

# Greener Pastures

Securing the economic and  
environmental future of Britain's farms



Ned Hammond

Foreword by Rt Hon George Eustice MP

## About Onward

Onward's mission is to develop bold and practical ideas to boost economic opportunity, build national resilience, and strengthen communities across all parts of the United Kingdom.

We are not affiliated to any party but believe in mainstream conservatism. Our vision is to address the needs of the whole country: young and old, urban and rural, for all communities across the UK – particularly places that have too often felt neglected or ignored by Westminster.

We believe in an optimistic conservatism that is truly national – one that recognises the value of markets, supported by a streamlined state that is active not absent. We are unapologetic about standing up to vested interests, putting power closer to people, and supporting the hardworking and aspirational.

## Thanks

The author would like to thank the European Climate Foundation for their financial support for Onward's Getting to Zero programme. I would also like to thank all the external organisations and stakeholders who provided evidence and feedback. In particular, I would like to thank Tom Lancaster, Sam Hall, Nick von Westenholz, and Henry Wethered. Adam Hawksbee, Deputy Director, edited this paper. These contributions all improved the quality of the analysis and ideas. Any mistakes, however, are the authors' own.

Onward is a small non-profit that relies on the generosity of our donors and patrons to do our work. We are indebted, in particular, to our Founding Patrons: Martyn Rose, Michael Spencer, David Meller, Bjorn Saven, Richard Oldfield, Robert Walters, Tim Sanderson, James Alexandroff, Jason Dalby, Graham Edwards, John Nash and Theodore Agnew. Without this philanthropic support, our work would not be possible.

## About the author

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# Foreword





During the EU era, very little attention was given to discussion about future agriculture policy. The rules of the Common Agricultural Policy (CAP) were determined elsewhere. Any "reform" was the product of multiple compromises with twenty-eight countries, all with different agendas. It was stifling, and since it was impossible to have any meaningful influence over the shape of the policy, very few people outside a small band of officials in the Department for Environment, Food and Rural Affairs (DEFRA) even bothered trying.

That's changed. Whatever the strengths and weaknesses of the current policy mix in the UK, there is now a vibrant public debate about agriculture, with leading think tanks like Onward taking an interest and delving into a policy area that has been closed for the best part of half a century.

It has been liberating for DEFRA too. No longer do officials spend their time fretting about compliance with EU law, infraction risk and "disallowance" penalties imposed by the European Commission. Over the last six years, creative thought and building new policies from scratch have been the order of the day.

With that freedom to innovate comes a responsibility to get it right. We decided to phase out the legacy subsidies for land ownership over seven years to help businesses adapt. The concept of a subsidy with conditions would be replaced with paying willing land managers to adopt sustainable practices and make space for nature.

Animal welfare outcomes would be financially rewarded for the first time. Farmers would receive a profit margin for participating in the new schemes. Recognising the low profitability of agriculture, there would be a substantial increase in grants to help farmers invest and reduce costs, and new regulations to protect the integrity of contracts in the supply chain.

During my time at DEFRA, I was always clear that there should be an iterative approach. We knew we wouldn't get everything right in the first go and should refine and modify the policy by learning from experience. Onward's new publication, Greener Pastures, is a great contribution to that vibrant debate now taking place about agriculture, food security, land use and nature's recovery.

There are some good proposals that are in line with internal work that DEFRA has been working on for some time, such as creating a market in biodiversity credits, developing a role for accredited private groups and charities to help deliver schemes, grants for slurry management and new technologies such as methane inhibitors in feeds and fertilisers made from wastes.

Onward also rightly identifies the need to increase payment rates to drive levels of participation in the new schemes. The statutory target for species abundance under the Environment Act should drive payment rates, not the outdated formula of "income foregone", which the EU and World Trade Organisation (WTO) still cling to.

If we want land managers to deliver ecosystem services, we should treat it as a market and not begrudge them a margin. Although the Government decided to abandon the income foregone methodology several years ago, there will doubtlessly be corners of Whitehall that would want a reversion to the past approach. That would fail farmers and the environment and must be resisted by every political party as we enter an election year.




**The Rt Hon George Eustice MP**

Member of Parliament for Camborne and Redruth

Former Secretary of State for Environment, Food and Rural Affairs

# Executive summary





Farming can conjure up images of rolling hills with grazing cattle, golden fields of wheat and barley, red tractors and flat caps. It might stimulate nostalgia, with thoughts of a time gone by.

But agriculture underpins much of modern British life. Its output accounts for less than 3% of the goods produced in the UK. Yet in the most rural areas, from Cornwall to North Yorkshire, agriculture and food manufacturing contribute over a quarter of goods produced. And British farming provides more than half of the food consumed in the UK.

Today, Britain's farms face major challenges on two fronts: economic and environmental.

The economic challenge has four main elements:

- **Farms generate low and volatile profits.** They are squeezed by larger retailers and manufacturers, and are reliant on EU-era basic payments which are being phased out. Profits are volatile because farmers are highly exposed to the fluctuating cost of inputs, such as spiking fertiliser prices when Russia invaded Ukraine. Some farms generate large profits, but over two-fifths earn less than £25,000 of income each year and 15% of all farms make a loss.
- **Farms suffer from low growth.** Agriculture has underperformed the UK economy since the financial crisis due to a lack of investment, labour shortages, and changes to trade. Its output has only risen 5% since 2010 and exports have declined by 12.5% since Brexit.
- **Farms face a demographic crisis.** Older farmers are continuing to work due to a lack of successors. And at the same time, potential new entrants are unable to access the finance, land or experience they need to start farming. Nearly three in ten farmers are over 65 and the proportion of UK agriculture workers aged above 50 has increased by 15 percentage points since the mid-2000s.
- **Farms can't cope with extreme weather.** A lack of natural features, such as trees, restrict the land's ability to soak up and store water. Few farms have water storage to help cope with drought. And indoor vegetable production has declined. In 2020, wheat yields collapsed 40% due to drought and flooding. And in late 2023, hundreds of tonnes of vegetables were lost to floods.

A financially thriving and climate resilient domestic agriculture sector is essential, given much of the UK's imported food comes from countries facing significant climate risk and geopolitical uncertainties.

Farming is not only vulnerable to the changing climate, it also causes environmental damage. The environmental challenge facing agriculture has three main elements:

- **Farming emissions are stubbornly high.** Its main components - livestock burps and waste, fertiliser application and peatland damage - dropped

substantially in the 1990s and 2000s but have not continued that path in the last decade. Agriculture and land use contributes 11% of UK emissions and is the sector most off track from future targets.

- **Farming is a major contributor to water pollution.** Overuse of synthetic fertilisers and inadequate storage and processing infrastructure for manure result in nutrients seeping into rivers and lakes. This can lead to algal blooms on the surface of rivers, which suffocate the fish below. Agriculture and rural land management pollutes 40% of water bodies in England.
- **Farming intensification has caused biodiversity decline.** The removal of trees and hedgerows from farmland has taken away wildlife habitats. Over 100,000 miles of hedgerows have been lost since 1950. Pesticides have killed plants and animals beyond just those they are targeted towards. Since 1970, the number of farmland birds has dropped by nearly three-fifths.

The Government must act fast to address the twin economic and environmental challenges. To do so, they need to tackle the root causes that have been driving the problems facing British farms.

**First, farmers have faced the wrong incentives.** Under the EU's Common Agricultural Policy (CAP) farmers were originally subsidised to produce food, leading to intensification of agriculture and the removal of natural features to maximise yields. CAP reforms in the 1990s and 2000s removed some of the distortive effect but did not do enough to promote environmental protection. The new Environmental Land Management schemes (ELMs) have improved the incentives but low payment rates and bureaucracy are putting many farmers off applying.

**Second, farmers have not been encouraged by the private sector to produce environmental goods.** Private finance markets for domestic nature-based carbon and biodiversity credits are starting to emerge. This is prompted by companies and individuals choosing to offset their emissions, meaning they pay for tree planting or nature restoration projects. But less than 3% of UK woodland and below 1% of peatland are currently used for carbon credits. Farmers are wary of producing and selling credits because the markets are underdeveloped.

**Third, investment in infrastructure and new technology has been too low.** Limited spending on machinery, equipment and infrastructure hinders productivity but also leads to environmental damage, such as water pollution. New technologies could address agriculture's emissions and resilience problems, and provide growth opportunities for the industry. The Department for Environment, Food and Rural Affairs (DEFRA) has begun to tackle this with the Farming Investment Fund and Farming Innovation Programme but these initiatives are not dealing with some significant environmental problems.

**Fourth, the communities that underpin farming are not being fostered.** Not enough farmers are being given the financial backing they need to support each

other with environmental challenges. Only 6,000 out of over 100,000 farmers in England are in cluster groups. And farm succession is becoming a challenge. In previous generations this simply involved a family transition. But that continuity is disappearing and potential young farmers cannot secure the necessary experience, land or finance.

**Finally, domestic and international relationships are not being harnessed for the good of farmers.** Large supermarkets and food manufacturers can change the price and volume of their orders at the last minute without consequence. This hits farmers' profits and creates uncertainty about production, which leads to 1.6 million tonnes of food waste each year. Brexit has resulted in substantial barriers to exports to the EU. And trade deals with Australia and New Zealand are detrimental to some British farmers.

The Government is on the right path with ELMs, the Farming Innovation Programme, the Farming Investment Fund, and other initiatives. And its new approach to trade deals, such as CPTPP, has been better for the agriculture sector.

But agriculture's difficulties are still proving a political challenge for the Government. Farmers have been frustrated with the slow implementation of the new Environmental Land Management payment schemes, labour shortages and unfavourable trade deals. Focus groups held for Onward found that farmers think the Government should be doing more to support them.

Rural communities as a whole feel economically neglected and are disgruntled by water pollution. The Liberal Democrats have pinpointed National Trust and Women's Institute members that are unhappy with the state of rivers and lakes as potential swing voters in seats in southern England.

In 2019, the Conservatives won 98 of the 100 most rural seats in England and seven of the ten most rural constituencies in Wales. But recent polling suggests they could drop to 63 seats in England and two in Wales.

Ministers must do more to tackle the root causes of the twin economic and environmental challenges if the Government is to restore its reputation among the farming community. One challenge cannot be solved without fixing the other. Fortunately, the fiscal headroom to take on these issues is available in the farming budget.

Correcting the incentives for farmers means enhancing ELMs and fixing the bodies that support it. This paper sets out a five point plan to make ELMs a success. The plan encompasses bonuses to encourage greater environmental action, payments for regenerative farming, more effective farm advisory services and quicker payments, support from third party organisations on the most environmentally ambitious projects, and the removal of tax barriers to nature restoration.

The Government should help to develop a private finance market for nature that works for both buyers and sellers, introducing mandatory accounting rules and creating a nature credits bank.

Innovation spending should be increased around four key areas of environmental and economic opportunity. DEFRA should fund research into new types of methane suppressing feed additives, create an alternative proteins innovation cluster centred in North Yorkshire, support the development of new machinery to build a low emission peatland farming sector, and focus gene editing R&D on climate resilience.

Installing more infrastructure is required to improve productivity, tackle water pollution and enhance resilience to climate change. DEFRA should increase funding for slurry storage and water management, and launch new grants for poultry manure management and indoor farming. Planning barriers to building agricultural infrastructure should also be overhauled.

Grants' structural issues need to be fixed to enable more capital investment. Interest free loans should be offered to finance the purchase of infrastructure ahead of grants being received. And farmers should be allowed to purchase second hand equipment. More technological items, such as drones and sophisticated GPS systems, should be eligible for support.

DEFRA needs to rebuild agricultural communities by bringing together farmers across places and generations. It should expand the facilitation fund to support more farming cluster groups. And it should support the next generation by launching a land mobility programme to match older farmers with successors, increasing the number of county farms, and introducing grants and loans for new entrants to access farmland.

The Government should level the playing field between farmers and their larger customers by giving the Groceries Code Adjudicator greater powers across the supply chain and trialling longer term contracts. And it should work with the EU to give farmers easier access to its biggest export market.

Agriculture was central to Britain's past. But it can also be a thriving and sustainable part of its future. The Government can win back support from frustrated farmers and secure the agricultural sector - but it must act quickly.

## Recommendations

- 1. Deliver a five point plan to make ELMs work for farmers and the environment.**
  - 1.1** Offer bonus payments to farmers to carry out environmental actions on more of their land.
  - 1.2** Run a trial of Countryside Stewardship multi-year options for the transition to and maintenance of regenerative farming.
  - 1.3** Create an integrated "Environmental Land Management Advice Service" and give the Rural Payments Agency a short-term funding boost to improve IT systems.
  - 1.4** Enlist third party organisations to deliver more higher tier Country Stewardship and Landscape Recovery agreements.
  - 1.5** Amend agricultural property relief to include land that has undergone nature restoration.

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- 2. Develop accounting, regulatory and pricing frameworks to underpin well-functioning private nature markets.**
  - 2.1** Develop mandatory standards for private biodiversity and soil carbon credits.
  - 2.2** Create the "Nature Credits Bank" for nature-based carbon and biodiversity credits.

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- 3. Direct innovation spending to capitalise on four key areas of environmental and economic opportunity.**
  - 3.1** Fund innovation in methane suppressing feed additives, approve their use and mandate the inclusion of additives in feed once product choice is available to farmers.
  - 3.2** Create an innovation cluster for plant-based and fermentation-made proteins centred in a new Investment Zone in North Yorkshire.
  - 3.3** Create a low emission peatland farming innovation centre, and fund the development of machinery and equipment.
  - 3.4** Fund gene editing research that widens crop varieties, and accelerate secondary legislation for gene edited products.

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- 4. Increase grant funding and reduce planning barriers to tackle water pollution and enhance climate resilience.**
  - 4.1** Continue Slurry Infrastructure Grant funding after upcoming rounds and introduce a Farming Transformation Fund grant for poultry manure fertiliser production systems.
  - 4.2** Increase Water Management Grant funding and introduce a Farming Transformation Fund grant for controlled environment agriculture facilities that use renewables or waste heat.
  - 4.3** Reduce planning barriers for slurry stores and on-farm reservoirs.

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**5.** Remove the barriers to accessing the Farming Investment Fund so more farmers can improve productivity and environmental performance.

**5.1** Offer interest free loans to farmers accessing Farming Investment Fund grants.

**5.2** Update the Farming Equipment and Technology Fund to include drones and more sophisticated GPS systems, and allow the purchase of second hand equipment.

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**6.** Bring farmers together to tackle environmental challenges by expanding the number of cluster groups.

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**7.** Support the next generation by increasing the number of county farms, introducing a land mobility programme, and financing access to agricultural land - and complete implementation of the Rock Review recommendations.

**7.1** Provide £30 million annual funding for councils to purchase land for county farms and incorporate regenerative agriculture training.

