of their payments. This creates challenges for farmers who start the process of shifting to regenerative agriculture using their own funds but then want external support to continue the activity.

JARGON BUSTER: Additionality is required in all offsets to demonstrate that the actions of the farmers would not have happened without the payment from the offsetting business. If an activity is said to be additional, then there must be proof that this would only occur if there were offset payments.

Designing farmer-led carbon schemes

One farmer based in the East Midlands uses regenerative farming methods to produce wheat, barley, oilseed rape and beans – with a suckler herd of 60 cattle and 500 ewes – across 1,000 acres. The farm has planted 4,000 trees in recent years and installed two roof-mounted solar arrays to support on-site renewable energy generation. He firmly believes in the potential opportunities of private markets to support farmers to deliver nature recovery on their farms. He is also motivated to find new income streams to support farm sustainability post-Brexit and by sequestering carbon, become part of the solution to climate change, not part of the problem. He says he likes to think "intergenerationally" about sustainability and farming: "in the 1950s, food production was paramount, now the number one issue is climate change."

On his own farm, he's worked with investors to monetise the increase in soil carbon which arises from adopting regenerative practices on 230 hectares of arable land. He used Ecometric to assess baseline measurements which measured over 6,500 tons of carbon sequestered for the 2021-22 period. Using the Cool Farm Tool to estimate on-farm emissions led to a net sale of 5,000 tonnes.

The sale of these carbon capture certificates has become the second largest source of income on the farm after wheat. At present, certificates can only be used for "in-setting", i.e. accounting for Scope 3 emissions that arise indirectly in corporate supply chains.

He believes this income stream is essential to stimulate the wider adoption of regenerative practices across other farms in the UK, and can help corporate actors compensate for their emissions. However, he acknowledges this solution may not be suited to all soil types – this particular model works best on clay soils, which can sequester more carbon than light, sandy soils.

One farmer reported a lack of transparency related to which companies were involved in tree planting initiatives and others were concerned about the impact on rural communities if trees were to replace farming.

Some corporate actors looking to offset their carbon emissions have been buying land for planting trees to gain carbon credits or using land agents and non-governmental organisations to find farmers to participate in offsetting initiatives. One farmer in Wales reported a lack of transparency related to which companies were involved in tree planting initiatives and others were concerned about the impact on rural communities if trees were to replace farming. One farm advisory service said they had been sending a clear message to all their farms in the network "for people to sit tight and not sell any carbon credits at the moment until we know what's going to happen with a new policy that's being developed in Wales at the moment", under Wales' Sustainable Farming Scheme. They recounted one farm that sold their carbon over a 30-year period to a drinks company, after which they regretted this decision having entered into the agreement "too soon". Now this farmer actively warns other farmers not to follow suit and has even engaged with the Welsh government about their experiences.

While this is not found to be a widespread practice, it has resulted in increased land prices in some areas. This can constrain opportunities for small farms to grow and hamper the resilience of the small family farming sector. There is also, ultimately, a value judgement about the most appropriate way of mitigating climate change and the choice of farming models in the future.

There is a key role for insurance companies to address the potential burdens that farmers must fulfil expected rates of carbon sequestration. For instance, the issue of selling carbon credits has an inherent risk: if there was a natural disaster the farmer might be legally and financially obliged to cover the costs of any recuperation. This would be a disaster for them financially and could cripple an already precarious business without effective safeguards. However, effective insurance with force majeure clauses can mitigate this potentially devastating risk to a farm business, though this may not always be the case and farmers must exercise caution when taking out or reviewing insurance policies.

4.2 Carbon insetting and payments in the supply chain

The agriculture and food sectors have their own ambitions to be net zero. Payments from within the supply chain can therefore be made for verified emission reduction, often called carbon certificates, and considered carbon insetting. Payments for reducing fertiliser use, avoiding intensive cultivations and planting of cover crops help farmers transition to regenerative agriculture. Insetting natural capital is a way for companies to embed the value of nature within their products or services.

JARGON BUSTER: Insetting occurs when a business is buying produce from farmers and asks the farmer to undertake activities that will compensate for any carbon dioxide emissions (or damage to nature) arising from growing, processing and distributing a product. Farmers helping their customers in this way can be given a premium on their products or preferential access to specific value-added markets.

In Wales, a farmer reported that a major supermarket which buys their lamb through a distributor requested that some farms carry out an annual carbon audit on their farm which produces a traffic light-based report that shows what areas of the farm could do better and what steps farm can take to further reduce their emissions. This was not yet conditional for farmers to supply the supermarket, but was thought by the farmer who signed up to the scheme to be driven by the supermarket wanting to know the carbon impact of Welsh farms in their supply chain.

In the future, farmers may be required to be net zero themselves. This requires a wider decarbonisation of agriculture and the sequestration of carbon by farmers for their own businesses where further reductions in emissions are not possible. If the farming sector is not net zero itself and farmers have sold their carbon credits, then the sector may need to find other ways to offset its own emissions. One of the key issues is that when the private sector purchases environmental credits from farmers they can take the gains from the agriculture sector and attribute these to their own sector within the UN's **national inventory of carbon reductions**.[11]

There is a need for greater transparency and assurance of different environmental objectives in insetting initiatives. The origin and environmental credentials of the producer of a crop can be recorded by quick response digital scanning systems (QR codes). Interviewees expressed caution about the use of more complex systems (such as blockchain).

Measuring soil carbon in preparation for future contracts: Northern Ireland's multi-stakeholder approach.

In Northern Ireland, environmental and agricultural land policy is at a crossroads. A national voluntary government-backed scheme, the Soil Nutrient Health Scheme (SNHS), will offer one-to-one training to farmers on data collected about the health of their land and environmental assets. The SNHS will provide accurate information on nutrient levels, including pH, phosphorus (P), potassium (K), magnesium (Mg), sulphur (S) and Loss on Ignition (measuring organic matter), and estimates of carbon stored for each field. Soil samples on fields of 0.1 hectare or above will be collected free of charge by the soil sample collection contractor.

A LiDAR survey[12] (which helps to produce maps that show surface water run-off areas and the location and extent of hedgerows, trees and woody biomass on the farm) will help farmers to make better use of manures, reduce the risk of nutrients entering waterways by generating nutrient run-off risk maps and help farmers to manage their overall carbon stocks. Training will be delivered by CAFRE (the national agricultural training body) on the role of carbon on farms and support will be provided to create a nutrient management plan (which may be required for future government/ DAREA schemes). This long-term vision and investment are enabled by having a public sector-owned water supply system with the economic incentives to act resting with the government.

Key informants we interviewed that are close to the design and implementation of this scheme suggested that such a data-centric model is helping to empower farmers to take an informed engagement in future carbon markets as soil health will be verified through a proven, standardised approach at scale. Farmers in Northern Ireland may also be able to participate in the future purchase of environmental credits at scale when sector-specific environmental schemes become established, ie, through supply chain investment.

4.3 Biodiversity offset payments

Businesses may pay farmers and land managers for wildlife and nature benefits through sponsorship approaches or more formal approaches as a requirement for obtaining planning permission. In England, developers in the property and construction sector are financing an emerging biodiversity net gain market where they can purchase credits for the provision of a 10% uplift in biodiversity on a site being put forward for development[13]. However, this is not being advanced in all UK devolved nations (it becomes mandatory in England in 2023). In England, new businesses and other land agents have been creating mechanisms to deliver Biodiversity Net Gain and encourage farmer participation. Local authorities help to facilitate Biodiversity Net Gain but one interviewee found that their local authority was competing with other landowners when proposing sites for development.

There is also an explicit link between Biodiversity Net Gain and Local Nature Recovery Strategies (LNRS), which are set out in the Environment Act (2021) and link to the creation of national local nature recovery networks. Therefore, within the new Biodiversity Net Gain landscape, there are opportunities for farmers to get involved in a more localised or regional approach to biodiversity strategies. It must be noted that within the Biodiversity Net Gain framework, land for offsetting does not feature as highly as on-site mitigation measures due to the 'mitigation hierarchy' which prioritises avoidance of any environmental impact or on-site mitigation through the provision of on-site alternative habitats; only when these possibilities have been exhausted does the potential to offset land outside the development area come into force[14]. It is also important that any offset land is close to the displaced habitat (ie, the closer a farm to the development site the more biodiversity credits can be accrued), and therefore some farmland could be considered too distant from the development site to be considered as a potential offsetting site.

How does biodiversity net gain work? Biodiversity credits and the role of developers and local authorities

A multi-purpose farming estate in the southwest of England that supports livestock, organic, regenerative farming and supports various corporate events and community initiatives is setting up a Biodiversity Net Gain project but is finding the process slow and complex, even for a larger estate to engage in. They told us: "There are no suppliers currently in our local planning authority. We started working on this three years ago to design the project." This has involved recruiting a local ecological consultant to develop

a management plan over the 30-year contract period. "You get 30 years' worth of money up front but if you then monetise that across the whole 30-year term it's not that exciting really in terms of investment yields," they said.

They have found that the metrics are not flexible, but "stuck and rigid, which are not suitable to an outcome-driven rewilding project or natural processes". However, progress is being made: "We've registered our units, we have calculated them, we have got ongoing conversations with various local developers ... sites closer to a development site have more value (for biodiversity credits) but this gets diminished the further away you go." Aside from ironing out complex contracts, the fact that Biodiversity Net Gain is not yet mandatory (expected to be late 2023) is also affecting the market from developing quickly. They said: "one of the reasons it's not really growing as a concept yet is that if you're a developer, you wouldn't be rushing to sort this out because it's not being made mandatory. And so you don't have to put your hand in your pocket."