**7.2** Launch a Land Mobility Programme to bring older farmers and potential successors together.

**7.3** Offer young farmers new financing options to access agricultural land.

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**8.** Expand the Groceries Code Adjudicator's powers and trial new contracts that increase certainty for farmers.

**8.1** Expand the Groceries Code Adjudicator's powers to more effectively support farmers.

**8.2** Trial longer term supermarket contracts that increase certainty for farmers.

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**9.** Negotiate a veterinary agreement with the EU to reduce barriers to exporting food.

# Poorer farms

Agriculture's economic  
challenge





Farming is integral to the fabric of British society. It spans the entire country, with agriculture utilising roughly 70% of the UK's land.<sup>1</sup> Around 470,000 people work in farming and agriculture accounts for 2.8% of goods produced in the UK.<sup>2 3</sup> But in the most rural areas of the country, it contributes 10% of goods value produced. And in combination with the food manufacturing industry it supplies, this rises to over 20%.<sup>4</sup> British farming produces 60% of food consumed in the UK by value, and 54% by volume.<sup>5 6</sup>

But the economics of British farming are becoming more challenging. This section looks at these problems in turn, setting out how profits, productivity, demographics, and climate resilience are contributing to an emerging challenge.

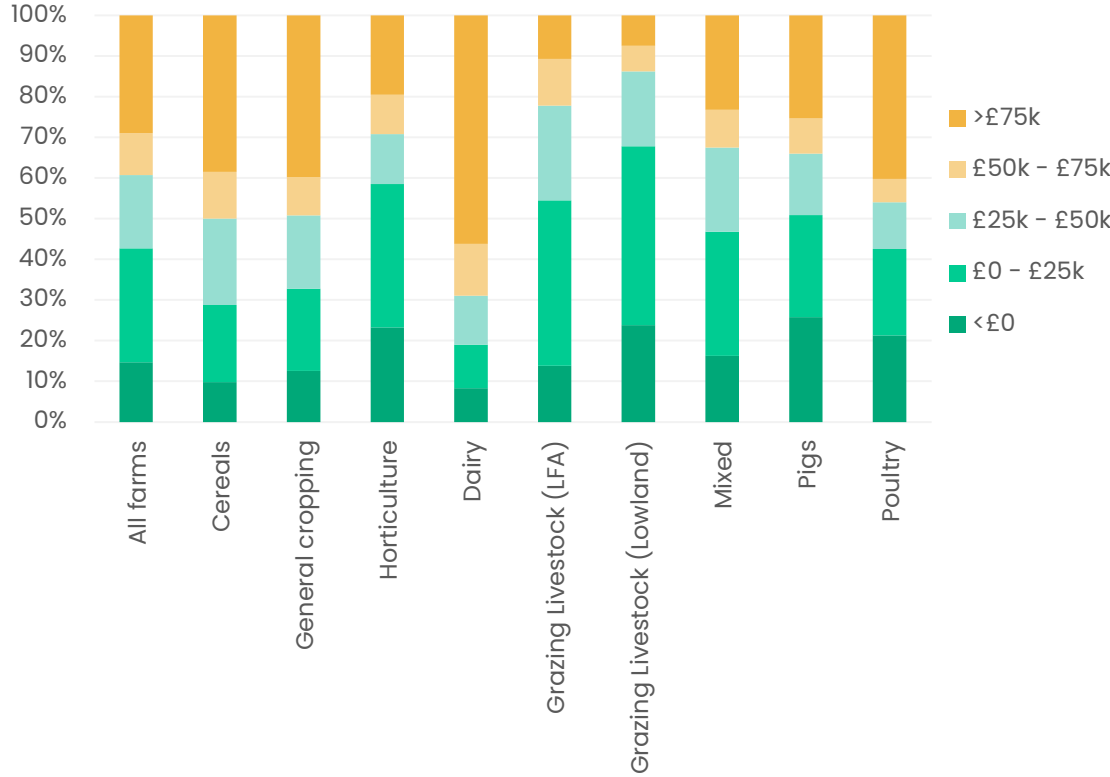
### 1. Farms generate low and volatile profits

Between 2019/20 and 2022/23, average annual farm profit was £70,000 including non-agricultural activities, such as running a bed and breakfast, and income support payments. But this figure masks the spread of profitability within the sector. 15% of all farms make a loss and over two-fifths earn less than £25,000 per year. And there is significant variance in profit generated by different types of farms, as shown in figure 1.<sup>7</sup>

**Figure 1: Distribution of farm business income by farm type in England 2019/20 - 2022/23**

Source: DEFRA

Note: All farms figures not available for 2019/20



Farming profit is also highly volatile. The industry generated nearly £8 billion of income from farming activities in 2022. But since 2010, there have been three separate years when it has made less than £5 billion in real terms.<sup>8</sup>

### Farmers are squeezed by large customers and are exposed to volatile inputs

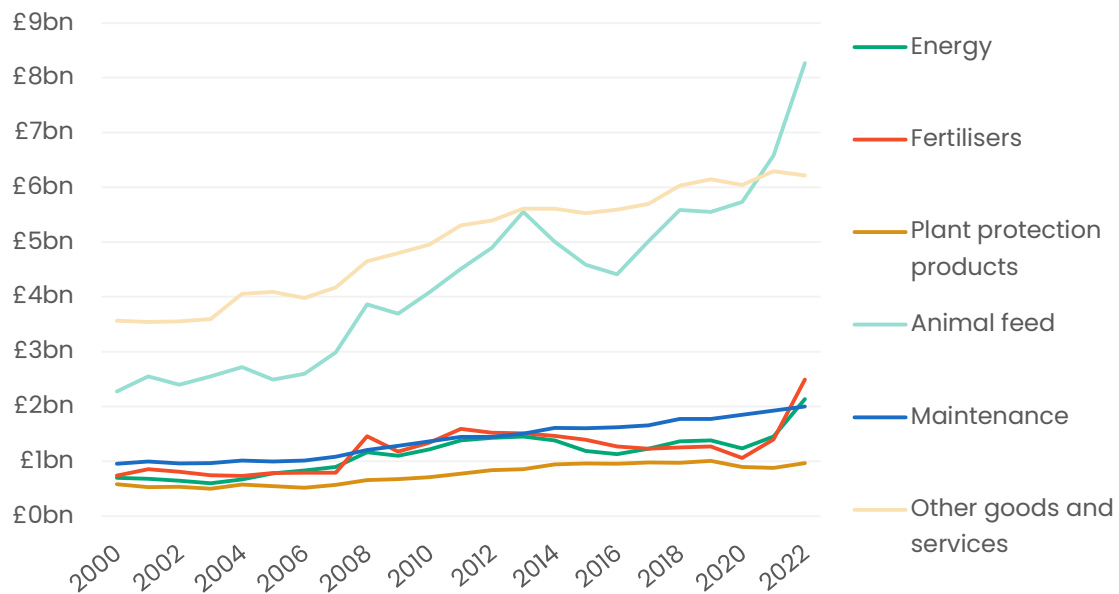
Retail is a major sales channel for many farmers. But farmers struggle to receive a fair price from supermarkets or from large food manufacturers and wholesalers in the middle of the supply chain.

Research by Sustain, a food system advocacy group, shows farmers often receive less than 1% of the profit from everyday foods. It calculates farmers make just 0.09p of profit on a loaf of bread, 0.05p on a block of cheddar, and nothing on a bag of carrots. The organisation highlights that farmers make little income on these products due to retailers wanting to provide low prices for consumers, overproduction to meet buyers' potential demand, and processors' and supermarkets' margins.<sup>9</sup>

The agriculture sector is highly exposed to volatile input costs, such as animal feed and manufactured fertilisers. Since the start of 2014, animal feed prices have at times been down by as much as a fifth but they are currently one-third higher.<sup>10</sup> Manufactured fertiliser costs are particularly volatile because they are reliant on natural gas in the production process, which shot up in price when Russia invaded Ukraine.<sup>11</sup> Prices have at times been a quarter lower than they were at the start of 2014 but they are currently almost 45% higher and at peak were 200% greater.<sup>12</sup>

**Figure 2: Aggregate expenditure on agriculture inputs in the United Kingdom (current prices)**

Source: DEFRA



The challenge of dealing with volatile input costs was highlighted by focus groups held for Onward of farmers from Devon, Cambridgeshire and East Anglia.

“(People think) farmers are being greedy, asking for more when supermarket prices are going up. And it’s like, well no it’s not. Do you realise how much fertilisers cost and everything is just going up so much? Obviously everyone knows, but people don’t see that on a day-to-day basis, I don’t think. They don’t appreciate that our overheads are going up as well.”

Female, 39, mixed farmer, Cambridgeshire

“One of the biggest challenges we face is the volatility in the markets. It’s quite something growing crops when you’ve got to buy the inputs and you’ve perhaps got to buy them six months, 18 months in advance and you’re taking a leap of faith. Nitrogen fertiliser, for example, last year if you could get it was about a thousand pounds a tonne.”

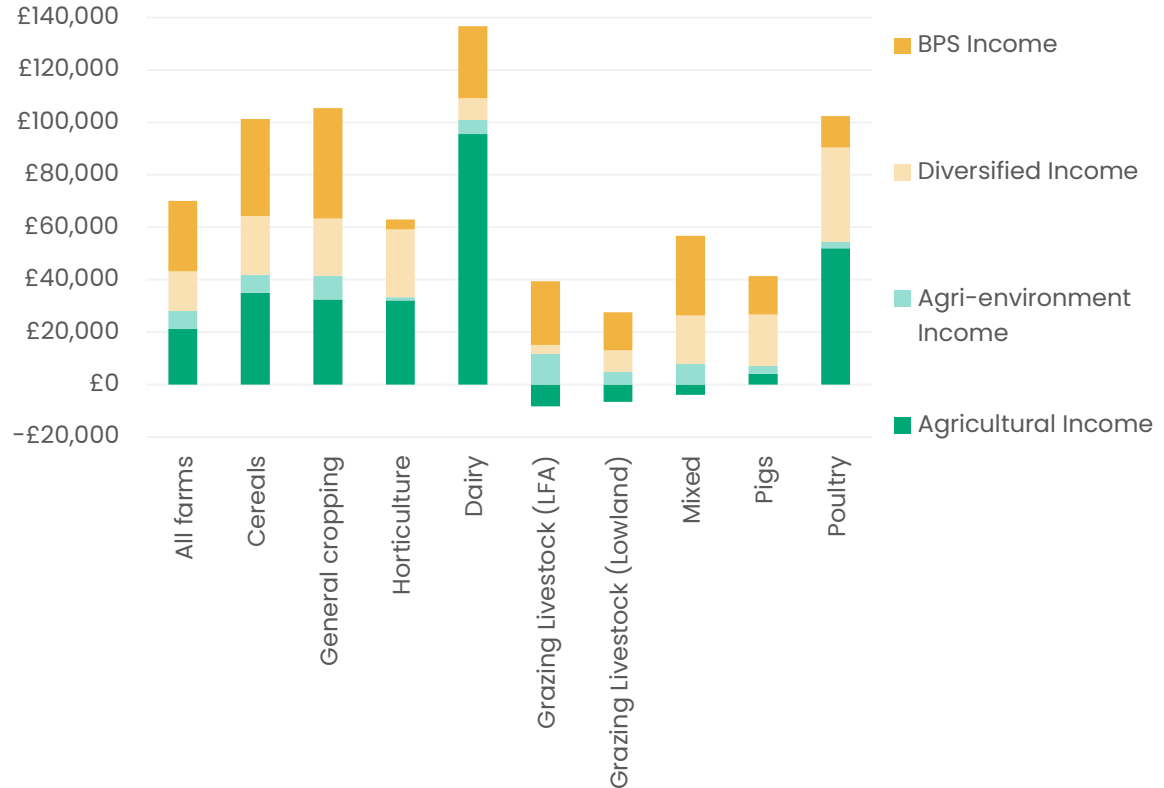
Male, 47, arable farmer, Cambridgeshire

### Farmers are still reliant on EU-era basic payments, which will be gone in five years

The Basic Payment Scheme (BPS) is an EU-era income support scheme for farmers engaging in agricultural activities provided by the Government based on the amount of land being farmed.<sup>13</sup> In order to receive payments, farmers must meet some minimal environmental standards, known as cross compliance rules, such as minimising soil erosion and protecting hedgerows.<sup>14</sup> BPS payments contributed £27,000 out of the £70,000 annual profit the average farm made over the 2019/20 - 2022/23 period.<sup>15</sup>

**Figure 3: Farm business income by cost centre by farm type in England 2019/20 – 2022/23**

Source: DEFRA



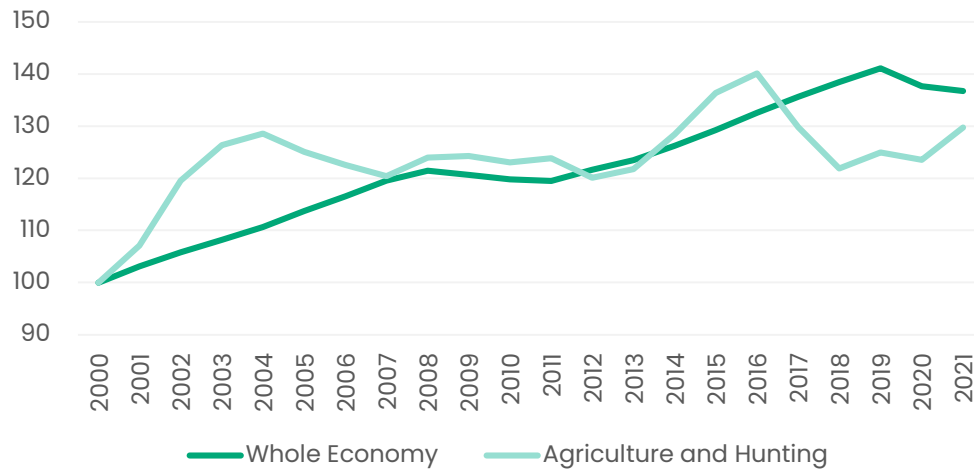
In 2020/21, BPS payments totalled £1.9 billion.<sup>16</sup> But they are being progressively lowered each year until they are fully phased out in 2028.<sup>17</sup> BPS is being replaced by payments for providing environmental goods and services alongside food production under the Environmental Land Management schemes (ELMs).<sup>18</sup> But, despite the potential to receive an alternative source of income, a Farmers Weekly survey in Spring 2023 found that nearly nine in ten farmers were unsure their farms would survive without BPS.<sup>19</sup>

## 2. Farms suffer from low growth

Agricultural output can fluctuate substantially year to year. But even accounting for the economic volatility, agriculture has grown by less than the overall economy since the start of the century. It was outperforming until 2015 but output has fallen since then.

**Figure 4: Gross value added growth (three year rolling average, index 2000=100)**

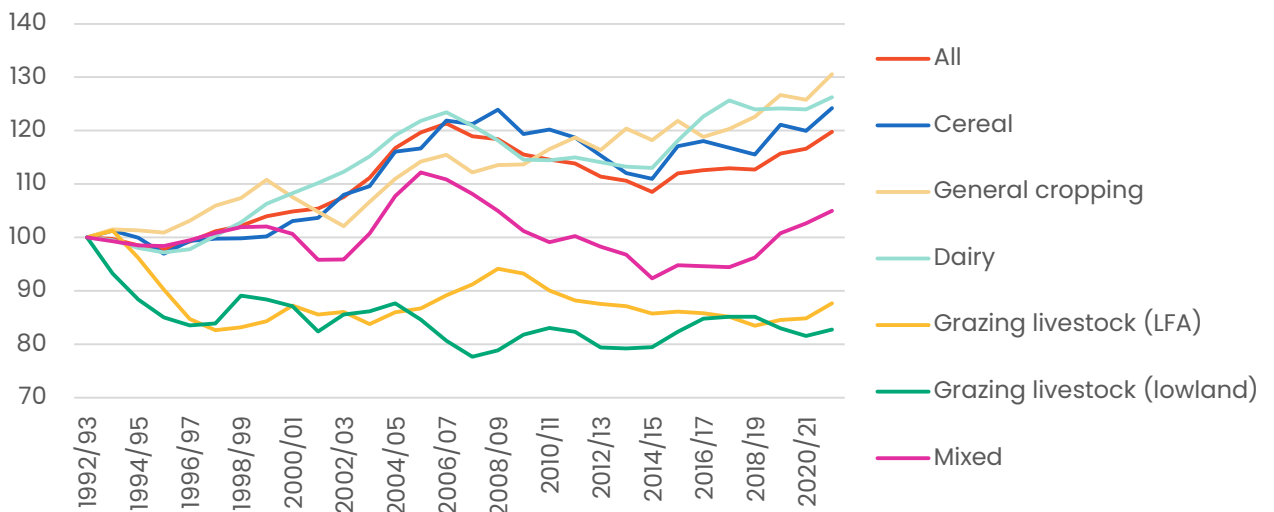
Source: ONS



The total factor productivity of farming in England has increased by around a fifth since 1990. But it has not improved since the mid-2000s. And the change in productivity varies greatly by type of farm. Arable and dairy farms' productivity has risen by between 25% and 30% since 1990. Mixed farms' productivity has been static and livestock productivity has dropped substantially.<sup>20</sup>

**Figure 5: Farms total factor productivity in England by type (three year rolling average, index 1992/93=100)**

Source: DEFRA



**Public and private investment in agriculture has not recovered since the financial crisis**

Agriculture, forestry and fishing business investment was nearly three-fifths higher in 2022 than 2000, in real terms. But current investment remains well below the pre-financial crisis peak and only recovered to 2008 levels in 2020. It

has also fallen relative to the overall economy. In the five years around the financial crisis (2007-11), agriculture, forestry and fishing business investment averaged 3.1% of the UK's total. It dropped to just 2.3% between 2017 and 2019 and, even following a recent increase, is still only 2.8%.<sup>21</sup>

Government expenditure on research and development (R&D) provides major benefits for the agriculture industry. The Roslin Institute's research helped to double the feed efficiency of poultry between the 1990s and 2010s.<sup>22</sup> And the John Innes Centre's wheat research is expected to be worth £500 million to the UK over the next 25 years.<sup>23</sup>

The Biotechnology and Biological Sciences Research Council funds many of these research institutes and innovation centres. But its spending has dropped from almost £600 million in 2014 (in 2021 prices) to £470 million in 2022/23.<sup>24 25</sup>

DEFRA's innovation funding has fared even worse. In 2010, its R&D expenditure was close to £200 million (in 2021 prices).<sup>26</sup> In the years leading up to 2010, the department funded research that helped to develop disease resistant wheat varieties, reduce the spread of foot and mouth and other animal diseases, and improve water efficiency of horticulture crops.<sup>27</sup>

But its R&D spending collapsed during the last decade. In 2021, it was just two-thirds of the 2010 level (in 2021 prices). And its contribution to total Government R&D spending fell from 1.5% to just 0.8%.<sup>28</sup>

**Figure 6: Defra R&D net expenditure (constant prices)**

Source: ONS



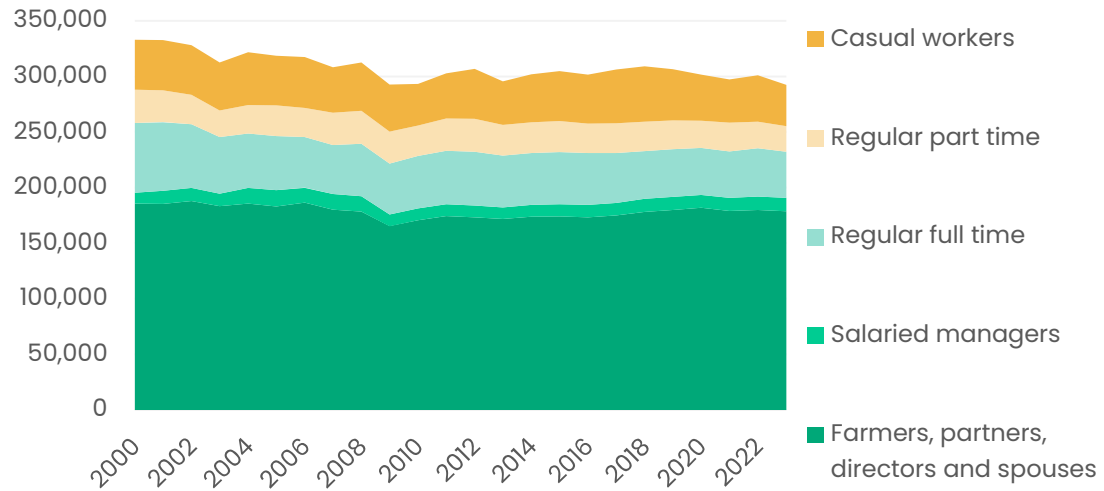
### Business numbers have begun to drop and the industry is affected by labour shortages

Since 2009, the number of agriculture, forestry and fishing businesses has increased by just 2%, while the whole economy's business numbers have risen by over a quarter. And agriculture business numbers have gone into decline in recent years, falling by 5% between 2018 and 2023.<sup>29</sup>

The farming workforce in England has fallen by 12% since the start of the century and 5% from its recent peak in 2018. The reduction in the workforce in the last five years is largely due to a decline in the number of casual workers.<sup>30</sup>

**Figure 7: Number of people working on commercial agriculture holdings**

Source: DEFRA



The decline in casual workers coincided with post-Brexit immigration laws coming into effect, which placed restrictions on migrant labour. This led to substantial labour shortages in 2021, particularly in horticulture, the sub-sector most reliant on casual workers.<sup>31</sup>

### Trade with the EU has declined and new trade deals could impact domestic sales

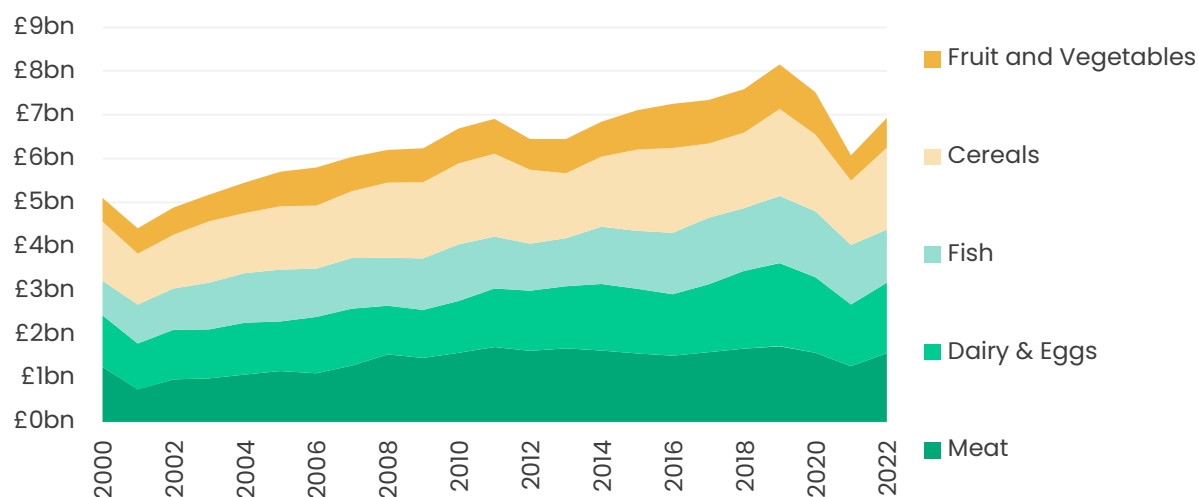
Brexit has created obstacles for farmers to export to the EU. Since leaving the EU, food products need to receive certification and go through border checks to be sold to the bloc.<sup>32 33</sup> This process increases the administrative burden on farmers and has led to a drop in exports. Since 2019, exports of meat, dairy, fish, cereals, fruit and vegetables to the EU have fallen 15% and in total have dropped 12.5%.<sup>34</sup>

Leaving the EU presents opportunities for farmers to export their goods to other countries. But thus far free trade agreements (FTAs) have been negotiated with countries that have very competitive agriculture sectors and are net agri-food exporters. These deals have caused British farmers concern about the impact on domestic sales.

When the UK signed FTAs with Australia and New Zealand, Minette Batters, President of the NFU, remarked that “it’s clear that UK farmers have very little to gain from these two deals”.<sup>35</sup> As we explore below, Ministers responded to these concerns in later trade discussions.

**Figure 8: Value of exports to the EU (2022 prices)**

Source: DEFRA



### 3. Farms face a demographic crisis

Farmers are much older than the average worker. In England and Wales, 29% of farmers are over 65 compared to just 4% of workers across the whole economy. Only 6% of farmers are under 25 compared to 10% of all working adults.<sup>36</sup> The number of UK agriculture workers aged over 50 has increased by one-third since 2005, while the number below 25 has dropped by a fifth.<sup>37</sup>

Older farmers are continuing to run their farms for two main reasons. Some are doing so because they want to, viewing it as a way of life or enjoying the social status their position holds.<sup>38</sup> Others continue out of necessity as there are few younger people to take over and they do not want their business to end.<sup>39</sup>

Many young people do not want to become farmers. There are social deterrents, including hard physical work and isolation. Economically, potential young farmers with high levels of education can find better paid employment in other industries.<sup>40</sup> During the last decade, the number of people in UK higher education studying agriculture and related subjects has dropped by 7% compared to the total student population rising by 15%.<sup>41</sup>

But some industry experts claim there is no shortage of young people interested in farming. Instead, the problem is they cannot enter the industry or do not know how to.<sup>42</sup> A survey carried out by The National Federation of Young Farmers' Clubs and Lantra found that almost three-quarters of young people think it will be difficult or impossible to move into farming, with finance and access to land cited as the top barriers.<sup>43</sup>

**Figure 9: Age profile of farmers and all working adults in England and Wales**

Source: ONS



#### 4. Farms cannot cope with extreme weather

Climate change is the biggest medium to long term risk to the UK's domestic food production. Extreme weather events, such as droughts and floods, affect agricultural productivity. And the industry is currently unable to combat these effectively, already leading to large swings in yields.

In 2020, wheat yields dropped by 40% due to a combination of droughts and floods. A hot, dry summer in 2018 caused potato, carrot and onion yields to fall 20%, 25-30% and 40% respectively.<sup>44</sup> And in October 2023, vegetable and cereal crops across the UK were devastated by Storm Babet and other flooding events.<sup>45</sup>

In focus groups, farmers commented on the impact of climate change. They highlighted that it damages crops and grass, requires additional work such as more crop watering, and reduces their ability to plan ahead.

“Yes, (climate change is) having a profound effect on my crops. The volatility last year was terrible. We ended up having to irrigate crops which historically we wouldn't have to irrigate, which again is an increased cost. But the problem is we couldn't do it everywhere because the water wasn't available. And secondly, without it we'd have had nothing.”

Male, 47, arable farmer, Cambridgeshire

“We get these extreme weather events now where it's extremely dry and then it goes to extremely wet very quickly and it's very difficult to farm with those extremes because you're never quite sure. At this time of year (late August) we're finishing harvest, we're starting to prepare ground now for putting wheat in the ground and all of a sudden you get another week down the line and because we've had such a long dry spell, all of a sudden we get massive deluges of rain that then come along. So it's very difficult to plan.”

Male, 44, arable farmer, East Anglia

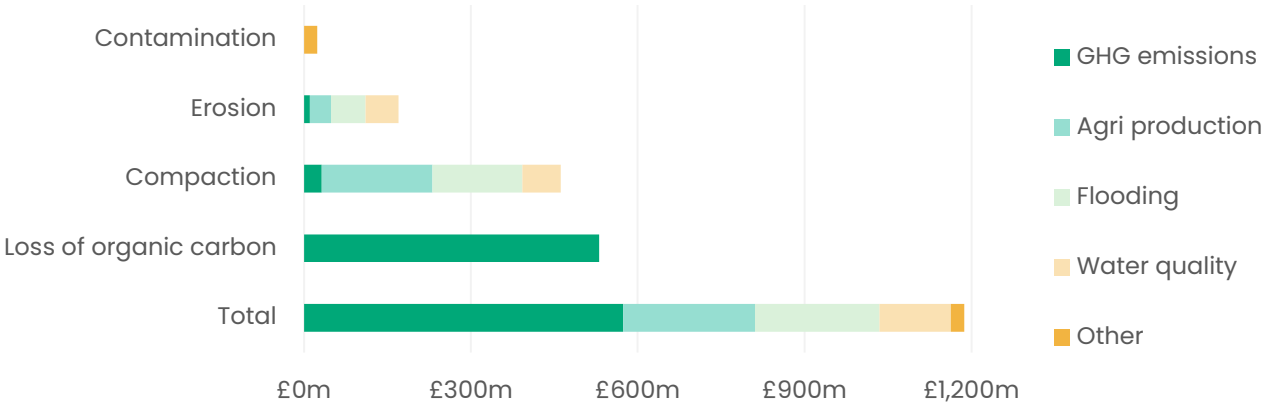
**Declining soil health leaves farms exposed to flooding and drought, and reduces productivity**

Intensive agriculture can cause soil degradation. Greater use of heavy machinery and long grazing seasons can lead soil to compact. More disruption to soil through tilling and harvesting can result in erosion and loss of organic matter. These impacts reduce the land's ability to resist flooding and drought.