Various natural capital market initiatives that aggregate suppliers of nature benefits have been developed by private or not-for-profit actors to market environmental outcomes more widely. In these cases, a delivery partner acts as an intermediary to guide farmers and investors. Emerging offsetting initiatives can allow farmers to stack sources of natural capital together across public and private schemes ('blended approaches'), as long as there is not double payment for the same activity.

JARGON BUSTER: Stacking allows a landowner or farmer to put various overlapping elements of natural capital on a piece of land into separately packaged units or nature-based credit schemes.

JARGON BUSTER: Blended finance is a combination of public or private capital. Having capital from across different sources helps to spread risk and allows organisations to collaborate on shared objectives while seeking either a financial, social or environmental impact return.

There is a need to balance supporting the growth of a market and protecting individual farmers with appropriate due diligence.

There is significant work being done not only in the UK but internationally to agree on standards that will enable nature trading. For instance, the voluntary verification organisation Verra has signed a memorandum of understanding to create a nature credit framework which hopes to steer finance to invest in nature conservation and restoration. Similarly, there are other initiatives such as CreditNature's Nature Impact Tokens[15]. These tokens offer nature-positive investment opportunities in verified nature recovery projects. These are linked to performance metrics of ecosystem health. This demonstrates the importance of measurement and the need for long-term monitoring as well as clear contracts. Biodiversity Net Gain approaches should enforce this, but there is a danger of more informal sponsorship approaches being less rigorous with the potential for greenwashing. However, sponsorship approaches can be an important way to start relationships between farmers and businesses, and a stepping stone towards more rigorous approaches.

There has been a keen interest in these by investors and those eager to utilise emerging markets to act as an intermediary between farmers, landowners and investors – which is necessary while the market becomes established. However, it is important to treat nature-based markets with caution. Participation often requires environmental know-how that farmers may not have. There is a need to balance supporting the growth of a market and protecting individual farmers with appropriate due diligence. There have already been cases where some of these nature-based platforms have gone out of business, in part because these platforms are competing amongst themselves while the ins and outs of regulatory issues and wider land supply issues have not been resolved. There remain questions about who pays for the management of sites after the end of the contracts and how much land will be valued without a confirmed income stream.

Biodiversity net gain, farm clusters and local nature recovery strategies – the importance of farmer input

One cluster of farmers is mapping its collective biodiversity assets with digital mapping systems. Using this approach is helpful to engage farmers because, as one interviewee argued, "farmers love a map". The group has the financial support to fund an assistant who is using the data from the maps to carry out biodiversity opportunity mapping, a process which requires farmers to think outside of the box in terms of future land use. Mapping ecosystems also requires understanding connectivity between farms, for instance, identifying wildlife corridors. The group has a long-term relationship with the local Wildlife Trust and will benefit from a local nature recovery priority area, which will direct Biodiversity Net Gain funding to these priority areas. A group leader suggested that the group was "lucky" in this regard because of the

potential financial benefit that could accrue to farmers through offsetting, which will be encouraged by local councils.

However, there are issues with coordination in monitoring local nature-related outcomes in collaboration with other stakeholders. While the cluster had contributed to a draft local nature recovery plan there was a lack of clarity around the funding and wider responsibilities on this. An NGO was carrying out its own woodland mapping and the cluster members were keen for their mapping to stay independent from others. This poses an issue for the synchronisation of various datasets going forward, where those creating data may not necessarily want to share their data with others or prefer to use a different approach.

As the cluster lead suggested, any biodiversity opportunity map that is created must have the consent of the farmer to identify viable potential opportunity areas; if the farmer does not agree to particular opportunity schemes, then the hypothetical potential portrayed in such an opportunity mapping exercise will "fall flat on its face".

It is also important to note that clusters, while incredibly helpful to provide a space for discussion, meetings and farmer-led initiatives, are not available in every area. They take time and resource to establish, commitment from their members to sustain themselves, and need to be supported by grant funding. However, they are a very exciting and innovative model to support engagement in natural capital markets.

The Environmental Farmers Group: a farmer-led approach as a natural capital one-stop-shop

The Environmental Farmers Group is a Wiltshire-based cooperative in the Avon River catchment "set up by farmers for farmers" in 2021 in response to a "complicated and uncertain" post-Brexit policy landscape. The EFG aims to mutually improve the environment on members' farms. It allows its members to be able to trade with businesses and commercial organisations in voluntary environmental markets, such as biodiversity net gain, nutrient offsetting and carbon trading. Rather than private companies approaching farmers on an individual basis, the Environmental Farmers Group allows its members to access natural capital opportunities under one umbrella.

The group started following a suggestion by Minette Batters (President, National Farmers Union, NFU) and Teresa Dent (CEO, Game and Wildlife Conservation Trust, GWCT) in July 2020. The farmers who heard this suggestion took it seriously and started working as a small group to understand what they did and didn't know about the landscape, doing research into natural capital markets. The group also secured support from experts to guide the group, in addition to the NFU and the GWCT's support to navigate this new financial landscape.

Key activities carried out by the group have been to create a trading template so that its members are ready to trade with businesses or deal with local authorities, it has drafted heads of terms and is also taking a deep dive into how biodiversity credits enabled through the Environment Act (2021) can be measured (using Defra's 3.1 biodiversity metric) on its members' farms and what kind of tools are appropriate to gather data for different types of schemes.

As the group's website says, this is a win-win for members and as well as seeking to engage with farmers under these new financing mechanisms:

"Both sides only have to go to one place. One place to understand and explore the trade. One set of rules. One set of monitoring. One better environment. We'd be pleased to be called a trusted navigator in a complex world."

This type of approach can resolve many of the issues that have been raised in this report, including achieving environmental outcomes at scale by taking a group approach to seeking environmental benefits as well as avoiding duplication of effort where individual farmers may be contacted by different organisations wanting to invest in a farm's natural capital. Indeed, the group is now looking to potentially expand from its original catchment area and is becoming a go-to place for developers that want to work with farmers in natural capital markets.

It also makes the process much more transparent, as its members can discuss opportunities with each other, with the support of experts to guide their decision-making. All natural capital market trade by members goes through the group. Having contact with just one group is also much more efficient from the perspective of commercial interests, such as developers, or local authorities.

Next on the list for the group is to better understand the tax implications of engaging in natural capital payments and formalise its cooperative membership. As a collection of different farm clusters, the group is planning to develop a catchment and conservation plan depending on whether grant funding is made available to support this.

4.4 Insetting natural capital when you sell your produce

Farmers can be paid a premium for additional work carried out to promote nature or support lower-impact farming, such as regenerative farming. Accreditation is often linked to year-on-year improvement with mandatory monitoring. However, innovators can be unfairly squeezed in the overall improvement they can make each year if they are already performing well under kitemark standards. Examples of insetting initiatives include Jordan's Farm Partnership where there is a premium paid for farms committing at least 10% of their land to wildlife and meeting the LEAF Marque requirements (an accreditation scheme established by Linking Environment and Farming). As one organic farmer in England said, most of her consumers like buying their meat because it is Pasture for Life accredited, which is appealing to consumers because it chimes with their values and desires to buy 100% grass-fed: "I think you can appeal to a group of people who value what you're doing and are prepared to pay a good and fair price for it."

Kitemarking and certification schemes can be key drivers in terms of encouraging a formal commitment to nature and carbon in supply chains.

Kitemarking and certification schemes can therefore be key drivers in terms of encouraging a formal commitment to nature and carbon in supply chains. Some concerns about changing legislation for large businesses (such as the supermarkets, wholesale buyers and banks lending money to farmers) will mean in the future they all will have to report on the impact of their business on natural capital. It may be that farmers will therefore not choose to enter natural capital markets but will be required to demonstrate a positive contribution as a requirement for selling their produce or borrowing money.

One corporate produce buyer saw biodiversity as a logical follow-on from improving carbon emission reductions, in what they termed "our continuous improvement strategy". They had taken various positive moves towards capturing biodiversity within the supply chain, including having a supplier scorecard which assesses suppliers on their technical performance and what they are doing environmentally, such as whether they are measuring waste, water in biodiversity. Interestingly, the supplier referred to themselves as "green financiers", where they were able to finance green initiatives by investing in the supply chain relating to outcome-based practices and environmental improvements due to their insetting investment model.

This particular supplier stressed the importance of standard metrics, and saw the lack of standardisation as a key reason why most farms were not actively measuring carbon emissions or biodiversity impacts. They also suggested there was a lack of incentives to do so, and that change was unlikely without an attractive package of incentives. The lack of a standard approach was made more complicated because – as other respondents also felt – biodiversity

is difficult to quantify, and therefore having a biodiversity-positive range of products is not yet a practical option. As they said, "We need to be aligned to the same metrics and outputs. From the top level we need that. Whether that comes from larger corporate organisations or government policy isn't yet clear, but waiting for government to regulate will take too long." This suggests that in order for measurement of biodiversity impacts to be accelerated, this requires corporations higher up the supply value chain to act.

Private schemes – encouraging flexible and innovative farmer-led approaches

Matthew Doggett is a family arable and livestock tenant farmer in the east of England who specialises in regenerative agriculture and produces wheat, barely, oats, peas, beans and hobby cattle across 950 acres. He is part of the Jordan's Farm Partnership which he says is leading to improved production and overall making the system function more effectively on his farm. Matthew sees his regenerative approach as vital to ensure that organic matter can thrive. He is also LEAF accredited, which he uses to access Jordan's insetting market.

Matthew has data going back 20 years on soil health. In his case, local Wildlife Trust visits support monitoring on his farm, LEAF supports a carbon audit while Jordan's requests biodiversity monitoring data, which he describes as "not too hard" to complete. He also says organisations like the Farming and Wildlife Advisory Group provide excellent support on nature-related schemes and initiatives. This requires assessing farm habitats and occasionally there are visits to crosscheck his responses.

He argues that in comparison with government schemes, the administration for private ecosystem service initiatives is much more light-touch. One of the key issues he sees with government schemes is that they don't focus on quality, only output. There is also a lack of an incentive structure and praise for good environmental practices that reward or measure success, they only prioritise income foregone which is not an effective metric for progressive change. He believes that government schemes, such as the SFI, are not being effectively marketed by government nor are they paying enough and tend to encourage a tick box engagement.

He has participated in the LENS project, a UK and European-wide initiative where land managers submit proposals to deliver nature outcomes from an agreed list or can submit their own ideas and submit their bid in an online portal (NatureBid). An aggregator (which might be a grain merchant, an environmental organisation or a farmer network) collates all the proposals

submitted. The purchasers then assess the proposals and agree a price which might be negotiated with the aggregator. The sale of ecosystem services must be 'additional' to any work currently being carried out or funded. Different activities on the same area of land that support nature can be funded. They can also be used to accelerate sustainable or regenerative practices. Evidence of activities undertaken need to be captured in before and after photos, receipts of purchased materials and services.

Matthew argues that these types of private schemes are more flexible and they focus on rewarding good practices. The funders of the LENS project recognise that not all outcomes can be verified equally, but can relate to a baseline of minimum standards required depending on the natural capital being enhanced. Landowners are not expected to pay for additional data collection and analysis or conduct their own carbon footprints, but they must provide specialists data and access to their land upon request. Monitoring visits are typically on an annual basis.

Private schemes tend to have much shorter time scales, for instance, one-year water company projects or two to five-year projects with supply chains. He finds private schemes are also easier to monitor than some government schemes through providing photographic evidence, accompanied by an occasional visit – which Matthew says is better than a more stick-based, regulated approach by visits from inspectors who can issue fines.

He says there are lots of pressures on farmers at the moment: "There are lots of people trying to press their own agenda on farmers – I'm just trying to walk my own path and accept the agenda that I'm interested in." Anything else might compromise farmer autonomy to engage in natural capital initiatives in a way that makes sense for their own farm business.

4.5 Water quality and nutrient neutrality

Water companies are themselves regulated and must provide water to a particular standard. The issue of nitrogen and phosphate loads in rivers and groundwater has become increasingly important. New housing developments and agricultural run-off (pesticides and fertilisers) have been key causes of worsening water quality, among other factors. As such, water companies have responded by creating schemes to pay farmers to improve their agricultural practices, many of which are encouraging regenerative agriculture.

There is increasing attention being paid to nutrient offset schemes, particularly by property developers seeking to overcome challenges of acute phosphate loads across the UK

Benefits to society and water companies include improved water quality and reduction of pesticides and fertilisers, improved flood resilience and an overall increase in biodiversity and organic soil content. However, not all schemes are being rolled out equally across the UK with initiatives centred around specific catchments. Where water networks are held in public ownership (such as in Northern Ireland), water quality issues are addressed in other ways.

In Wales, a nutrient offsetting and trading platform has been under development. Several English water companies have been using a 'reverse auction' model where farmers can bid to provide cover crops in specific catchments, and hence reduce pollution entering water sources. However, some of these schemes have been criticised for encouraging a race to the bottom where farmers are not able to positively price themselves into the market. This is in contrast to some emerging catchment-based partnerships which are encouraging more fair pricing mechanisms that allow farmers or landowners to set their price, which is then matched with a buyer wanting to purchase at a similar level. Some of these catchment partnerships are seeking to become honest brokers on behalf of the government or water companies, acting as intermediaries between farmers and private or public entities.

There is also increasing attention being paid to nutrient offset schemes, particularly by property developers seeking to overcome challenges of acute phosphate loads across the UK, which is effectively halting development in many areas. However, there remains uncertainty regarding policy in this area. **Natural England's Nutrient Neutrality** methodology offers an evaluative framework for farmers/developers to have a fair payment structure. However, as with biodiversity net gain, ensuring good governance of these schemes is paramount to ensure these empower farmers and do not encourage a race to the bottom on price.

Demand for land for nutrient neutrality is also unknown. One land agent suggested these initiatives will not be on large areas but will require significant land use change on these sites, such as converting arable land to (partial) woodland, reedbeds or permanent pasture. This could be an opportunity for organic conversion and regenerative farming that helps reduce fertiliser inputs (nitrates and phosphates).

4.6 Diversification, leisure and recreation

While tourism may not typically be considered a private natural capital scheme, there can be income from leisure and recreation where the public pay for landscape and views, field sports, fishing or viewing wildlife as an attraction. Agrotourism is helping to sustain rural communities and nature-friendly practices,

and rewilding attracts visitors willing to pay for seeing nature. However, rewilding itself has come under pressure from its role in potentially taking land out of agricultural production.

Challenges and opportunities of diversification – insights from a farm in the southwest

One livestock farmer based in the southwest of England manages a small regenerative farm, and also offers ecotourism on a campsite. This is sited to maximise views of the natural landscape and gives access to wild swimming opportunities. They describe the experience as, "Glamping in the beautiful English countryside on your own hill, in a dome."

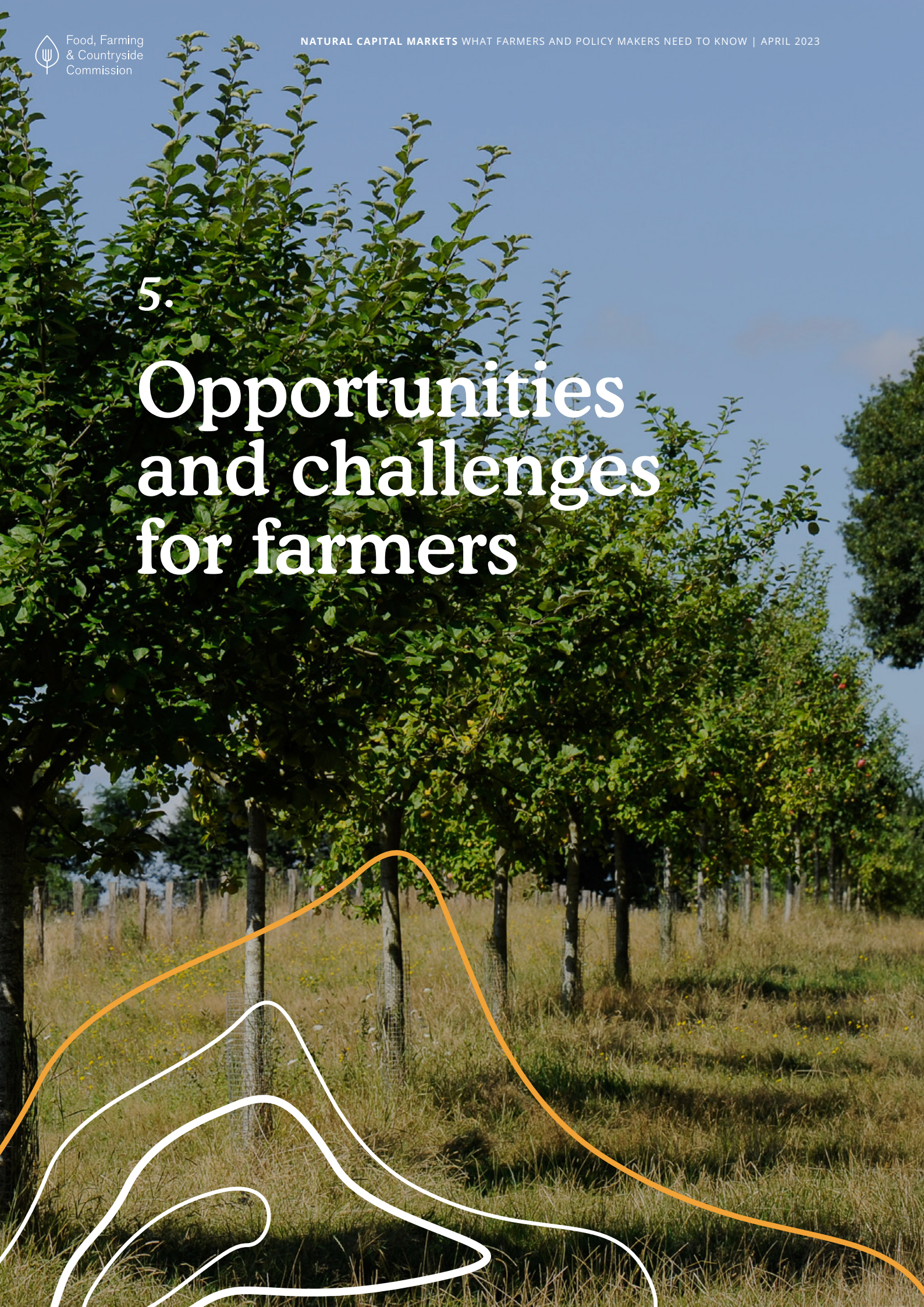
The glamping business is managed through Airbnb. The farmer says that while their business is on a farm, customers either want really high-quality accommodation or they want a more rustic, rural experience and it can be hard to find a middle ground.

They say that being a livestock farm with just cattle and sheep was not enough to attract enough visitors to justify having an open farm day, and they find that offering domestic tourism based on the natural environment is a more attractive business offer. They also host also shooting days, and they find that there is more interest in shooting than camping.

Despite trying to earn a supplementary income, their reliance on grant funding is essential to keep the farm business alive. They point out, though, that incentives need to spur productivity and not result in perverse incentives, like, they suggest, some covid-related furlough grants did.