The Environment Agency estimates soil degradation from agriculture and extreme weather costs £1.2 billion each year in England and Wales. The countries lose 2.9 million tonnes of topsoil to erosion each year. And most UK cropland has lost 40-60% of its organic matter.<sup>46</sup>

**Figure 10: Cost of soil degradation by type and impacts**

Source: Environment Agency



## The focus on yield in farm layouts and crop breeding have reduced climate resilience

Nature supporting landscape features, such as trees and hedgerows, on farmland or in the surrounding areas can reduce the risk of flooding. Trees' and hedges' root systems enable water to penetrate into soil faster and deeper, increasing water infiltration and reducing run-off.<sup>47</sup>

But the amount of trees and hedgerows on farms has declined in the UK, mainly due to intensification of agriculture. Around 118,000 miles of hedgerows have been lost in the UK since the 1950s.<sup>48</sup> Only 3.3% of the UK's agricultural land is used for agroforestry, well below several other large European countries, such as France, Italy and Spain.<sup>49</sup>

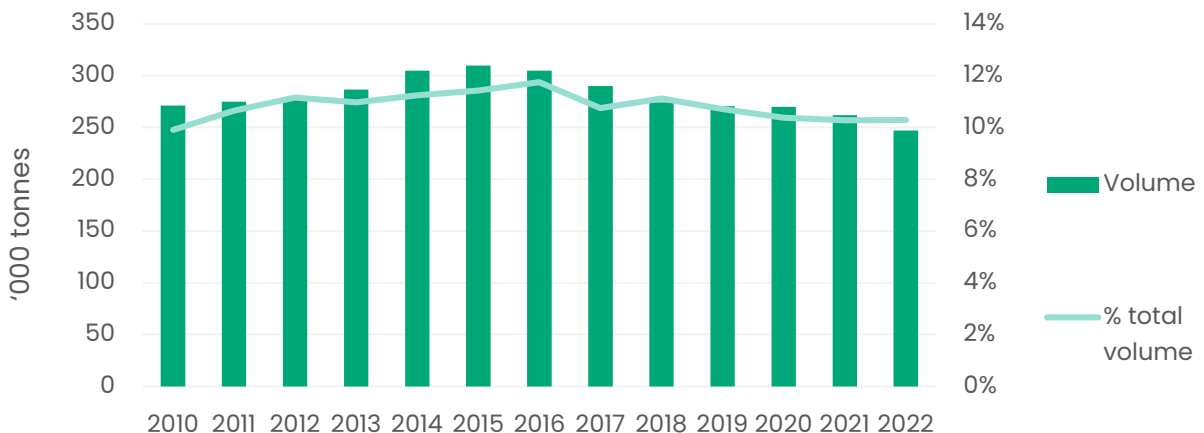
Crop diversity is seen as critical for agriculture's resilience and adaptation to climate change.<sup>50</sup> But crops have mostly been bred for yield so have a reduced capacity for tolerating extreme weather and changing climatic conditions.<sup>51</sup> 75% of plant genetic diversity has been lost globally since the 1900s due to the focus on high yielding breeds.<sup>52</sup>

## Not enough controlled environment agriculture means too much farming is exposed to weather

Controlled environment agriculture (indoor farming) involves the use of greenhouses, polytunnels or vertical farming facilities to grow fruit and vegetables. Optimising conditions such as temperature, humidity and carbon dioxide is energy intensive.<sup>53</sup> The most common sources of greenhouse heating are natural gas, liquid propane gas and fuel oil so facilities can generate high emissions and are exposed to volatile fossil fuel prices.<sup>54</sup> But, they are not affected by climatic conditions so can enhance resilience to climate change.

**Figure 11: Volume of vegetables produced in controlled environment facilities in the UK**

Source: DEFRA



Controlled environment production in the UK has been declining, though, due to labour shortages following Brexit and the spike in energy prices following Russia's invasion of Ukraine. The volume of vegetables produced in controlled environment agriculture facilities has dropped from over 300,000 tonnes in 2016 to less than 250,000 tonnes in 2022. And its contribution to total production has fallen from 12% to 10% in that time.<sup>55</sup>

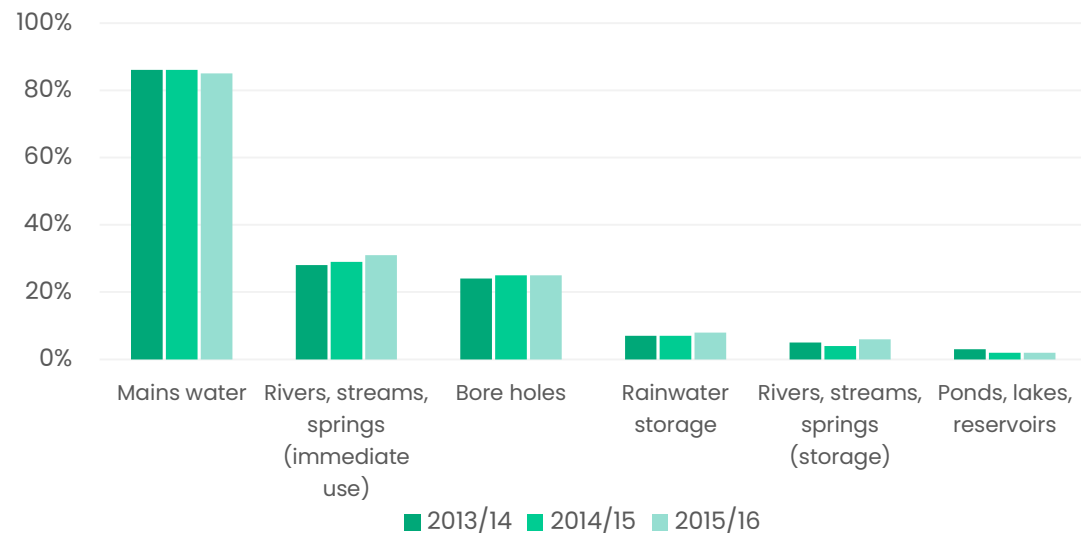
Greenhouses only contribute 2.5% of vegetables produced in the EU.<sup>56</sup> But several European countries have far larger controlled environment agriculture industries than the UK. The Netherlands produces 1.7 million tonnes of greenhouse vegetables per year, accounting for 80% of its total.<sup>57 58</sup> Spain's Almeria region grows between 2.5 million and 3.5 million tonnes of fruit and vegetables in greenhouses annually.<sup>59</sup> And France produces over 700,000 tonnes of vegetables in controlled environment facilities each year.<sup>60</sup>

### Insufficient water storage leaves farms vulnerable to droughts

Only around 15% of farms have stores for water, such as rainwater storage or reservoirs. Roughly two-thirds of water used by farms is sourced from mains supplies and just 3% comes from natural or constructed water stores.<sup>61</sup>

**Figure 12: Percentage of farms using water sources by type**

Source: DEFRA



Farms across the country reported that drought had affected yields in 2022, illustrating the precarious state of farms' water supply.<sup>62</sup> The NFU argues that all new public water supply infrastructure should be designed for multi-sector benefits, including securing food supplies.<sup>63</sup> No major reservoirs have been built since the water industry was privatised in 1989 and some have been sold.<sup>64</sup> But some farmers have highlighted the need to construct more water storage facilities on farms as well, which the NFU also supports.<sup>65</sup>

### Box 1: Why domestic climate resilience is important

The UK imports 46% of food that people consume so increasing the level of imports could be perceived as an option to tackle domestic production challenges.<sup>66</sup> But several imported products and major supplying countries face severe threats from climate change.

Morgan Stanley estimates that globally over two-fifths of wheat and rice, one-third of maize and almost one-fifth of soybean production takes place in locations at risk from climate change. And it calculates that \$314 billion of production is vulnerable.<sup>67</sup>

Analysis by Christian Aid found eight of the 25 countries that export the most to the UK face high climate vulnerability. And more than a fifth of the items in the average grocery shop are at risk.<sup>68</sup>

Research by the Energy and Climate Intelligence Unit calculates the impact of climate change at home and abroad has led to the average UK household's food bill being £361 higher during 2022 and 2023.<sup>69</sup>

The 2022 Government Food Strategy report noted that trade strengthens food security.<sup>70</sup> But it also acknowledged that enhancing domestic resilience to climate change is essential to improve the country's long-term food security. And this is critical for the Government given a recent report found the UK risks civil unrest in the coming decades unless food security planning is adequate.<sup>71</sup>

Improving farming's climate resilience can also provide benefits to the wider community. Adding trees and hedgerows, and improving soil health can reduce the risk of flooding in the surrounding area. Water storage facilities can also store flood water on farms away from nearby settlements. A study in Covedale in the Yorkshire Dales found that a combination of flood management measures across 10% of the catchment reduced the flow of water during high rainfall events by 12%.<sup>72</sup>

# Polluting farms

Agriculture's  
environmental challenge



Many farmers feel great responsibility for stewarding the countryside. Farmers of all types undertake work to enhance the landscape, encourage wildlife to flourish, and protect rivers and lakes.

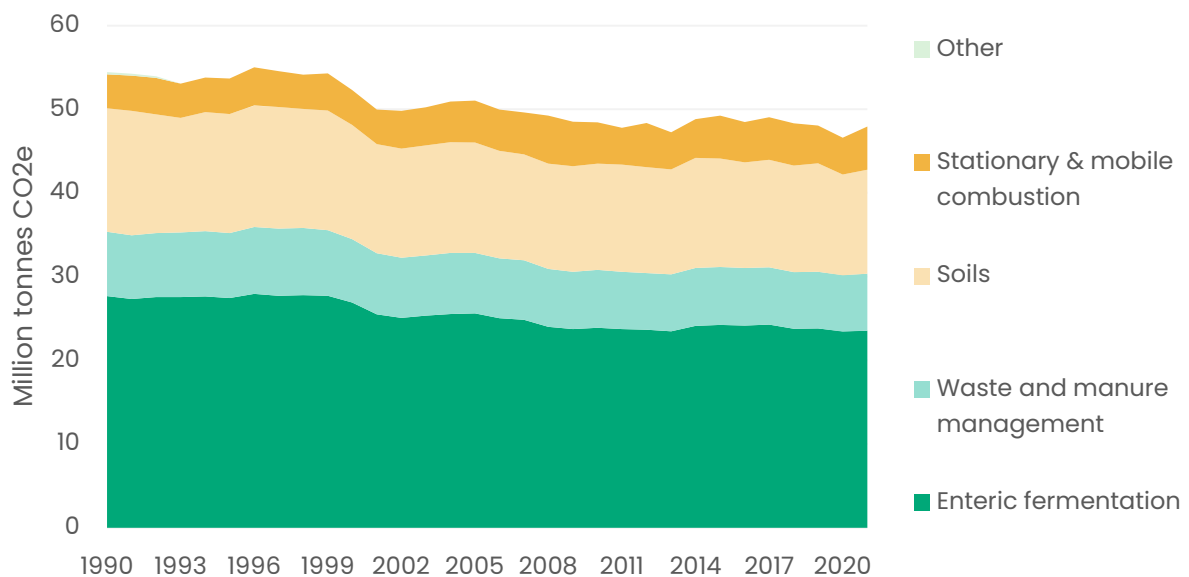
Yet agriculture remains a significant cause of environmental damage. Over one in every ten tonnes of greenhouse gas (GHG) emissions in the UK comes from agriculture.<sup>73</sup> Pollution from agriculture and rural land management affects 40% of England's water bodies.<sup>74</sup> And intensive agriculture is one of the biggest causes of biodiversity decline in the UK.<sup>75</sup>

## 1. Farming emissions are stubbornly high

Agriculture GHG emissions account for 11% of the UK total. Livestock contribute nearly two-thirds of the sector's emissions through enteric fermentation (the digestive process of cattle and sheep which releases methane in burps) and their waste. The use of fertilisers on soils caused around a quarter of emissions, with fuel use in machinery and equipment generating the remainder.<sup>76</sup>

**Figure 13: UK agriculture emissions**

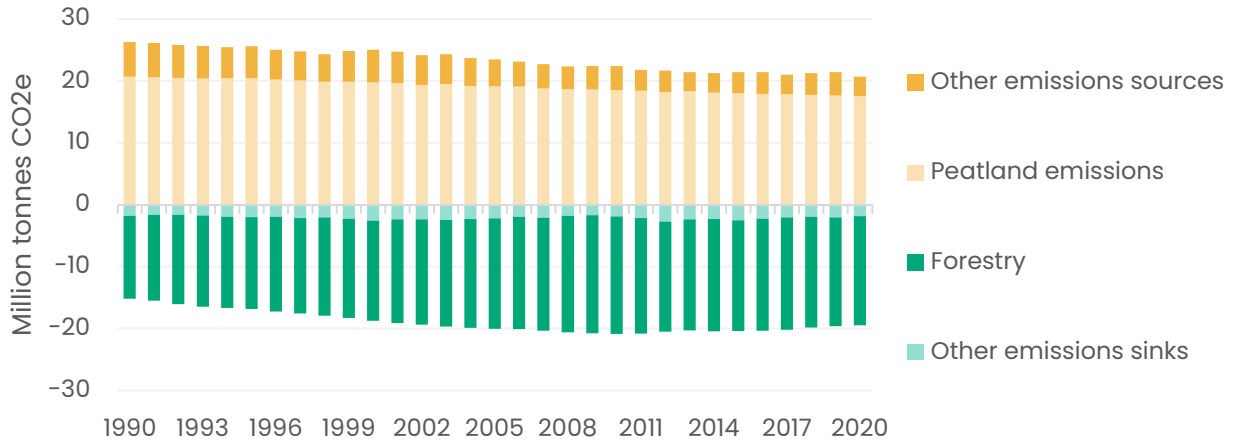
Source: Climate Change Committee



Land use is currently a small net emitter, with slightly more emissions released from activities such as peat drainage and management than the carbon taken out of the atmosphere by forestry. But the Climate Change Committee (CCC) estimates land use will need to become a net carbon sink worth 3.3MtCO<sub>2</sub>e by 2035 for the UK to meet its target to reduce agriculture and land use emissions by 29%.<sup>77</sup>

**Figure 14: UK land use emissions**

Source: Climate Change Committee



Agriculture and land use emissions have fallen by one-quarter since 1990, but since 2010 they have declined just 2%. Emissions from all other sectors, excluding surface transport, have fallen by at least 10% since 2010. According to the CCC, agriculture and land use is the most off track of all sectors for meeting future emissions targets, with none of the policy plans for the sector deemed credible.<sup>78</sup>

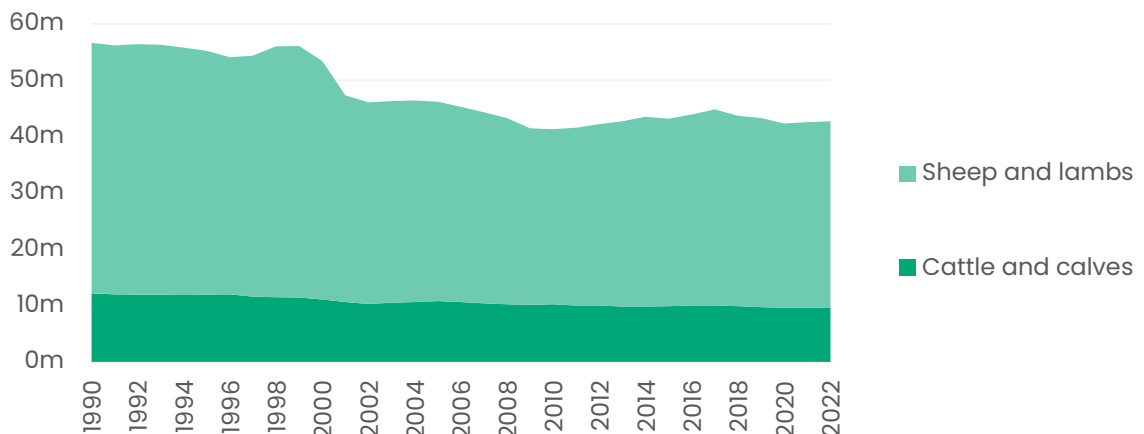
**Livestock numbers are flat and emissions intensity is not falling fast enough**

Livestock generate nearly two-thirds of agriculture’s emissions through their digestive processes and waste, mostly in the form of methane.<sup>79</sup> Farming causes almost half of the UK’s total methane emissions, over five times the level of fuel supply. Livestock emissions have fallen by 15% since 1990 but just 1% since 2010.<sup>80</sup>

There are around 9.5 million cattle and 33 million sheep in the UK. The total number of livestock is a quarter lower than it was in 1990 following a steep decline in the early 2000s driven by subsidy changes and foot and mouth disease. But numbers have increased modestly in the last decade.<sup>81</sup>

**Figure 15: UK cattle and sheep population**

Source: Climate Change Committee, DEFRA



Since 1990, beef emissions intensity has only decreased by 7% and sheep meat has increased 3%, although dairy has dropped by 15%.<sup>82</sup>

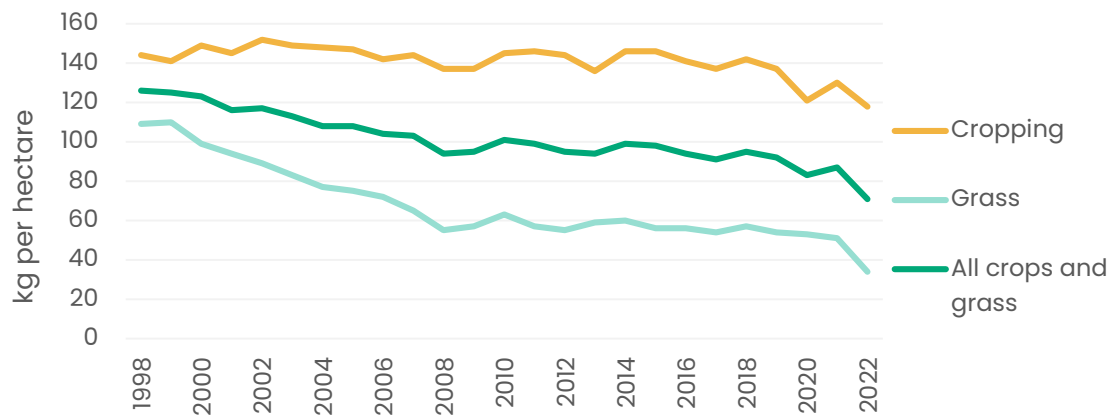
### Fertilisers continue to be heavily used

Fertilisers have played an important role in increasing crop yields and livestock productivity to help feed a growing population.<sup>83</sup> Manufactured chemical fertilisers are used to provide additional nitrogen to that naturally occurring in soil. Arable farms utilise chemical fertilisers to accelerate crop growth and pastoral farms use them to grow more grass for animal feed.<sup>84</sup> But nearly 30% of agricultural emissions are nitrous oxide, mostly from the use of fertilisers on soils.<sup>85</sup>

Fertiliser use dropped considerably in recent years due to drought and floods affecting cropping conditions in 2020 and Russia’s invasion of Ukraine creating supply limitations and high prices in 2022.<sup>86 87</sup> Otherwise, fertiliser application and the associated emissions have only decreased slightly since 2010, although they have fallen substantially since the 1990s.<sup>88 89</sup>

**Figure 16: Great Britain agricultural nitrogen application per hectare**

Source: DEFRA



### Too little peatland restoration and forest creation take place

Peatland in a natural condition is one of the most carbon rich ecosystems.<sup>90</sup> The wet conditions mean plants that grow on peatlands do not fully decompose so the carbon is stored rather than released. Peatlands cover just 3% of the Earth’s surface but store 30% of all land-based carbon.<sup>91</sup>

But growing food on peatland requires dry, traversable conditions. Starting in the 1600s, farmers drained large areas of peat across the UK for food production.<sup>92</sup> Only 22% of peatland in England is undamaged and only 16% of peat soil recorded in the East Anglian Fens in 1850 remains.<sup>93 94</sup>

And when peatland is drained or damaged it releases carbon dioxide. Total peatland emissions in the UK have declined 15% since 1990. But peatland

management still contributes around three-quarters of land use emissions sources and 4% of total UK emissions.<sup>95</sup> Lowland peat farming accounts for 1.5% of all UK emissions.<sup>96</sup>

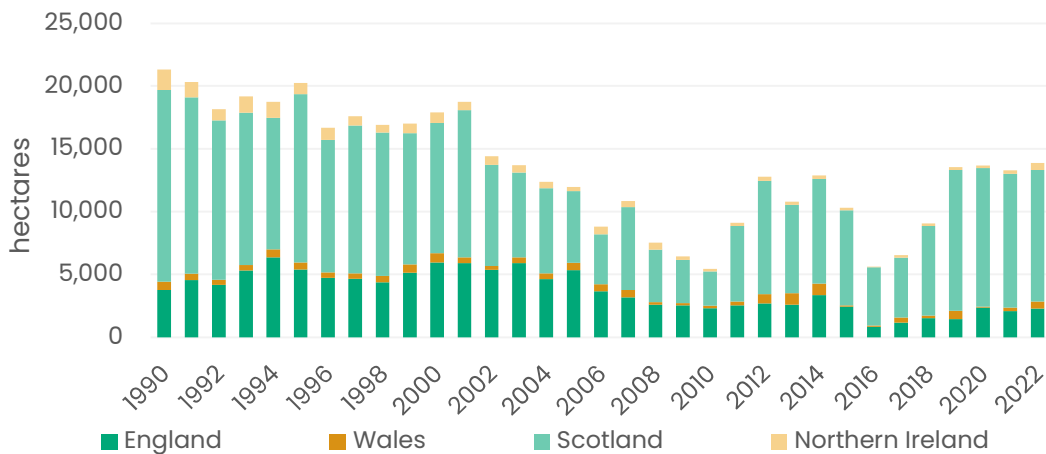
The CCC recommends that by 2025 67,000 hectares of peatland be restored each year to sequester carbon (remove it from the atmosphere). Only 12,700 hectares were restored in 2022/23.<sup>97</sup>

But the UK’s lowland peat soils provide around 40% of all vegetables grown in the country and produce various cereal crops.<sup>98</sup> Restoring all peatland could affect food security and economic output. The Lowland Agriculture Peat Task Force Chair’s Report, published in June 2023, highlighted the need to develop new methods of peatland farming which generate lower emissions.<sup>99</sup>

Forestry is the UK’s major land use carbon sink but the amount of carbon it sequesters has declined in the last decade, as shown in figure 14.<sup>100</sup> Afforestation (the creation of new woodland) rates are significantly off track to achieve the CCC’s land use carbon sink projections.

**Figure 17: UK new tree planting area by country**

Source: Climate Change Committee



## 2. Farming is a major contributor to water pollution

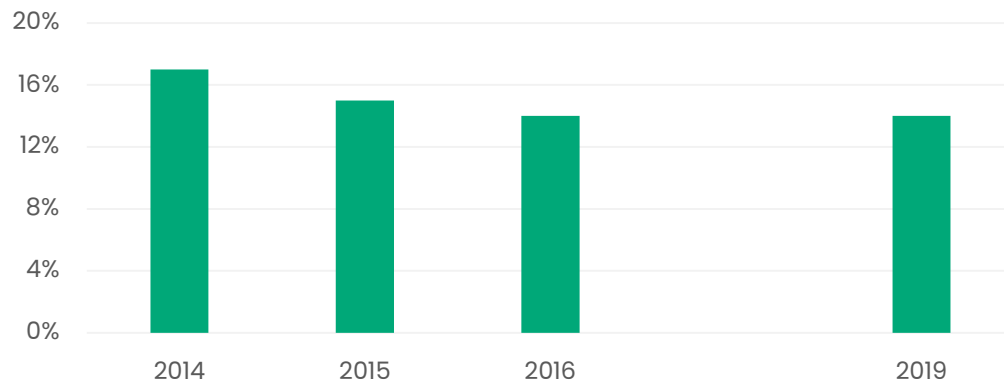
Only 14% of rivers in England meet ‘good’ ecological status.<sup>101</sup> Water pollution comes from various sources including the water industry, the urban and transport sectors, government activities, and agriculture and rural land management.<sup>102</sup>

Agriculture causes water pollution through nutrients, such as phosphorus and nitrates; chemicals, including pesticides; faecal bacteria and pathogens; and soil sediment. These pollutants lead to loss of biodiversity, such as algal blooms killing fish, and can present risks to human health.

**Figure 18: Percentage of rivers in England achieving good or high ecological status**

Source: DEFRA, Environment Agency

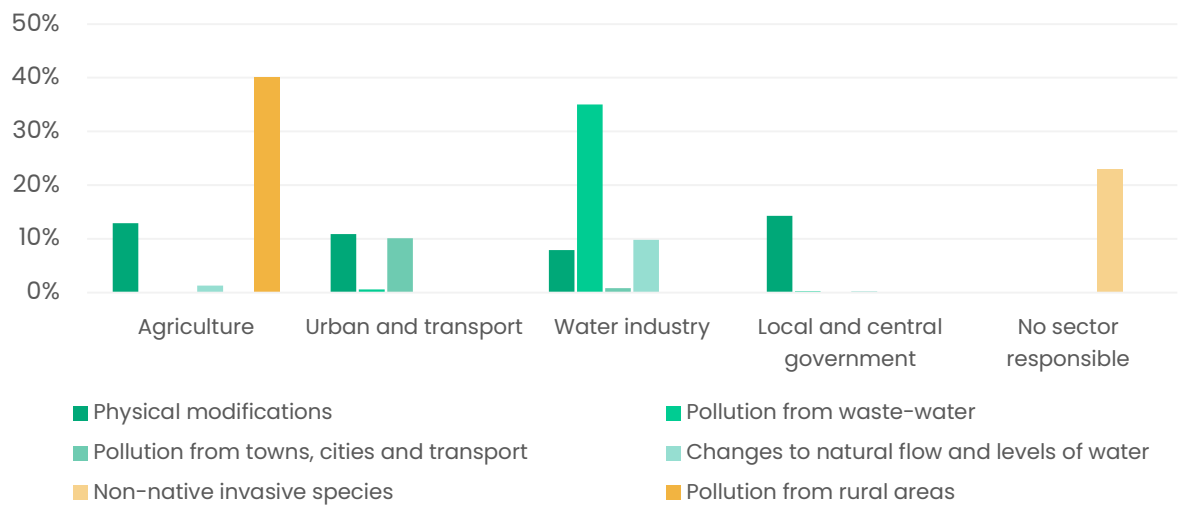
Note: After 2016, the Environment Agency moved to a triennial reporting system



Pollution from agriculture and land management affects 40% of water bodies in England. This is modestly higher than the water industry, which impacts 36% of water bodies through wastewater (see figure 19). The Environment Agency states that the relative contribution of agriculture pollution to water quality pressures has been increasing. Around 50% of nitrate and 25% of phosphorus in the water environment, and 75% of sediment pollution derives from agriculture.<sup>103</sup>

**Figure 19: Percentage of water bodies in England affected by selected sectors by type of impact**

Source: DEFRA



### Overuse of fertilisers, lack of storage and intensification of farming cause excess nutrients to enter the rivers and seas

As well as applying manufactured fertilisers, farmers spread manure on fields to provide nutrients to soils. Although manufactured fertiliser application has fallen, the use of fertilisers and manure continues to add over 1 million tonnes more nitrogen and phosphorus than soils can absorb.<sup>104</sup> The surplus nutrients can leave

fields when rainfall run-off, soil erosion or field drainage occur causing pollution to water bodies.<sup>105</sup>

One of the reasons for overspreading manure is a lack of storage for slurry (the semi-liquid mixture of manure and water). Insufficient slurry storage also contributes to water pollution because farmers cannot avoid spreading manure at inopportune times, such as the winter.<sup>106</sup>

The lack of slurry storage is partly the result of the consolidation of dairy farming. In 2021, the Environment Agency estimated the number of dairy farms has fallen by over 4,000 since 2006. But in that time the average herd size increased by 40 and the average milk yield per cow has risen by 1,000 litres. Slurry storage infrastructure has not kept up with the expansion of farms.<sup>107</sup>

The spreading of poultry manure also causes river pollution. Poultry manure has particularly high nutrient content.<sup>108</sup> That can make it an effective fertiliser but when it enters rivers, it has a bigger impact on water quality. The growth of intensive poultry farming has led to lower water quality in surrounding areas, which the RePhoKUs project has highlighted is a significant issue in the Wye catchment.<sup>109</sup>

### Box 2: Poultry farming boom pollutes the River Wye

In the Wye catchment in south-east Wales, Herefordshire and Shropshire, intensive poultry farming has expanded rapidly. In the last ten years the number of chickens has risen from around 13 million to over 20 million.<sup>110</sup>

The growth of poultry farming has coincided with an increase in phosphates entering the River Wye. Some poultry farms have installed facilities to burn the manure or convert it into pellets. But many farmers cannot afford the infrastructure, so manure is left in fields or spread locally.<sup>111</sup> The RePhoKUs Project estimates farming in the Wye catchment generates a 2,000 tonne phosphorus surplus each year, nearly 60% higher than the national average.<sup>112</sup>

The increased phosphate content in the river has caused algal blooms, starving the river of light and oxygen. This has led to multiple impacts on the natural environment. 90% of the white water-crowfoot plant, which provides nursery space for river life, has disappeared, the salmon population has collapsed, and river invertebrates are completely absent in some areas.<sup>113 114</sup>

Industry participants have begun to make efforts to reduce the impact on the river. Supermarkets are funding poultry farmers to construct wetlands, designed to remove phosphorus from the watercourse.<sup>115</sup> And Avara Foods, a major chicken manufacturer, has announced plans to stop selling poultry manure in the river catchment.<sup>116</sup>

### 3. Farming intensification has caused biodiversity decline

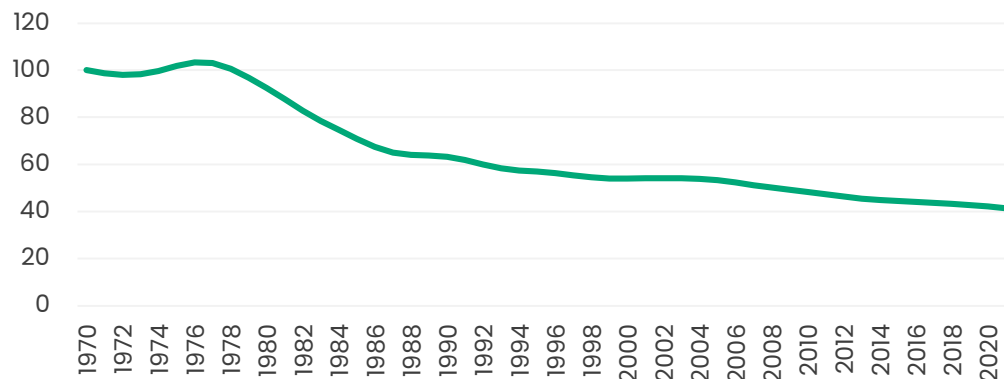
The UK has lost almost half of its biodiversity since the industrial revolution.<sup>117</sup> Its biodiversity intactness is in the bottom 10% worldwide and is last in the G7.<sup>118</sup> Since 1970, overall species abundance (the number of individuals of each species) has declined 19% and priority species abundance has dropped 63%.<sup>119</sup>

Agriculture is one of several causes of biodiversity loss on land in the UK, alongside climate change, hydrological change, urbanisation, invasive species, pollution and woodland management.<sup>120</sup> But intensive agriculture has been identified as the greatest contributor.<sup>121</sup> It has reduced the amount of trees and hedgerows on farms, leading to fewer habitats for wildlife, including pollinators.