Summary of benefits of nature-based schemes and potential risks

	OPPORTUNITIES	RISKS AND LIMITATIONS
Carbon (offset credits)	Payments can be made for carbon sequestration (eg, woodland creation) or emission avoidance (eg, peatland restoration) through carbon offset credits.	Long-term land use change to meet integrity rules of permanence, additionality, etc. Needs 5–30-year contracts and assurance that carbon remains captured. Farmers may need their land to sequester their own carbon emissions in future, as a requirement set by produce buyers (so selling carbon to others may complicate this). Tenants will need landlord collaborations. Need to take tax and legal advice depending on scale and type of contract. Farmers and their insurance may have to cover costs of replacing carbon if there is a fire, drought, invasion of pests, etc.
Carbon (insetting) payments in the supply chain	Payments from within the supply chain can be made for emission reduction (less fertiliser use, avoiding intensive cultivations and the planting of cover crops).	Soil carbon initiatives require commitment to regenerative farming, eg, no-till drilling and cover crops. Unlikely to meet integrity requirements for carbon credits unless there is a rigorous baseline; soil carbon not well established and not accepted as carbon credits by some buyers.
Biodiversity (offsets)	Building developers pay farmers to create habitats to offset damage created by new build (eg, Biodiversity Net Gain). Includes sponsorship from businesses for wildlife projects.	Biodiversity Net Gain applies to England only. Usually needs to be close to development sites so not available to all farms. Most suited to land that is in poor condition that will provide the biggest uplift in biodiversity value from changes. Robust contracts are critical and complex. Long-term legal contracts of 30 years or more with uncertainty over the opportunities at the end of the contract period. Tenant farmers will need the permission of landlords. Takes land out of production. Sponsorship can also be linked to 'greenwashing', if the actual benefits to nature are not properly monitored.
Insetting biodiversity (value-added marketing)	Selling farm produce with a premium for biodiversity benefits.	Premium may not cover the costs of accreditation and measurement. Reporting on the environmental benefits may become a requirement or condition for farmers to sell produce and normalise a nature premium to the extent that farmers are no longer financially rewarded for it.
Water quality and nutrient neutrality	Water companies pay farmers for reducing phosphate and nitrate. Long-term contracts for reed beds or taking land out of production.	Less intensive administration and measurement than other initiatives with 6-month contracts for cover crops. Water quality and nutrient trading schemes are only open to farmers within specific catchment areas. Reverse ('Dutch') auctions amongst farmers can encourage a race to the bottom, and less opportunity for farmers to participate. Nutrient neutrality opportunities only open to farmers within specific catchment areas and with long-term commitment.
Diversification, leisure and recreation	Offering nature-based tourism and leisure eg, rural stays, horse riding, field sports, wildlife watching.	Possible were set within attractive locations. Diversification requires different skill sets and investment in infrastructure. Risks of variable domestic tourism.



5.

Opportunities and challenges for farmers

5. Opportunities and challenges for farmers

Based on the interviews with a range of actors in the natural capital markets, we set out different questions farmers and landowners should consider when thinking about committing to a particular natural capital market opportunity and identify some potential risks and ways these can be mitigated.

5.1 Ways to engage in natural capital markets

As the previous section shows, there is a range of avenues where there is potential for farmers to be paid for natural capital. The table below illustrates the routes that farmers and landowners were found to be engaging with different types of natural capital markets.

	OPPORTUNITIES	RISKS AND LIMITATIONS
Directly with the buyer of natural capital	Allows the farmer to set up a contract directly with a business seeking to pay for their natural capital.	Contracts are not standardised and there could be a risk that contracts may not always have the farmer's or landowner's best interests at heart. Requires farmers to be legally savvy to understand the consequences of specific clauses or to be able to afford to pay for a lawyer or advisor to review it.
Offset and inset providers and aggregators (private and hybrid)	Developed by a number of different actors, including environmental non-governmental organisations, land agents and organisations that are seeking to act as intermediaries or brokers between landowners and natural capital markets. Involves a consortium of buyers around market opportunities and sellers.	It is not always clear why a farmer or landowner should choose a particular nature-based platform (aggregator). Some nature-based platforms have already gone out of business – which might prevent farmers from participating in other schemes.
Through a land agent	Offers farmers an opportunity to engage in markets that link to the existing asset base that landowners' agents represent.	Not all farms can afford to pay for a land agent. While land agents are paid to represent the farmer's interests, they may have ties to specific private companies or want to market their own schemes. Different levels of experience in relation to natural capital.

Farm clusters, cooperatives and mutuals	Farmers in a given area come together to create critical mass in private sector or public sector environmental schemes. They are linked to trusted organisations within the agri-food sector. They can coordinate relationships between potential buyers of ecosystem services and farmers using a representative who acts on behalf of the members. Can become the go-to for developers and local authorities which can empower farmers to get the best deals. Offers a more strategic way to engage in natural capital markets and offer optimised outcomes by considering how different individual pieces of land can be considered within an ecosystem approach.	Farm clusters do not exist in every location. They are often dependent on grant funding to create projects. Often requires external support to get a group going (financial, supporting governance, etc). Numerous inception and start-up meetings can be a strain on people's time to get groups going. Issues of scaling up can also affect competition laws.

5.2 Identifying what can be sold

Understanding these opportunities starts with exploring what may be possible and who the buyers might be. This may relate to improving water quality with payments from a water company, creating wildlife habitats with payments from property developers or a premium from produce buyers, capturing carbon in trees and soil, or having income from visitors who appreciate the landscape and nature on farms. Farmers involved in natural capital markets were found to be identifying the locations where there was greatest potential to increase the natural capital while minimising the restrictions on other parts of their business. There can be a minimum area of land required to enter an agreement, which can limit participation from smaller farms unless there is collaboration with other farms. Interviewees also reported that longer contract periods may be problematic for tenant farmers to enter into.

Farmer Question: What ecosystem services/natural assets do you think you can be paid for (water quality, wildlife, carbon, landscape, etc)? Is there a minimum size of land that can be put forward under different schemes?

RISK TYPE	POTENTIAL CONSEQUENCES	SEVERITY	MITIGATION
Some schemes have a minimum size that can be put forward	Excludes smaller farms. Could mean less land available for other markets, or land taken out of food production.	**	Check the minimum size of each scheme and weigh up your priorities in terms of how you want to manage that land in the future to maximise your overall business opportunities.

Some schemes (eg, Biodiversity Net Gain, nutrient neutrality, catchment areas) are area specific, so not available to all farms	Farmers and landowners may expect to benefit from some schemes but there are regional or other geographic limitations on how much, if at all, farmers can benefit.	**	Check if there are any regional differences to the scheme. Explore potentially better paid or more appropriate schemes that are not restricted based on your location (eg, distance from a development site).

Challenges can be faced by tenant farmers as there are questions over who owns natural capital. For example, interviewees questioned whether it is the land owners who retain the soil carbon or the tenant farmer who is managing the land? Tenant farmers will need to obtain landlord consent for any change of use. The Rock Review of tenant farming in England found that there needs to be more coordination among government to ensure that natural capital markets and the forthcoming land use framework can protect tenancies. These might include considering how tenants could play a greater role in supporting natural capital such as woodlands.

The ability of tenants to enter into contracts will depend on their ongoing relationships with landlords. This highlights the need to find collaborative approaches to sharing the benefits, with suggestions that tenant farmers play a crucial role in managing the flow of ecosystem services but that landlords own the natural capital stock. This is likely to be confirmed by government policy but also requires a collegial approach facilitated by advisors (such as agents) who can consider the longer-term relationship interests of both parties.

Farmer Question: What can a tenant sell and what will your landlord support? What permission is needed, how to share with the landowner, and what agreements are needed?

RISK TYPE	POTENTIAL CONSEQUENCES	SEVERITY	MITIGATION
Landlord is not prepared to support tenant farmer's efforts to engage in natural capital on their land	Tenant farmers become excluded from natural capital opportunities.	**	Check your existing tenancy agreement before having a conversation with your landlord. Seek out advisors that can act as a broker to support mutually beneficial agreements that can effectively integrate both public and private finance for nature. Do prior research into opportunities and present a business plan to your landlord.

With the range of different elements of natural capital available, farmers need to decide if they sell these elements separately (what can be termed 'stacking') or 'bundling' the different elements together to sell carbon and biodiversity benefits to a single buyer. This will depend on the interest of buyers, with limited examples of demand from offsetting buyers at present. This is likely to be more popular with insetting relationships, for example, if a produce buyer wants to ensure that their supply chains are moving towards carbon net-zero and nature positivity. In England, private funding can be used alongside government schemes such as the Sustainable Farming Incentive (SFI) as long as there are payments for different activities. However, there is potential for confusion as new opportunities are introduced.

Farmer Question: Do schemes allow you to have the same piece of land in different natural capital markets?

5.3 Type of contract

Contracts can be complex, and those relating to biodiversity and natural capital can be even more complex, given dependencies on other species, climate, land management, etc. Understanding what type of contract you are being asked to sign is vital as well as whose interests it is serving and the expectations of you to manage your land in a certain way. A clear view of what a robust insurance policy would look like, how this is covered and how much responsibility is on the land manager to deliver on the contract terms in the event of natural disasters or climate change impacts is critical.

Farmer question: What type of contract are you being asked to sign, and what are the implications?

RISK TYPE	POTENTIAL CONSEQUENCES	SEVERITY	MITIGATION
Contracts may not have the farmer's or landowner's best interests at heart	Without a legal background or sound advice, contracts can be unclear, and risk being signed without full understanding of their repercussions.	***	Ask what type of legal framework the contract is structured under, eg, conservation covenants, Section 106, management models and lease models, etc. Discuss risks fully with family members and staff and other stakeholders who understand your business objectives.
Some schemes may put the risk of ensuring contracts are met onto the farmer or landowner	Farmer can be legally and financially obliged in event of natural disaster to cover the costs of any recuperation eg, if there is a fire, drought, invasion of pests, etc.	***	Check the wording very carefully. Discuss the issue of insurance carefully. Check if your insurer covers natural disasters or impacts of climate change (eg, force majeure). Find out how others have addressed the issue (eg, forums, clusters, etc.)