The abundance of breeding farmland birds has fallen by three-fifths since 1970.<sup>122</sup> Since 1990, butterfly abundance on farmland is down almost a fifth.<sup>123</sup> And plant species richness (the number of species) has declined in several agricultural settings, although it has increased on arable and horticultural land.<sup>124</sup>

**Figure 20: Farmland birds abundance in the UK (index 1970=100)**

Source: *Join Nature Conservation Committee*



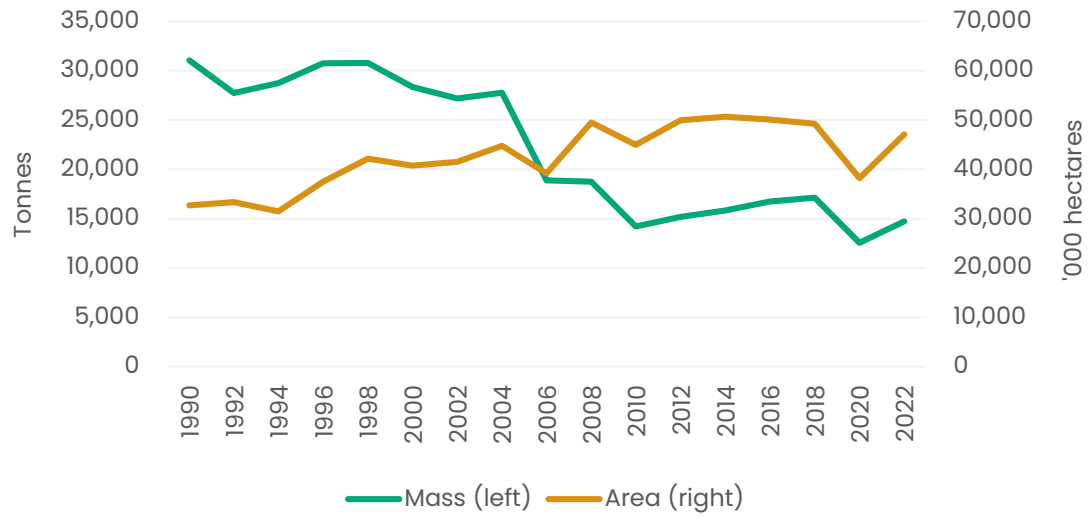
#### Use of synthetic chemicals damages nature

As well as generating emissions and polluting water, fertilisers also reduce biodiversity. They do this by increasing the productivity of plants, leading fast growing, taller varieties to dominate and preventing smaller species from receiving sufficient sunlight.<sup>125</sup>

Pesticides reduce biodiversity through their primary purpose as they kill animals or plants that may affect production yields. But their impact is much greater because they are typically not specific to a certain pest or contained in a certain area. And they often persist for weeks or months.<sup>126</sup> The mass of pesticides applied has fallen considerably since 1990. But it has been flat in the last decade. And the area on which pesticides are applied has risen by more than two-fifths in the last three decades, as shown in Figure 21.<sup>127</sup>

**Figure 21: Pesticides usage on arable crops in the UK by mass and area**

Source: Fera Science



# Political farms

## Agriculture's volatile voters





## Farmers are disgruntled by delays to ELMs and the impact of trade deals

The economic challenges faced by farmers are contributing to a rift with the Government. Farmers are frustrated by the slow implementation of Environmental Land Management schemes (ELMs), labour shortages, and trade deals with Australia and New Zealand.<sup>128</sup>

There are signs that DEFRA's outreach efforts and alterations to ELMs during 2023 are thawing relations with farmers somewhat.<sup>129</sup> But negative sentiment towards the Government was also illustrated by focus group members who suggested it is not being supportive and is failing to provide effective advice for the transition to new schemes.

"I don't think we've got a particularly supportive government. That's not going to be particularly helpful, and the world is full of all sorts of problems."

Male, 44, arable farmer, East Anglia

"The advice (from the Government) always seems a bit wishy-washy with the schemes. Sometimes it is not really that well written so you've sort of got to guess and hope it works out sometimes when you follow their advice."

Male, 35, mixed farmer, East Devon

The Labour Party has recently stepped up its efforts to attract these traditionally Conservative voters. In September, Keir Starmer wrote in *Country Life* highlighting how Labour would create "a new partnership with British farming."<sup>130</sup> At a Labour Party Conference event with Onward, the Shadow DEFRA Secretary, Steve Reed, highlighted that ELMs are not working financially, particularly for tenant farmers and smaller farms.<sup>131</sup> And the Shadow Minister for Nature and Rural Affairs, Toby Perkins, has promised to stop supermarkets treating farmers unfairly.<sup>132</sup>

The Liberal Democrats have also been targeting farmers. Ahead of the Tiverton and Honiton by-election in June 2022, the party attacked the implementation of ELMs.<sup>133</sup> At its annual conference in 2023, the party demanded an extra £1 billion for the £2.4 billion farming budget.<sup>134</sup> And its policy programme includes reforming trade deals with Australia and New Zealand.<sup>135</sup>

Despite the criticism, both parties have said they would maintain ELMs, but neither has detailed how it would reform the schemes. And the Liberal Democrats have not spelled out how they would fund the additional £1 billion for the farming budget.

## Rural communities feel economically neglected and are frustrated by water pollution

It is not just farmers that are dissatisfied. Voters across the countryside feel that rural communities are being neglected. Polling by Survation of the 100 most rural constituencies in England conducted in April 2023 showed almost seven in ten people think the Government is not doing enough to tackle the cost of living crisis in rural areas. And just 36% think the Conservatives understand and respect rural communities and their way of life, only slightly higher than the 32% figure for Labour.<sup>136</sup>

Water pollution is also becoming a political problem for the Government. According to a YouGov survey conducted in June 2023, more than two-thirds of the public think the Government is doing too little about water quality. And 44% think the quality of rivers, lakes and seas in their local area is bad. Only 36% think the quality of water bodies is good, down from 43% in 2021.<sup>137 138</sup>

The Government has taken actions to tackle water pollution, such as requiring water companies to monitor all storm overflows and boosting funding for the Environment Agency to enforce regulations.<sup>139 140</sup> And Ofwat struck an agreement with water companies to invest £1.6 billion between 2023 and 2025 to reduce storm overflows, increase water resilience, and tackle nutrient pollution.<sup>141</sup> But despite these developments, the perception that the Government is not addressing poor water quality is widespread.

Both the Liberal Democrats and Labour are attempting to use water pollution to gain traction with rural voters. The Liberal Democrats are campaigning heavily on water pollution in southern target seats, with some party leaflets focusing entirely on the issue.<sup>142</sup> They have pinpointed National Trust and Women's Institute members that are unhappy with the state of rivers and lakes as potentially swing voters in blue wall seats.<sup>143</sup> Labour's shadow DEFRA team has promised to crackdown on polluting water companies and give farmers more money for slurry infrastructure.<sup>144 145</sup>

## Farmers' and rural communities could become swing voters

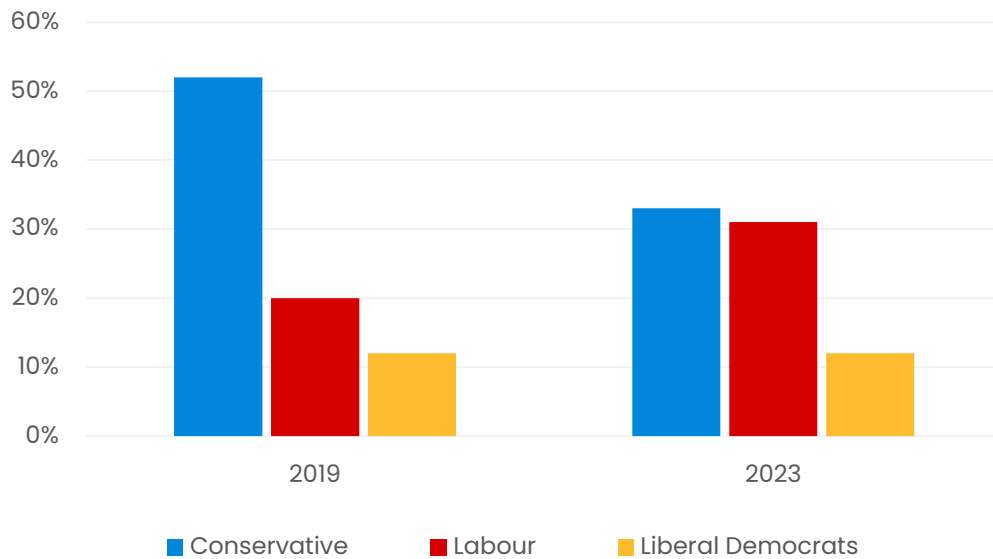
Farmers' concerns with the Government appear to be influencing voting intentions. A Farmers Weekly survey, carried out in late 2022, showed support for the Conservative Party among farmers had dropped to just over two-fifths from nearly three-quarters in 2020.<sup>146</sup>

And more recent polls have revealed a narrowing of the gap to Labour in the countryside as a whole. A YouGov survey in June 2023 found that support for the Conservatives among rural voters had fallen from 52% in 2019 to 33%, with Labour just behind on 31%.<sup>147</sup> The 19 percentage point swing away from the Conservatives in rural areas is slightly higher than the 17 percentage point swing across the

country, showing their vote is not holding up any better in traditionally strong locations.

**Figure 22: Westminster 2019 vote and 2023 voting intention of rural voters in Great Britain**

Source: YouGov survey results, 2-11 June 2023

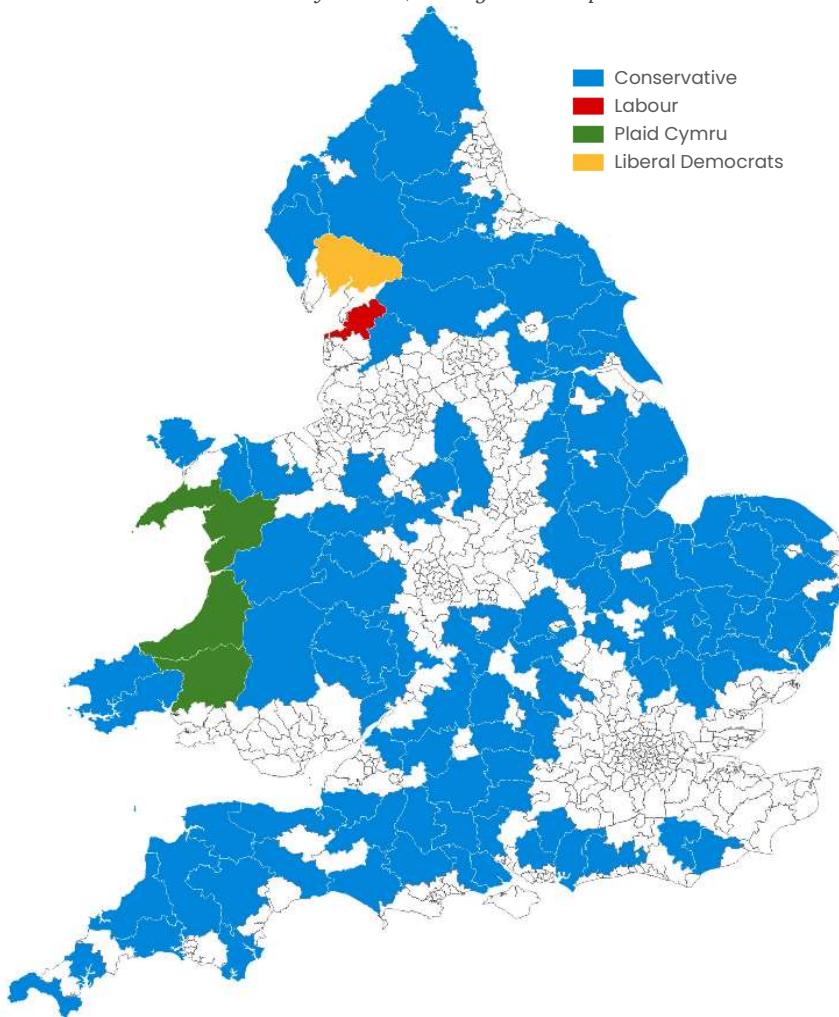


The Conservatives won 98 of the 100 most rural seats in England in the 2019 general election.<sup>148</sup> But during the last two years, the Conservatives have lost by-elections to the Liberal Democrats in the rural seats of North Shropshire, Tiverton and Honiton, and Somerton and Frome. And in 2023, it lost two rural by-elections to Labour, in Selby and Ainsty, and Mid Bedfordshire.