5.4 Length of contract

Buyers of ecosystem services will want to know that the changes made by farmers will lead to a degree of permanent change. For tree planting, this degree of permanence will be until the tree is harvested. If the tree is used for construction, the degree of permanence is extended as the carbon is locked away in buildings. If used for fuel, then the carbon would be released again. For soil carbon sequestration, there are contracts that last 10 years, although 5-year contracts are also found. This also assumes that farmers will retain the carbon in their soils after this date but is not enforced. Carbon trading platforms set aside a buffer of unsold carbon certificates to cover the risk of a farmer not retaining the carbon in their soils.

For Biodiversity Net Gain there is a requirement for at least 30 years and this may restrict change to this land use. Farmers, therefore, need to know how long they can commit for, and what agreements need to be put in place with others with a say over land use, such as landlords or future generations in family businesses. For farmers that cannot commit for long periods, then shorter 1-year or 6-month contracts with water companies may be more suitable.

Farmer question: How long can you commit for? What are the views of other landowners/family members? Are there short-term sales such as cover crops or paying visitors?

RISK TYPE	POTENTIAL CONSEQUENCES	SEVERITY	MITIGATION
Participation can require long term commitment to change land use	Future opportunities are curtailed.	**	Ensure you understand all commitments and restrictions. Ensure short-term financial return covers the loss of income and capital value after the end of the contract. Ask what will happen to the land at the end of the contract period. Need to take tax and legal advice depending on scale and type of contract.

5.5 Additionality and baselines

The buyers of ecosystem services from farmers are all focused on paying for additional benefits that can be clearly attributed to the payments. In this way, they focus only on new activity and are not willing and able to pay for the management of existing stocks of natural capital[16]. In the emerging natural capital markets, there are considerable risks of reputational damage, integrity loss and accusations of 'greenwash' if payments are seen to be paying for stocks of natural capital that already exist. Companies paying for ecosystem services are therefore taking a strict definition of additionality and excluding some farms that might be practising some elements of the desired practices already. Baselines are therefore vital in showing what has been added. However, even if there are baselines prepared now, it is not clear whether buyers of ecosystem services will pay for farmer-funded past additions to the stock of natural capital.

There is a risk that the focus on additionality creates perverse incentives for farmers to delay action until the markets are more developed. Interviewees were also concerned that this will create perverse incentives for farmers to 'reset' their natural capital stocks to a lower level, in order to receive payments. Some schemes have been careful to avoid these types of practices, for instance, by mandating that a baseline measurement is carried out for a period before the initiation of any scheme. For those farmers already starting to enhance natural capital, public sector-funded schemes are seen as vital ways of supporting the maintenance of natural capital stocks, although this is not clearly explored in the current initiatives being promoted by governments of the UK's different nations.

RISK TYPE	POTENTIAL CONSEQUENCES	SEVERITY	MITIGATION
Lack of data to inform nature-sensitive farm practices	Not understanding your natural capital baseline may negatively impact on farm management and outcomes for nature.	**	Carry out a carbon or natural capital audit (eg, through a nature-related produce scheme or linked to an environmental scheme). Encourage conversations on this issue in your farmer networks or cluster about best practice.
Some schemes are most suited to land that is in poor condition that will provide the biggest uplift in biodiversity value from changes	Without a proper assessment, farmers and landowners may put forward schemes that have a higher natural capital baseline and the gains are harder to evidence and be paid for.	**	Conduct your natural capital assessment based on a baseline so you know the health of different parcels of land before you commit to putting them forward.

Farmer question: How can you identify land that provides the greatest opportunity for natural capital uplift? Are there restrictions if you are already creating natural capital on a parcel of land? Can you be rewarded for existing natural capital through government programmes?

5.6 Uncertainty of new markets

The novelty of these markets, and the difficulties in defining and measuring the precise changes to natural capital, create risks for all involved. For many smaller farms, the best advice may be to wait until there is more clarity. Some farms may decide to be the first movers and innovators, taking the risks and also helping to develop the opportunities that might spread to other farms in the future. The uncertainty can lead to greater risks of accusations of mis-selling and greenwashing. This is a particular challenge for soil sequestration where there is still no single measure of soil carbon and many of the platforms selling carbon offsets rely on models to predict the amount of carbon sequestered. The intermediaries selling carbon offsets retain 'buffers' of carbon certificates in of changes to measurement and to provide assurance to buyers of offsets. Farmers interviewed for this project were also concerned about the sources of this money with concerns that businesses in other industries were buying offsets before they had exhausted other ways to reduce their own emissions.

Farmer Question: What do you know about the buyer? Has the buyer been recommended? What are different buyers offering? Are you selling direct or selling for credits/certificates? Does it matter where the money is coming from?

RISK TYPE	POTENTIAL CONSEQUENCES	SEVERITY	MITIGATION
Farmers cannot access or afford advisors	Farmers may enter into contracts that are not sound or may not consider exploring opportunities in the first instance.	**	Contact environmental NGOs and charities (eg, Wildlife Trusts, FWAG) other farmers and local government for more information. Share the costs of an agent willing to offer advice to a group of farmers on specific issues.
Voluntary markets are unregulated	Lack of standardisation of schemes.	**	Shop around and ask lots of questions. Try and find out if there is an ombudsman or a complaint procedures process that you can follow. Wait until markets have standards or are more regulated.
Advisors/agents tied to specific schemes	Farmers and landowners may be encouraged to enter into an advisor's own scheme which may not be the most appropriate.	**	Ask about how advisors are paid if they refer you, do they get commission, etc? Ask what they know about other schemes and ask them to compare them based on specific points raised in this report that are important to you.
Schemes are discredited	Declining price for credits if buyers are avoiding a specific market.	***	Ensure intermediary organisation has rigorous methods, and large buffers of credits to cover any unforeseen issues.

Finally, there are risks that the prices being paid to farmers now may be lower than in the future when there is growing demand from buyers for carbon sequestration or biodiversity offsets. There is also a risk that the prices paid do not adequately cover the management costs for the full term of the agreement if these costs rise higher than expected inflation. With the uncertainty of the market, and the growing interest amongst retailers and food processors to reach net zero, there is a likelihood that farmers will need to demonstrate that they are at least net zero themselves. The farming industry also needs to show it is moving towards its net zero goals. If farms have committed their carbon sequestration to other businesses, then they could be limiting their opportunities.

Farmer Question: Do you want to sell now to a willing buyer or hold the opportunity for later (in case produce buyers require you to be net zero or nature positive)? Do you want to take action now or wait until more certainty? Do you feel the price is reasonable or do you feel it is undervalued?

RISK TYPE	POTENTIAL CONSEQUENCES	SEVERITY	MITIGATION
Farmers sell carbon credits before they are net zero themselves	Selling your carbon now may restrict your ability to become net zero in the future. This may be a requirement.	**	Only sell the carbon if you have a clear plan for being net zero.

5.7 Economies of scale

For all of the opportunities, smaller farms face the challenges that come from not having the critical mass of land to cover the costs of getting established. This 'liability of smallness' was reported by farmers having to pay fixed costs to get on to soil carbon trading platforms, irrespective of size. It is particularly evident when it comes to managing the risks of participating in the early stages of these markets. Larger businesses were reported to be able to spread the risk and deal with a higher degree of uncertainty because they have other income streams and diverse assets. This can also allow larger businesses to have the management time to explore these options, while smaller farms have greater time constraints that limits their ability to specialise in developing their understanding of these markets. The interviews also found that farmers looking to receive a premium from their produce buyer may find the smaller amount of produce sold does not create adequate premium to cover the costs of exploring the opportunity, or to cover the cost of the required reporting.

The challenge for smaller farms: perspectives from a Scottish crofter

Crofting is a specific legal system of land tenure in Scotland. While variable in form, it mostly exists as small scale (<5ha) "crofts" held by individuals, grouped together in townships with large areas of communally managed "common grazings".

One crofter, with sheep and small scale horticulture, is concerned that the small size of crofts will not be of interest to carbon and nature scheme investors. Schemes on the larger common grazing require investors to negotiate with the whole township, which is more complicated.

She worries that carbon consultants do not understand crofting and will not be able to provide tailored solutions for them. On the other hand, many crofters either aren't aware of the possibilities of private carbon and nature schemes, or believe these schemes are too hard to get into.

There is also a critical absence of legislation relating to who owns carbon credits, the respective rights of landlords and crofters, and how long term carbon credits can be managed in the context of common grazings and their crofting shareholder.

Solutions can come from buyers of ecosystem services designing initiatives that do not exclude small farms. Further opportunities are also being sought through farmer clusters and other collaborations. This can allow costs to be shared by these project aggregators and justifies a representative of farmers to invest their time in becoming a specialist in the subject and negotiating on behalf of farmers. However, there are still very few examples of such collaborations leading to tangible income streams for smaller farmers. There are also various natural capital online marketplaces (platforms) that allow farmers to join markets at scale.

Farmer Question: Does the income cover the cost of setting up/joining initiatives? Are there farmer groups, clusters, cooperatives or other organisations that can be honest brokers? Can groups of farmers come together to share ideas?

RISK TYPE	POTENTIAL CONSEQUENCES	SEVERITY	MITIGATION
Threat to financial viability of business	Unexpected commitments can add to costs.	***	Ensure you can afford the exposure to additional costs
Some nature-based platforms have already gone out of business	Potential loss of income. Can prevent farmers from participating in other schemes.	***	Ask what would happen if the business closed and how the contract deals with this issue. Check Companies House for how resilient the business is.