Onward's analysis of Survation MRP (multi-level regression and post-stratification) polling conducted in August and September 2023, shows that the Conservatives' representation in the 100 most rural constituencies in England is at risk of dropping to just 63 seats following a general election. Labour would rise to 33 seats.<sup>149</sup> Predicted Conservative losses include Huntingdon, North Dorset and Hexham, which have been held by the party for 40, 70, and 100 years respectively.<sup>150 151 152</sup> In the ten most rural constituencies in Wales, the poll suggests the Conservatives could fall from seven seats to just two.<sup>153</sup>

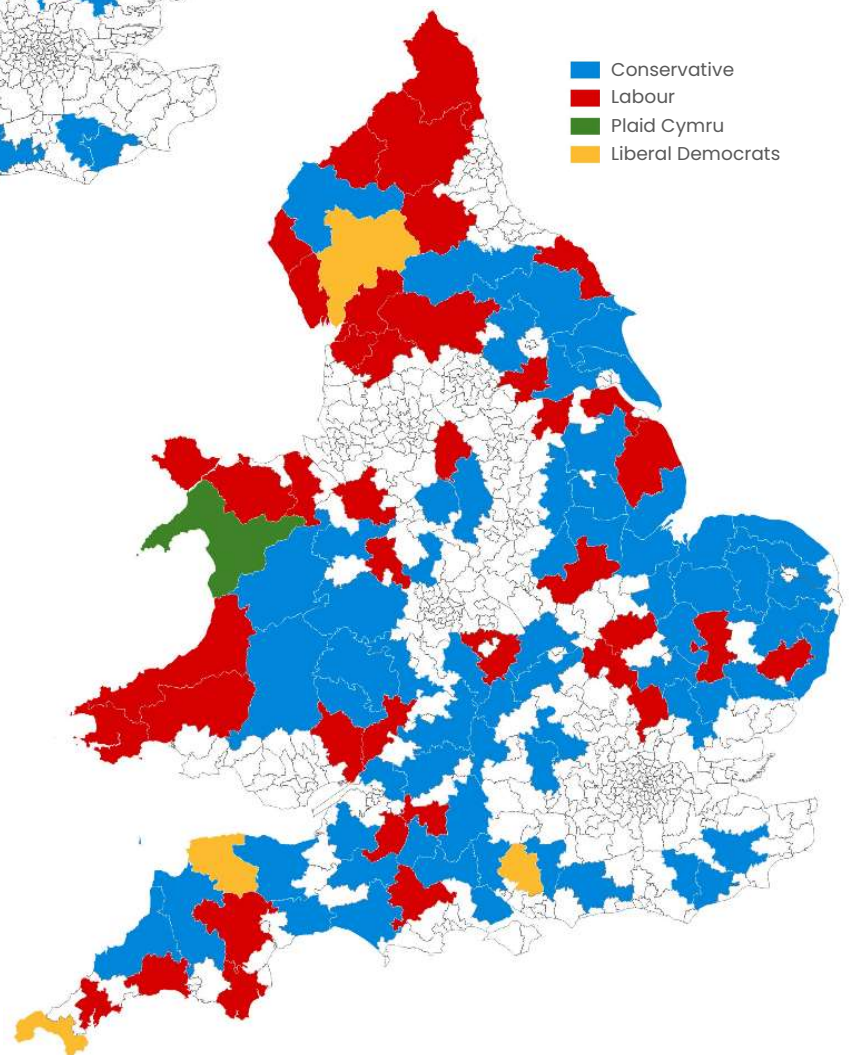
**Figure 23a: 2019 winners of the 100 most rural constituencies in England and ten most rural constituencies in Wales**

Source: Survation survey results, 18 August – 1 September 2023



**Figure 23b: 2023 voting intention of the 100 most rural constituencies in England and ten most rural constituencies in Wales**

Source: Survation survey results, 18 August – 1 September 2023



# Getting to the roots

The five factors driving  
agriculture's challenges





Farming's twin economic and environmental problems are driven by five factors:

1. Farmers have faced the wrong incentives.
2. Farmers have not been encouraged by the private sector to produce environmental goods.
3. Investment in infrastructure and new technology has been too low.
4. The communities that underpin farming are not being fostered.
5. Domestic and international relationships are not being harnessed for the good of farmers.

The main government failure has come from providing farmers with false financial incentives that have led to inefficient businesses causing environmental damage. It has also not sufficiently accounted for differences in environmental and animal welfare standards in recent trade deals with Australia and New Zealand.

The primary market failure is the private sector failing to address the externality of environmental damage. The result is an underdeveloped private finance market for carbon and biodiversity credits, and a lack of investment in environmentally beneficial infrastructure and new technology. Other market failures include the buying power that large supermarkets and food manufacturers wield over farmers, and new entrants' demand for experience, land and finance not being matched by supply.

## 1. Farmers have faced the wrong incentives

Following the second world war, the UK introduced the Agriculture Act 1947, which aimed to increase domestic food production, partly by subsidising product prices.<sup>154</sup> When the UK joined the European Economic Community in 1973, it entered the Common Agricultural Policy (CAP), which also subsidised the production of food. This encouraged farmers to increase yields as much as possible, which led to greater use of fertilisers and pesticides, and removal of natural features.<sup>155</sup>

Reforms to the EU's CAP implemented in 1992 shifted payments to direct income support (which later became the Basic Payment Scheme (BPS)) and further reforms introduced a greater focus on environmental stewardship.<sup>156 157</sup> But the payments still do little to protect the environment and can cause damage by enabling wasteful use of resources. They have also paid tens of millions to some of the UK and EU's wealthiest landowners.<sup>158</sup>

Following the vote to leave the EU, the Government decided to move away from direct payments for farmed land to payments for carrying out actions that enhance the environment. Over the last few years, DEFRA has been introducing the Environmental Land Management schemes (ELMs) in England. The schemes are based on the principle of public money for public goods. Other countries in the UK are implementing their own alternative farm support schemes based on the same principles.<sup>159</sup>

## ELMs incentivises farmers and landowners to improve the environment

ELMs is the Government’s flagship sustainable agriculture policy. It comprises three schemes: Sustainable Farming Incentive (SFI), Countryside Stewardship (CS), and Landscape Recovery. CS has existed since 2015, while SFI and Landscape Recovery were piloted in 2021 and began to be rolled out in 2022.<sup>160 161 162</sup>

SFI and CS pay individual farms to carry out certain environmental actions for multiple years, such as growing winter cover crops for soil health and flower-rich grass margins for natural pest management. It is possible to have CS and SFI agreements together as long as the same activity is not paid for twice.<sup>163</sup>

CS also provides payments for capital works and items, such as planting hedges and sheep netting. CS is split into mid tier and higher tier agreements. Higher tier is more tailored and involves detailed land assessments to design plans for optimal environmental actions in specific areas of each field.<sup>164</sup>

Landscape Recovery pays for large scale projects involving multiple farmers and landowners. Projects entail bespoke agreements aimed at achieving specific environmental goals, such as sequestering carbon and creating wildlife-rich habitat.<sup>165</sup> Farming can continue but the focus of projects is significant restoration of nature, which could involve rewilding.<sup>166</sup>

**Table 1: Environmental Land Management schemes summaries**

Source: DEFRA

Note: Actions payment range is based on area based multi-year options only

	<b>Sustainable Farming Incentive</b>	<b>Mid Tier Countryside Stewardship</b>	<b>Higher Tier Countryside Stewardship</b>	<b>Landscape Recovery</b>
<b>Application process</b>	Non-competitive	Non-competitive	Competitive	Competitive
<b>Number of eligible actions</b>	23	84 multi-year 80 capital works	137 multi-year 118 capital works	n/a
<b>Actions payment range (per hectare)</b>	£45 - £732	£20 - £2,129	£6.07 - £2,129	£200 - £900
<b>Length of agreements</b>	3 years	5 years	5+ years	20+ years

DEFRA originally planned to split funding evenly between the three schemes. But in 2022 it decided not to allocate specific expenditure to each scheme to allow for more flexibility. This was criticised by environmental groups at the time, but directing one-third of funding to Landscape Recovery would ultimately not have been popular.<sup>167</sup> Focus group members were mostly strongly against rewilding, particularly if it takes place on productive land.

“I think (rewilding is) a massive threat to the farm and the country really. I think it’s very naive of anyone who thinks it’s a good idea to be honest, because I think really we can produce very good crops and very good produce in this country at the minute. The weather is some of the best in the world for producing quite sustainable crops.”

Male, 36, pastoral farmer, East Devon

“There’s so many stories of countries wanting to drop livestock numbers and cropping area for rewilding that it makes you wonder, where are we going to produce the food? It is just encouraging the likes of Brazil to cut down more rainforest, making money out of wood. And then the quickest thing is to grow soya and graze cattle. It’s just encouraging the wrong areas to get into bigger food production and we’re just going to import.”

Male, 35, mixed farmer, East Devon

### The transition has not been smooth so far but backsliding would be a mistake

The transition to ELMs has been challenging to date. Problems with the schemes include that they do not pay enough, have taken too long to be implemented, often do not work for smaller farms, can be difficult to access, and may not be sufficiently ambitious to restore the environment.<sup>168 169</sup>

The slow implementation of the new schemes has caused concern about a ‘valley of death’ for farmers as they lose BPS payments faster than they can replace them. Between the 2020/21 and 2022/23 financial years, DEFRA’s combined spend on BPS and ELMs (and other agri-environment schemes) fell from £2.3 billion to less than £2.0 billion.<sup>170</sup>

A survey conducted by Farmers Weekly during the spring found that nearly nine in ten farmers were uncertain whether their farms will survive without BPS payments.<sup>171</sup> This sentiment was shared by some focus group members.

“So fertilisers one, chemicals have obviously gone up a lot. Fuel keeps creeping up and with the loss of things like BPS... it is quite challenging trying to make the figures stack up.”

Male, 44, arable farmer, East Anglia

### **A return to BPS would be a disaster for the environment**

During the Truss premiership, it was suggested that Ministers wanted to scrap the transition to ELMs and instead continue paying farmers based on the amount of land they have.<sup>172</sup> While those plans did not come to fruition, it could be perceived as an easy option to regain support among farmers.

But that would be a mistake. BPS is the system that has caused agriculture to become unsustainable in the first place. And although the transition has had challenges, plenty of farmers are engaging with the new approach.

The same Farmers Weekly survey that showed concern about losing BPS payments also found strong interest in undertaking environmental measures for financial reward. More than half were interested in carrying out actions to enhance biodiversity and clean water. Both the Farmers Weekly polling and focus groups held for Onward demonstrated younger farmers are not as concerned about BPS disappearing.<sup>173</sup>

“Well BPS... There was a time when we did rely on it but now we don't rely on it and I look at it's a bit of bonus money at the end of the day... I kind of use it to invest in some infrastructure on the farm or if we need some machinery. I don't plan for it to come in, if you know what I mean.”

Male, 31, mixed farmer, Mid Devon

### **Adopting a polluter pays principle for all environmental impacts could reduce food security and raise food prices**

An alternative approach to driving the agricultural transition would be to remove subsidies and make farmers pay for the pollution they cause. Farmers could be charged for any emissions they generate or fertiliser and manure run-off into rivers and lakes.

The Environment Agency already uses this principle to an extent for water pollution. The organisation has been criticised for allowing pollution to escape penalty, but it began enforcement action against 144 of 1,536 non-compliant farmers in the 2022/23 financial year.<sup>174 175</sup>

New Zealand is cited as an example by those arguing for this approach to be utilised more widely. The country slashed farming subsidies in the 1980s and is

currently planning to introduce a carbon pricing scheme for agricultural emissions.<sup>176 177</sup> But the possibility of carbon pricing has come under pressure from farming groups that argue there could be a significant reduction in domestic production.<sup>178</sup> And there are worries about carbon leakage, where emissions move to other countries rather than being stopped.

In the UK, most farms are small businesses making limited profit. 96% have less than ten employees and over three-fifths farm under 50 hectares.<sup>179 180</sup> Charging farms for all environmental impacts could put many out of business, lowering domestic food production. This could result in a heavy reliance on imports, increasing the UK's vulnerability to geopolitical events and leading to higher food prices.

And the Netherlands provides a warning about the political consequences of heavy handed environmental policy. The Dutch government's plans to buyout and shut down livestock farms to reduce nitrogen emissions has led to large protests and the rise of the populist Farmer-Citizen Movement party.<sup>181</sup> The party won 15 out of 75 seats in the provincial elections to the senate in May 2023, which was influential in the fall of the coalition government.<sup>182</sup>

### **ELMs balances support for farmers with a transition to sustainable agriculture**

Alternative options to ELMs fail to provide a solution that supports farmers to both remain financially viable and improve environmental performance. While Labour and the Liberal Democrats have attacked the “chaotic and dysfunctional” transition to ELMs, both parties support the introduction of the schemes.<sup>183 184</sup> But ELMs has several issues to resolve if it is to meaningfully reduce agriculture's environmental impact and provide adequate financial support to farmers.

### **Participation in ELMs remains low**

The Government's ELMs update in January 2023 stated there were around 40,000 agri-environment agreements in place, covering 34% of agricultural land.<sup>185</sup> In October 2023, DEFRA announced that it had received 14,000 expressions of interest in the 2023 SFI offer, although some of those farmers will already have CS agreements or have had an SFI agreement in 2022.<sup>186</sup>

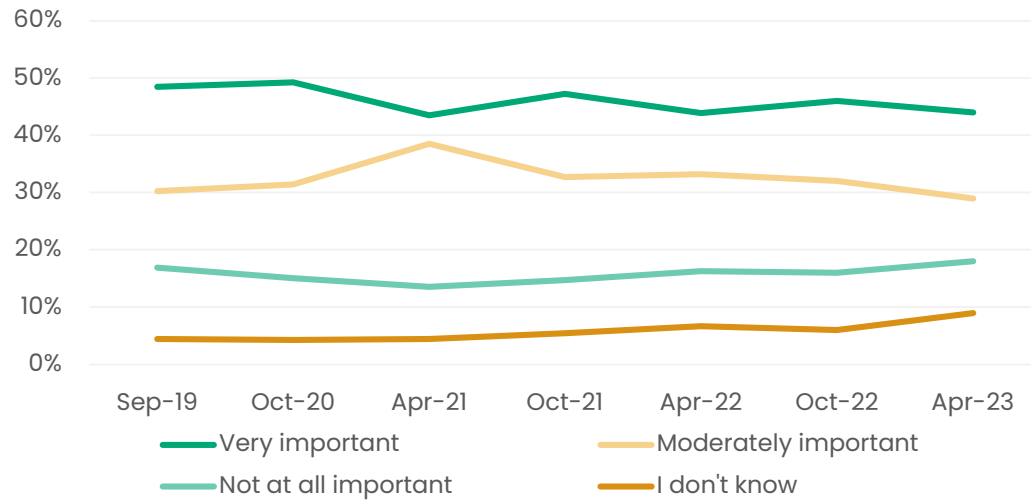
Participation will need to increase considerably if the Government is to reach its target of 70,000 agreements covering 70% of farms and 70% of farmed land by 2028.<sup>187</sup>

A Farmers Weekly survey conducted in spring 2023 suggests reaching the participation targets will be challenging. It found that SFI had declined in popularity from 67% in 2021 to 43% this year. And, more worryingly, it indicated that in the past two years the proportion of farmers that are not interested in joining ELMs at all had risen from 18% to 27%.<sup>188</sup>

Figures from DEFRA’s farm opinion tracker are a bit more positive, finding that 77% of farms think public payments for environmental outcomes will be important in the future. But that is down from a peak of 88% in April 2021.