The potential of farm clusters to provide strength in numbers and legitimacy in natural capital markets

One arable and regenerative family farmer in the East of England that produces combinable crops (wheat, barley, oats, beans and peas) on two farms totalling 1,196 acres firmly believed that the contribution of a farm cluster can be far greater than farm walks, social events and knowledge sharing. He suggested that farm clusters have great potential to prove that active farmers can present a legitimate offer for engagement in natural capital markets, so long as the messaging and communications are strong. He says: "Working as a cluster gives strength in numbers and can ensure that individual farmers are not taken for a ride. Alone, most farms are too small to engage in private markets. However, clusters can offer portfolio-level markets."

5.8 Unintended consequences

The novelty of these sectors creates risks for smaller farmers and tenants due to the uncertainty and lack of knowledge of consequences. The additionality rules, discussed earlier, can mean signing up for one activity could limit future opportunities. For example, a farmer may enter into an agreement to restore biodiversity to a plot of land and then subsequently seek payment for carbon sequestration. However, there remains a lack of clarity over whether the soil sequestration is 'additional' or would have happened anyway once the nature restoration has changed the land use from arable to permanent pasture or woodland.

Farmer Question: Will signing up to sell one of your natural assets now, limit other future opportunities? Do you consider selling each asset separately or sell a bundle?

The generous payments for Biodiversity Net Gain are much higher than the returns farmers can get from growing produce, and so this income can be valuable for creating resilience and diverse income streams at times of fluctuating produce prices. However, the reduction of farm sizes could affect the viability of the agricultural activity. The changes in land use may be providing short-term income streams, but there remain questions of what will occur after the end of the agreement. For example, Biodiversity Net Gain payments may occur over 30 years, but then there remain questions over the sources of income on the land after that period and also what management costs will still be incurred in order to maintain the natural capital.

Farmer Question: If the contract requires a major change of land use, will this make your other enterprises more diverse/resilient or less viable in the long term?

A final unintended consequence relates to the impact of changing the business activity from agriculture to other purposes. At present the definition of "agricultural" needs more attention as it may restrict tenants from participating in initiatives that break the terms of their tenancies. Interviewees were concerned that changes to business activities away from the current definition of "agriculture" can affect the ability of family farm businesses to obtain inheritance tax relief if the business is to be continued by future generations. It is also unclear if the activities will be regarded as trading activity for tax purposes which can also have an impact on the availability of reliefs. The VAT status of the activities was also identified as an area that needs careful consideration.

Farmer Question: How will changes in farming and land use affect your long-term plans (eg, changing restrictions in the tenancy or inheritance tax position)?

RISK TYPE	POTENTIAL CONSEQUENCES	SEVERITY	MITIGATION
Limiting future opportunities	Signing a contract for one type of natural capital can limit future contracts.	**	Get good advice and look at options of bundling different types of natural capital in a single contract.
Impact on other farm enterprises	Land taken out of production may limit the viability of other agricultural activity.	***	Careful budgeting of income streams and costs under different future scenarios.
Tax implications if natural capital markets displace traditional forms of agricultural business activities	Additional tax costs to the business affects viability, and loss of inheritance tax relief for multi-generational family farms.	***	Get advice from specialist advisors.

5.9 Who manages land use

As new opportunities develop, there will be growing pressure on competing land use. There are concerns that there will be a shift away from food security if land is diverted to environmental outcomes. Alternative views see opportunities for combining natural capital with producing food under regenerative agriculture systems. There are also calls to increase the efficiency of food production and hence allow more space for nature.

There are risks that existing tenants will be negatively affected by landlords looking to maximise natural capital returns and seek to change tenancies. There are cases where rural communities are affected by the loss of traditional farming opportunities. The impact of such changes will depend on how natural capital initiatives blend with other farming activities. Of particular interest is the potential for new opportunities to arise for those managing biodiversity-rich habitats or providing complementary services such as 'safaris'. The extent to which these jobs will be available for those who have lost opportunities is not known.

Farmer Question: Will there be new job opportunities for managing land in natural capital initiatives?

RISK TYPE	POTENTIAL CONSEQUENCES	SEVERITY	MITIGATION
Land owners less willing to rent land to tenants	Fewer opportunities for existing tenant farmers and new entrants.	***	Collaboration between land owners and tenants to develop natural capital opportunities. Land owners start joint ventures with existing and new entrant farmers.

5.10 Measurement

All natural capital initiatives require clear measurement that can identify change from a baseline. Some initiatives conduct the baseline as the first stage of the process. There is a risk that some offset companies will seek to reduce costs by having less rigorous baselines and ongoing monitoring that may be needed for 'ground truthing' of their models. Having a good baseline may open new opportunities but there are risks that the methodology used for the baseline are not considered adequate in the future. The Sustainable Farming Incentive (SFI) provides some funding to cover the costs of soil testing, but the funding provided at the introductory stage may not cover the costs of soil testing that would be required if carbon certificates are being sold.

Farmer Question: Do you need to measure natural capital on your farm? What baseline measurements do you have of your natural assets? What approaches are recognised/accredited by buyers?

Measuring biodiversity impacts tends to be more complex. There are innovative approaches that can reduce the measurement costs for farmers. As mobile phone-based technology related to identification of flora and fauna develops, there is a democratisation of ecology and growing cadre of volunteer recorders that can support farmers' measurements. The technology includes plant identification apps, identification of bird species based on recording bird calls and the evidence

of wildlife species from water samples using environmental DNA. There may be benefits from groups of farmers coming together to share the cost of these surveys.

Where there is a premium paid for insetting, or a payment is made for farmers' time, the costs of measurement can be included in that price. There is a risk that the measurement of carbon and biodiversity impacts could become a requirement for produce buyers and banks lending to farmers. Under the current government and industry-wide initiatives, there is a growing requirement for large businesses to report on their emissions and impact. The impact of these businesses can be seen by the direct emissions they produce (often referred to as scope 1), the indirect emissions from generating the electricity that they use, (referred to as scope 2) and the emissions that they are enabling within the businesses in their supply chains (referred to as scope 3). While almost all farming businesses would be excluded from such requirements because of their size, they will still be affected as they are in the supply chains of these large businesses. There is a risk that smaller farms may be disproportionality affected if produce buyers decide to only buy from those farms that are measuring their impact. It is hoped that businesses will provide incentives within their supply chain and those businesses involved in selling natural capital may have a head start in providing this data.

RISK TYPE	POTENTIAL CONSEQUENCES	SEVERITY	MITIGATION
Inappropriate methodology leading to poor quality data	Data cannot be used by schemes resulting in lost time and effort. Measurement may be avoided.	**	Identify people who have the skills already, build capabilities on the farm, work with other farmers.
Smaller farms will be disproportionally affected by the fixed costs of measurement	Profit margins are squeezed, or smaller farms discouraged from any natural capital monitoring. May mean it is only possible for larger or collaborative projects to participate.	**	Agree what costs you are expected to cover and how much they will be. Ensure these costs are covered by payments/premiums. Take advantage of local experts who would be willing to carry out routine monitoring (eg, local experts, hobby bird watchers).

Farmer Question: What help can you get from volunteers such as bird watchers and local environmental organisations? What technology can reduce the costs? Can groups of small farms share the costs? Can you use public sector-funded schemes to cover costs?

6. Policy issues

6. Policy issues

The policy environment plays a key role in supporting the development of natural capital markets. The following issues were identified as areas where further policy engagement is required. While there is much attention to these markets within the UK governments, there is a need for an agenda that ensures all farms of different sizes, types and locations are considered.

WHAT CAN BE SOLD

Policy can shape the types of natural capital that can be traded and also provide the incentive for the private sector to start paying for ecosystem services. For example, the market for biodiversity net gain has developed as legislation requires developers to offset their impacts. Likewise, the interest in carbon offsetting has come about as businesses respond to the requirement to report on their impacts such as through the Task Force on Climate-related Financial Disclosures. The interest in water companies comes from the legislative requirement to improve water quality. Sensible regulation of environmental impacts can therefore create the incentives for businesses to work with farmers to solve these issues and create new opportunities for small farms.

In England, Environmental Land Management Schemes (ELMS) play a key role in delivering environmental actions. There is some overlap with the private sector-related natural capital payments although care is taken by both ELMS and the private buyers to avoid double payments. ELMS needs to play a role in complementing private payments for ecosystem services. There is a risk that ELMS may be crowding out private investment, as farmers prefer to go for shorter contacts under ELMS. A policy agenda, therefore, needs to explore how ELMS can crowd in rather than crowd out investment.

As mentioned before, farmers are delaying their decisions about changing their practices as they are uncertain about when the payments will start. The 'additionality clauses' can mean that a farmer starting action before having a contract for payment for the ecosystem service, could then not be eligible for payment. At the same time, some government-backed schemes were felt by some farmers we interviewed to be restrictive and easy to get penalised: some practices encouraged were not felt to be common sense or were being done anyway and therefore not able to be paid for (eg, the Scottish Agri-Environment Climate Scheme).

Additionality also means that private payments cannot support existing good practice. The public good of maintaining high quality existing natural capital needs to be supported though ELMS. Farmers reported that they are penalised when having past stewardship actions that reverted arable land to less intensive wildlife-

Policy can shape the types of natural capital that can be traded and also provide the incentive for the private sector to start paying for ecosystem services. Certainty in markets comes when there are common standards and systems in place that can hold businesses to account.

friendly grassland. While the initial payments were attractive enough to incentivise a shift away from arable production, these subsequently were reduced to a fraction of the original payments once the stewardship contract was being renewed. This lack of support of existing good practice is creating a perverse incentive for farmers to delay action, or even reduce their current level of natural capital so that they can then demonstrate greater additionality. A policy agenda to support *maintenance* of natural capital would address this. This could include exploring support payments and tax incentives where higher standards are being met.

CREATING MORE CERTAINTY IN MARKETS

The uncertainty in natural capital markets, and in agriculture as a whole, is leading land managers towards a "wait and see" strategy. As the different natural capital markets of carbon offsetting and Biodiversity Net Gain develop, there is a need for a policy agenda concerning how to ensure integrity in measurements and avoiding double payments. While the private sector takes time to develop different competing approaches, there is a public good of having common sets of metrics, a common understanding of approaches, and a national registry or ledger that will ensure a specific natural capital on a parcel of land is not double counted. This is particularly important where there is stacking of natural payments. This is also important where landlords and tenants may both be registering different elements of natural capital on the same parcel of land. No single private organisation should take on this role, and there is a strong justification for the public sector to play a coordinating role.

Certainty in markets comes when there are common standards and systems in place that can hold businesses to account. The UK Woodland Carbon Code and UK Peatland Code are examples of having common standards, and Defra's work on Biodiversity Net Gain also shows how public sector can play a role in creating the markets. The Soil Carbon Code is less developed and the vital role this can play in tackling climate change justifies a strong role for government in accelerating it. There also need to be systems in place for holding businesses to account and challenging claims of greenwash. The Advertising Standards Authority has been playing a vital role in this, and this should be strengthened and supported alongside other forms of trade standards to ensure the integrity of the new markets continues. Professional advice is vital but this too needs standards to ensure rigour and that professional indemnity insurance is covered.

ENCOURAGING INNOVATION

The early stage of these markets requires encouragement of pioneers who can reduce risk for others. Smaller farmers are making the right decision to see how the markets evolve and allowing those with deeper pockets to take the risk as innovators. There is also a range of intermediaries who are innovating new

services to act as a bridge between farmers and markets for natural capital. These innovators should be supported with innovation grant funding. The process of innovation is also driven by healthy competition. As the markets develop, there is a need for a balance between encouraging key intermediary businesses to innovate, but at the same time ensuring there is the healthy competition needed to drive further innovation and avoid having specific markets captured by very few buyers. Multiple providers can create confusion for farmers, so there is a need for signposting and assurance systems to ensure intermediaries meet high standards.

GOVERNANCE OF LAND USE

There has not been a clear land use policy in UK nations, although there is greater attention to this in Scotland and Wales. As natural capital markets emerge, there needs to be a policy agenda that ensures unintended consequences (social and environmental) are considered. For example, there are challenges facing upland communities where there has been rapid expansion of tree planting affecting whole communities. More careful planning of having the right tree in the right place can help ensure community impacts are positive. The planning system may need to be involved where there are major changes to land use affecting the wider community.

COLLABORATION

Where small farmers are not able to develop initiatives on their own, there can be benefits from having policy that encourages clusters, farmer-led solutions, cooperatives and landscape-led partnerships. There are also opportunities to have community-led funding where devolved budgets and local democratic decision-making can support initiatives with wider social and environmental impacts.

UNINTENDED CONSEQUENCES

Previous policies have been used to create clear definitions of what is termed ‘agricultural’. With natural capital markets creating new opportunities, there is a need to reassess this. At the moment, there is a disincentive for tenant farmers to enter into natural capital initiatives if the land in question is then deemed to be non-agricultural, and they could be given notice to quit. Similarly, there are measures to ensure family farms continue between generations rather than having to be sold to pay inheritance tax. Agricultural Tax Relief (and Business Property Relief) need to consider the trading activity in natural capital markets to ensure there are no disincentives for long-term contracts. The tax regime needs to align with the objective to encourage farmers and landowners to participate in natural capital markets. This can be achieved by amending the legislation to ensure that inheritance tax reliefs are not lost on the land taken out of agricultural use for these purposes.

MEASUREMENT

As natural capital markets emerge, there is a need for clarity of what should be measured and how to measure this. There is also a need to have a baseline from which to show additional natural capital accumulation. This can be covered by some payment systems, but with the delays in developing the markets, there is a need for having a baseline measurement funded by government so that farmers can then benefit from future positive changes such as increased carbon capture in soils. Public sector agri-environmental programmes can play a role in encouraging this. However, there is uncertainty over what should be measured in soil testing with a risk that the low levels of funding per hectare will result in lower cost soil carbon measuring which would not be usable as a baseline by those wanting to buy carbon in the future. However, there are considerable benefits for farmers to know how their practices support carbon capture and biodiversity, so any measurements can be positive on this front. There also need to be incentives for reporting on natural capital.

There is a need for a cadre of ecological surveyors to meet future needs in businesses, as well as volunteers supporting farmers. As technology develops ways of measuring biodiversity and other key measures, there can be a democratisation of ecological surveys with digital identification of flora and fauna. Having more volunteers available for smaller farmers will enable them to access knowledge on natural capital.

7. Conclusions and recommendations

7. Conclusions and recommendations

With the dramatic changes facing farmers, there is a need for new opportunities and income streams that also address our sustainability challenges. There are positive drivers for on-farm investment in natural capital driven by policy agendas such as government carbon net-zero targets and the ambition to increase the area of land protected for supporting wildlife. There are further positive drivers coming from businesses that want to work with farmers to offset their impacts and ensure their supply chains are sustainable. Despite this, the markets are not developing evenly or with sufficient clarity, which means they are not yet providing easily accessible income streams for farmers.

This is particularly important for smaller farmers who may not have the economies of scale or the capacity to explore innovative approaches. There is a need to use the transition to sustainability as a way of keeping smaller farms viable and avoiding the risks of some farms being excluded from these markets. If farmers are involved in natural capital markets, they are likely to be reporting on their positive impacts and therefore tend to be meeting the requirements of produce buyers and banks as these organisations increasingly require environmental reporting from farmers.

This report shows how there are opportunities, but there is also a need for innovative intermediaries and the public sector to unblock the current limitations. Firstly, there is a need for measures which reduce the costs for farmers and help them to understand what they are signing up for. This also requires investment in developing common measures for soil carbon and biodiversity and a greater understanding of the natural capital potential of different localities. For example, soil type affects the ability to sequester carbon, and biodiversity benefits are greater where there is interconnectivity and corridors. This emerging market also needs common standards to ensure both those paying for the ecosystem services and those providing the services are operating to high levels of effectiveness and integrity. Advisors need to play a more active role by advocating to government that there are many benefits of standardisation. In terms of contracts, one farm advisor in Wales suggested that farmers should have access to off-the-shelf contracts they can tailor to their own business and also have clauses that allow them to withdraw from longer-term contracts.

Secondly, there is a need for systems that allow farmers to stack different payments for ecosystem services and get paid for carbon sequestration, biodiversity benefits, water quality improvements and recreation in nature. This can require finding ways of 'bundling' payments so a there can be a single

contract for several ecosystem services. It also requires types of ledgers that record what is happening on each parcel of land so there is transparency regarding what is being sold to whom. No single private organisation should take on this role, and there is a strong justification for the public sector to play a coordinating role.

Four scenarios for payment for ecosystem services contracts

	SINGLE CONTRACTS	MULTIPLE STACKED CONTRACTS
Uncoordinated	Farmers may sign up to one contract (with government, business or through a hybrid aggregator).	Farmers and landowners have multiple contracts, but buyers have no way of knowing if there are double payments. Landlords and tenants may be looking to enter different but overlapping contracts.
Coordinated	Farmers are offered single contracts for bundles of natural capital. May require local intermediaries that can bring groups of smaller farmers together.	Multiple buyers of natural capital and choice for farmers. Ledgers and transparency function effectively, avoiding double payments. Cooperative models at scale allow farmers to work together to spread the risk of not delivering on natural capital or carbon on a single site by spreading the benefits.

Thirdly there is a need for coordination and cooperation that brings together groups of farmers to work at a landscape scale, and develop natural capital offers that are simple for smaller farmers to access. Cooperation will also be required between landlords and tenants with new approaches found to clearly share the benefits of natural capital payments. Coordination and collaboration are also needed to support localised decision-making to create effective land use frameworks that help plan how to balance different demands on the land. This requires the involvement of farmers, land agents and advisors, farming associations, NGOs and government (local and national).

Fourthly, a common theme running through this study is the huge uncertainty within the current market. Farmers must consider the level of risk they are willing to take at this early stage in the market. With great uncertainty, there is a need to ask, “is this for me?” There remain questions over whether farms can sell natural capital if they are not net zero or nature positive themselves already. If this becomes a future requirement to grow food, farmers cannot be in a position where they have sold the rights to these assets. There are also risks in terms of loss of natural capital that may have been paid for, with key questions for insurance of these assets

First movers and pioneers should be encouraged and supported to develop these markets and take the initial risks. This may mean that the initial development of the market is less accessible to smaller farmers who are less able to invest time in understanding the implications of signing a longer-term contract.

Where farmers have been investing their own resources in transitions to sustainable agriculture, there should be support for maintaining existing natural capital.

Where innovations are emerging, there needs to be a careful evaluation to learn lessons for all farmers. However, there is also a risk of not acting and missing out on income streams that are available. For farmers on a transition to sustainability and regenerative agriculture, there can be vital supporting income streams that can accelerate the transition.

Finally, where farmers have been investing their own resources in transitions to sustainable agriculture, there should be support for maintaining existing natural capital. The payment for ecosystem services will only be focused on the additionality of having new natural assets created. It will not support farmers who are doing good practices already. The public good of maintaining natural capital needs to be recognised and supported. Otherwise, there is a risk of farmers delaying good actions until a future market may develop.

Appendix 1 – Questions that farmers should consider

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Farmers and their advisors need to consider a set of questions when planning for payments for ecosystem services. In section 5, each of these questions is introduced and elaborated. They are presented here as checklist to shape farmers' own discussions.

Q1: What ecosystem services/natural assets do you think you can be paid for?

Water quality

- Improving water quality if there are water companies that want to pay farmers.

Wildlife

- Creating and maintaining new wildlife habitats with Biodiversity Net Gain.
- Maintaining wildlife habitats, for example, being rewarded for existing natural capital through government programmes.
- Getting a premium for produce, with certifications such as LEAF Marque/Jordan's, Fair to Nature, Organic.

Carbon

- Carbon capture in trees.
- Increasing carbon in the soil by changing the way you farm eg, offsets. and produce buyers.
- Improving soil so higher yield.

Landscape

- Visitors and tourism because of nature/landscape.

Q2: What can you commit to?

- What type of contract are you being asked to sign, and what are the implications?
- What can a tenant sell and what will your landlord support? What permission is needed, how to share with the landowner, and what agreements are needed?
- Is it possible/desirable to secure a longer tenancy agreement?
- Is your landowner open to a 'no agenda' meetings with tenants so that discussions can move from being transactional to being more collaborative.
- How long can you commit for? What are the views of other landowners/ family members?

- Are there short-term sales, such as cover crops or paying visitors?
- Do schemes allow you to have the same piece of land in different natural capital markets?
- Is there a minimum size of land that can be put forward under different schemes?

Q3: When do you sell natural capital?

- Do you want to sell now to a willing buyer or hold the opportunity for later (in case produce buyers require you to be net zero or nature positive)?
- Do you want to take action now or wait until there is more certainty?
- Do you feel the price is reasonable or do you feel it is undervalued?

Q4: Are you selling enough to cover your costs?

- Does the income cover the cost of setting up/joining initiatives?
- Are there farmer groups, clusters, cooperatives or other organisations that can be honest brokers?
- Can groups of farmers come together to share ideas?

Q5: What do you know about the buyer?

- Has the buyer been recommended?
- What are different buyers offering?
- Are you selling direct or selling for credits/certificates?
- Does it matter where the money is coming from?

Q6: What are the risks and unintended consequences to your farm?

- Will signing up to sell one of your natural assets now limit other future opportunities?
- Do you sell each asset separately or sell a bundle?
- Can you sell your carbon before you are net zero yourself?
- If the contract requires a major change of land use, will this make your other enterprises more diverse/resilient or less viable?
- Will there be new job opportunities for managing land in natural capital initiatives?
- How will changes in farming and land use affect your long-term plans (eg, changing restrictions in the tenancy or inheritance tax position)?

Q7: Do you need to measure natural capital on your farm?

- What baseline measurements do you have of your natural assets?
- Can you use public sector funded schemes to cover costs?
- What approaches are recognised/accredited by buyers?
- What help can you get from volunteers (eg, bird watching) and local environmental organisations?
- What technology can reduce the costs?
- Can groups of small farms share the costs?

Appendix 2 – Glossary

Appendix 2 – Glossary

Additionality	Additionality is required in all offsets to demonstrate that the actions of the farmers would not have happened without the payment from the offsetting business. If an activity is said to be additional, then there must be proof that this would only occur if there were offset payments.
Biodiversity net gain (BNG)	Biodiversity net gain (BNG) is an England-wide regulation whereby developers have to replace any biodiversity lost when they develop land. Legislation in the Environment Act (2021) sets out ways of valuing what they have lost and then requires this value, plus a minimum of 10% more, to be recreated either on the development site itself or at another site to 'offset' biodiversity losses arising from development (which becomes mandatory in 2023).
Blended finance	Blended finance is a combination of public or private capital. Having capital from across different sources helps to spread risk and allows organisations to collaborate on shared objectives while seeking either a financial, social or environmental impact return.
Carbon sequestration	Carbon capture and sequestration occur when plants and trees take carbon from the atmosphere and hold it in a growing tree or soil organic matter.
Carbon units	Carbon units are measures of how much carbon has been sequestered, for example, from soils, trees, other land uses or carbon capture and storage technologies (measured in tonnes of carbon dioxide equivalent (tCO2e). These units form tradeable exchange commodities as certificated credits or (voluntary) certificates in carbon markets.
Corporate Social Responsibility (CSR)	CSR is a voluntary business model where private companies or large corporates contribute towards societal goals through philanthropic activity, ethical decision-making or supporting charities and voluntary organisations.
Environmental, Social and Governance (ESG)	ESG is a framework whereby organisations seek to maximise value beyond the financial bottom line and contribute to societal and environmental goals. Often this involves being linked to accredited schemes and standards that can measure performance in realising these objectives. Many investors will screen organisations based on their proven track record on ESG which can help them to demonstrate that investees are not engaging in risky or unethical practices. Increasingly, private and grant funders are asking businesses to demonstrate ESG credentials. It also includes elements of voluntary Corporate Social Responsibility (see above).

Insetting	Insetting occurs when a business is buying produce from farmers and asks the farmer to undertake activities that will compensate for any carbon dioxide emissions (or damage to nature) arising from growing, processing and distributing a product. Farmers helping their customers in this way can be given a premium on their products or preferential access to specific value-added markets.
Natural capital	Natural capital includes a farm's assets of soil, trees, hedges and natural habitats. These are needed to deliver nature-based solutions. Measures of these natural stocks are required to be able to monetise them in natural capital markets.
Nature-based solutions (NBS)	The activities that use the soil and natural habitats to solve environmental problems such as water quality, flooding, wildlife loss, greenhouse gas emissions.
Net zero	Net zero is the UK government's ambition for the economy to have reduced greenhouse gas emissions to zero by 2050 in line with The Climate Change Act 2008 (2050 Target Amendment) Order 2019.
Nutrient neutrality	Nutrient neutrality relates to all development through the planning system that will increase people and nutrient load and requires housing developers to ensure that any increase in nitrates and phosphates that arise when people build and live in new housing is offset by projects with farmers that filter these out or reduce nitrates and phosphates elsewhere in a river system. It only applies in certain areas where there are water quality problems.
Offsetting	Offsetting occurs when greenhouse gas emissions or other damaging environmental activity takes place in one location and the impacts are compensated by taking positive action elsewhere. For example, a business may have carbon dioxide emissions and, as part of their strategy to reduce their impacts, they not only reduce emissions through energy efficiency but also decide to pay a farmer or woodland owner for planting trees that will capture carbon from the atmosphere as the trees grow.
Payment for ecosystem services (PES)	Payment for ecosystem services allow farmers to be paid for providing nature-based solutions on behalf of other businesses or the government.
Stacking	Stacking allows a landowner or farmer to put various overlapping elements of natural capital on a piece of land into separately packaged units or nature-based credit schemes.
TCFD	The Task Force on Climate-related Financial Disclosures (TCFD) was established by the international Financial Stability Board in 2015. The TCFD gives recommendations to companies about the information they should disclose on climate-related impacts so that risks can be considered, and climate change becomes a core business and investment angle globally. This has led to mandatory reporting for larger companies in the UK.
TNFD	The Taskforce on Nature-related Financial Disclosures (TNFD) is designed to follow a similar route to encourage reporting on biodiversity but is currently in the design stage.

*We encourage you to read the **The Prince's Countryside Fund's A–Zero glossary** of more environmental terms that can help to improve your knowledge of the different issues and topics relevant to this study.*

Footnotes

Footnotes

1 **An independent report** published in 2022 and written by the Tenancy Working Group (TWG) led by Baroness Rock to review tenant farming in the context of Defra's post-Brexit environmental schemes.

2 **https://www.princescountrysidefund.org.uk/wp-content/uploads/2021/06/is-there-a-future-for-the-small-family-farm-in-the-uk-report.pdf**

3 The research team were also able to leverage a link to a **Middlesex University research project** funded by the Natural Environment Research Council (NERC) and NatureFinance that examined the role of finance to support biodiversity reporting and sustainable finance of SMEs (SME FinBio). As part of this project, the research team produced policy recommendations and a nature and carbon investment toolkit, available on the project **webpage**.

4 See Section 4 for a comparison of the opportunities – and potential risks – for farmers and landowners in different carbon and natural capital markets.

5 See for instance Defra's **'Enabling a Natural Capital Approach'** (England).

6 Life Beyond Capital by John O'Neill. **CUSP essay series on the Morality of Sustainable Prosperity** | No 6

7 Reed, M.S. et al. (2022) Integrating ecosystem markets to co-ordinate landscape-scale public benefits from nature. PLoS ONE 17(1): e0258334. **https://doi.org/10.1371/journal.pone.0258334**

8 In Scotland, these principles are set within a government policy agenda to create a "wellbeing economy", where green economic recovery helps to meet climate and nature targets and lead to equitable, "just transitions".The Interim Principles lay the groundwork for a "values-led, high-integrity market for responsible private investment in natural capital to communities, investors, land owners, public bodies and other market stakeholders".

9 See: **https://www.gov.uk/government/news/50-projects-receive-up-to-100000-each-to-boost-investment-in-nature**

10 The **soil carbon code** is under development and there is also a **Saltmarsh Carbon Code** under development that will enable saltmarsh carbon to be purchased and support restoration projects.

11 This is the framework under which national government reports, set out in the from the Kyoto and Paris agreements.

12 LiDAR which stands for Light Detection and Ranging, is a remote sensing method that uses light in the form of a pulsed laser to measure distances between the source (in this case an aircraft) and the ground surface and objects on the surface (houses, trees, etc).

13 In addition, the English National Planning Policy Framework (NPPF, 2021) states that conserving and enhancing biodiversity, must be a core criterion of planning policies and decisions should "achieve net environmental gains" (para 118) and "take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries" (para 171).

14 As set out in set out in NPPF (2021) paragraph 175a.

15 Nature Impact Tokens were developed by the FinTech company CreditNature and launched by Ecosulis, nature recovery and rewilding advisors.

16 The Financing UK Nature Recovery initiative identified additionality occurring where the project would not have taken place without the funding, where it is not a requirement of existing laws and regulations or industry standards, and where it is not being funded already (Financing UK Nature Recovery, Background Paper, April 2021, p.13).

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