**Figure 24: Importance to farmers that DEFRA pays for environmental outcomes in the future**

Source: DEFRA



Some focus group participants, particularly arable farmers, were sceptical too. They suggested the environmental schemes were not worth the hassle because the money offered was too low, the administrative burden was too heavy and changing practices carries risks.

“We looked into, not the new one, but the old schemes, the stewardships, and it was going to cost us so much that we would not benefit to do it and we were just working to keep ourselves busy. It wasn't worth doing. We weren't coming out any better off, so we didn't bother in the end.”

Female, 51, arable farmer, East Anglia

“I haven't heard a lot of good. If I'm honest, I haven't studied (ELMs) and I haven't looked into it because I haven't really spoken to anybody that says that it's any good. And we are on a farm where we've got a lot of good arable ground... And it sounds like, by what I can gather, that there's not going to be much uptake on it.”

Male, 31, mixed farmer, Mid Devon

### Payment rates are not attractive enough to entice all farmers

The Government made efforts to improve the attractiveness of schemes in 2023. It raised CS multi-year agreement payment rates by 10% and committed to routinely review them in the future.<sup>189</sup> The 2023 SFI package gave farmers more flexibility to

pick and choose which actions they carry out. It also increased the number of actions available, offered a management payment worth up to £1,000, and removed the tier system that existed previously (with introductory, intermediate and advanced levels).<sup>190 191</sup>

Numerous focus group participants noted that the updated SFI scheme is an improvement and they planned to enter it.

“From a pasture point of view, the low grassland and the herbal lays is very good and a lot less red tape than the actual stewardship is. So I think they've gone to some measures, they've listened to a lot of farmers in respect to that and made it slightly simpler... So I think it's looking a lot more flexible for farmers and probably a lot more encouraging.”

Male, 36, pastoral farmer, East Devon

“We're in mid-tier (Countryside Stewardship) at the moment and we get on with it really well. It supports our system. We have just registered our interest in the SFI under five of the sections. My view is things that compliment land for example, like hedge management and soils et cetera are great because it's not changing your farming system.”

Female, 24, mixed farmer, East Devon

But even following the changes, NFU modelling has shown that under the current ELMs offer, upland farms are 37% worse off than under previous payment schemes.<sup>192</sup>

And the changes DEFRA has introduced will not automatically encourage farmers who have been put off by the perceived poor financial return of entering schemes in the past or have heard that they are not worth paying attention to. While the department has increased payment rates this year and has committed to review them in future, the payments are currently based on income forgone plus costs.<sup>193</sup> This may not attract the majority of farmers into the schemes as there is insufficient profit to be made.

DEFRA's worries about changing the way payments are calculated relate to the potential impact on food production and staying within World Trade Organisation (WTO) rules on subsidies.

The WTO classifies agricultural payments as green box, blue box or amber box based on whether they could distort trade. Paying above income forgone plus cost would result in the payment classification changing from green box to amber box, the potentially trade distorting category.<sup>194</sup> But this would not be considered an unfair trade distortion as long as payments do not exceed a certain level. That

level is over £2.5 billion in England.<sup>195 196</sup> DEFRA has stated it is open to exploring alternative approaches, so there is scope for higher payments.<sup>197</sup>

### **Bureaucratic structures put farmers off taking environmental action by raising administrative burden**

Farmers potentially have to deal with several DEFRA organisations to access payment schemes. The typical farmer that applied for a mid-tier CS agreement would likely have to interact with the Rural Payments Agency, Natural England, and Catchment Sensitive Farming (a joint venture between Natural England, the Environment Agency and DEFRA). The administrative burden can put farmers off from entering ELMs.

The agencies are also not doing enough to help farmers tackle environmental impacts or access the schemes. The Farmers Weekly transition survey conducted in spring 2023 found that nearly nine in ten farmers felt they did not receive enough government information on support measures, carbon management or air quality. Two-thirds felt they needed more information on biodiversity and water quality.<sup>198</sup>

The Rural Payments Agency (RPA) is responsible for administering farm payment schemes and making payments. The agency has faced several problems implementing ELMs. It delayed the launch of the 2023 SFI offer from August to mid-September because of technical issues. It has since adopted a controlled rollout, which meant that by mid-October only 1,000 of the 14,000 farmers to express an interest had agreements in place.<sup>199</sup> That delay came shortly after the mid-tier CS application window had to be extended, also due to technical issues.<sup>200</sup>

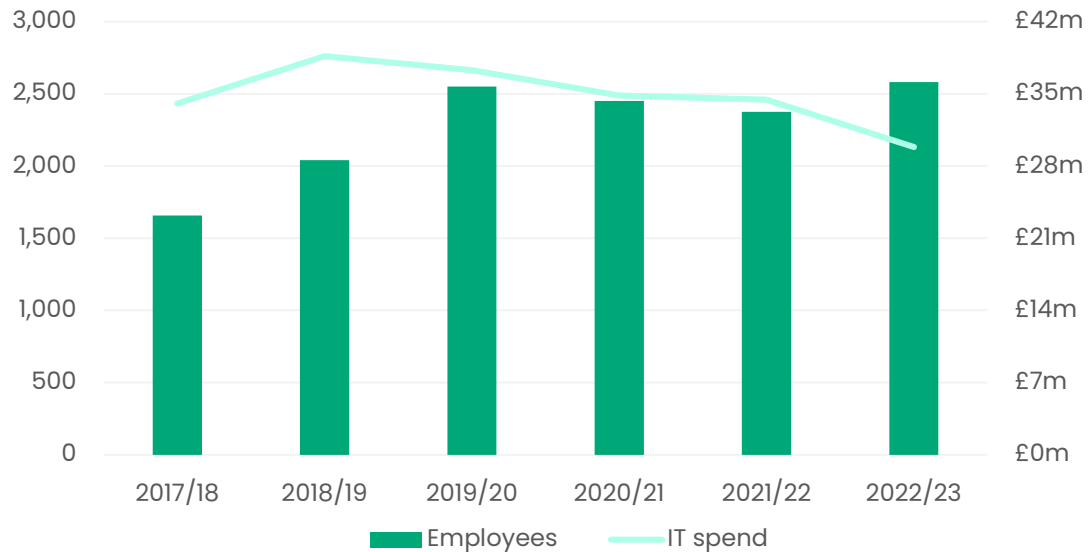
The issues with the schemes are causing farmers frustration and creating difficulties planning their sustainable agriculture businesses. The Chair of the Nature Friendly Farming Network, a farmer-led organisation advocating for sustainable food and farming, complained that DEFRA “seems to continue to over promise and under deliver.”<sup>201</sup>

The RPA has a history of poor performance. In 2018, the House of Commons Environment, Food and Rural Affairs Committee highlighted that late and inaccurate payments, poor communication, and errors in land mapping updates by the agency were “causing significant harm to farmers across the country”.<sup>202</sup> Last year, technical issues caused some rural land agents to be locked out of their clients’ accounts during the CS application window and shortly before the BPS window opening.<sup>203</sup>

The introduction of ELMs has made the RPA’s role more complex. The number of employees has risen to reflect this additional burden, increasing by more than half in the last five years. But, despite the organisation consistently having technical issues, annual spend on IT has dropped from nearly £40 million in 2018/19 to less than £30 million in 2022/23.<sup>204 205</sup>

**Figure 25: Rural Payments Agency number of employees and IT expenditure**

Source: Rural Payments Agency



Natural England’s responsibilities include monitoring and protecting sites of special scientific interest (SSSIs), advising the Government on environmental planning, and supporting farmers to enhance biodiversity, such as advising on and consenting higher tier CS applications. Natural England’s latest annual report suggests it is performing reasonably well. 16 of its 19 progress indicators are rated in the top two of four categories, and just one has the worst rating.<sup>206</sup>

But the agency has also angered farmers recently by designating an area of West Penwith in Cornwall as a SSSI.<sup>207</sup> Farmers are concerned that restrictions on managing the land will affect their operations. Natural England is having a similar issue in Dartmoor where its correspondence with farmers about reducing the number of grazing animals has been criticised.<sup>208</sup>

The Catchment Sensitive Farming programme provides advice to farmers on water and air pollution, soil health, and entering CS agreements. It is a bright spot of good practice. Focus group participants suggested they did not typically find Government advice helpful, but Catchment Sensitive Farming officers were an exception.

“Yeah, I’ve used (Catchment Sensitive Farming) because on my last mid-tier (Countryside Stewardship) application and on the capital grants you can get in our area you have to have a Catchment Sensitive Farming officer come in... Especially if it’s preventing dirty water from ending up in the water courses, they want to come and have a look. So we’ve dealt with a few of them. Yeah, they’ve been very helpful generally.”

Male, 35, mixed farmer, East Devon

“We are very lucky we got a very good (Catchment Sensitive Farming) officer in our area that has been sort of doing it for years. Unfortunately he’s had to go a bit higher up now, so he is not on the ground so much, but he’s still sort of there. And they are quite good and quite amicable people, they seem like they’re there to help you and we’ve done a lot of stuff through them... I think they’re the sort of people, if you are willing to try and do the right thing, they’re willing to help you. And I’ve never really found them anything but helpful actually.”

Male, 31, mixed farmer, Mid Devon

Since 2006, the Catchment Sensitive farming programme has improved water quality by up to 5% in areas it has operated. In 2021, DEFRA almost doubled the programme’s budget to £30 million so that it could increase its coverage of England’s farmland from 40% to 100%.<sup>209</sup>

But it still does not reach all farmers. Several focus group members that are less environmentally minded had not heard of Catchment Sensitive Farming. They also demonstrated some reliance on agronomists and plant breeders. These advisers are typically employed by or linked to agrochemical companies so dependence on them risks continued overuse of manufactured fertilisers and pesticides.<sup>210</sup>

“Where do I get my advice from? I dunno. I mean there are pharma groups locally, there are various plant breeders for obviously crops and bits and pieces that are helpful.”

Male, 44, arable farmer, East Anglia

“But there isn’t really anywhere where you can just go apart from your agronomist, you can deal with them and just, they’ll probably give you a bit of advice. They’re going around everybody else’s crops as well. So they’ve probably got a year’s experience on a certain type of a new variety of something. But apart from that, there isn’t anywhere where you can ring either that you can just say I need this advice about this. Well I haven’t found it anyway.”

Male, 42, arable farmer, East Anglia

## ELMs do not encourage farmers to change their practices enough to meet environmental targets

Another challenge for the schemes is to drive sufficient change in agriculture practices to address all the environmental issues the industry faces. Analysis by Carbon Brief suggests that the Government will not meet its agriculture sector climate and biodiversity targets based on the current schemes.<sup>211</sup>

**Table 2: UK agriculture related environmental targets**

Source: Climate Change Committee, Global Methane Pledge, DEFRA, HM Government

### UK agriculture related environmental targets

Reduce agriculture and land use emissions by 29% by 2035 compared to 2021
Reduce methane emissions by 30% by 2030 compared to 2020
Reduce nitrogen oxide emissions by 73% by 2030 compared to 2005
Halt the decline in species abundance by 2030 and exceed current levels by 2042
Return at least 75% of waters to close to their natural state as soon as practicable
Reduce nitrogen, phosphorus and sediment pollution from agriculture into water by 40% by 2038, and 10% by 2028

Some of the existing and planned future actions within SFI and CS are highly ambitious, such as not using insecticides, not tilling soil and establishing agroforestry systems.<sup>212</sup> But the option for farmers to do as few actions as they wish on as little land as they choose risks many not meaningfully changing their practices. And several of the actions that DEFRA is funding most heavily are capital works relating to the periphery of farmland rather than the farming itself, such as sheep netting, concrete yard renewal, and roofing for manure and slurry storage.<sup>213</sup>

The Government aims for 70% of farms covering 70% of farmed land to join ELMs by 2028.<sup>214</sup> But it also has a target for 65-80% of landowners and farmers to adopt nature friendly farming on at least 10-15% of their land by 2030.<sup>215</sup> This demonstrates that joining the schemes does not equate to undertaking nature friendly, or regenerative, farming (see Box 3 below).

### Box 3: What is regenerative agriculture?

Regenerative agriculture is not one specific method of farming. It is farming in a way that produces food while also enhancing the environment. The term regenerative primarily relates to improving the soil.

Groundswell, a farmer led organisation that promotes the adoption of regenerative agriculture, identifies five principles that regenerative farming should follow:

Don't disturb the soil

Keep the soil surface covered

Keep living roots in the soil

Grow a diverse range of crops

Bring grazing animals back to the land<sup>216</sup>

But if the Government is to achieve its agriculture and land use environmental targets while preserving food security, the majority of farmers will need to convert to regenerative farming. Research studies by the Centre for Ecology and Hydrology show that regenerative practices can deliver significant increases in bird and butterfly populations, and maintain or increase yields.<sup>217 218</sup> More farmers and landowners will need to undertake woodland creation and peatland restoration projects as well.

But raising farmers' environmental ambition has some of the same barriers as increasing participation rates. Environmental payments not being high enough and a heavy administrative burden can discourage farmers from carrying out more environmental actions in SFI and mid-tier CS agreements.

A lack of administrative capacity is limiting the number of the most environmentally ambitious projects that can be agreed. In September 2023, a petition was launched requesting more support from Natural England for higher tier CS agreements.<sup>219</sup> And DEFRA has only committed £37 million to Landscape Recovery projects in its first two years.<sup>220 221</sup> That is substantially lower than its plan to commit up to £50 million per year.<sup>222</sup>

The potential impact on inheritance tax also discourages some environmentally focused farmers from carrying out peatland restoration and woodland creation projects. Land on which farming activities are carried out is exempt from inheritance tax through agricultural property relief but rewilded land or woodland is not.<sup>223</sup>

Inheritance tax issues are a particularly significant barrier for tenant farmers. Farmers who own their land may be able to qualify for business property relief if they undertake nature restoration projects but landowners leasing their land cannot. They are reluctant to allow tenant farmers to carry out these projects because of the potential tax implications.<sup>224</sup>

The Government is aware of this issue. During 2023, the Treasury consulted on amending agricultural property relief for environmental land management, but it has yet to respond.<sup>225</sup>

## 2. Farmers have not been encouraged by the private sector to produce environmental goods

Private finance markets for environmental goods involve companies or investors buying credits from organisations that sequester carbon, avoid carbon emissions occurring, or increase biodiversity. This could entail creating new forests, preventing deforestation or carrying out nature restoration projects. Farmers that convert to regenerative agriculture practices could also sell credits for increasing biodiversity and storing carbon in the soils.

Companies purchase credits worth a tonne of carbon or a defined unit of biodiversity. Most markets are voluntary, with companies choosing to offset their emissions. But some are mandatory, such as the upcoming biodiversity net gain rules for housing and infrastructure developments.<sup>226</sup>

Globally, voluntary carbon markets are only worth £1.6 billion at present. But Morgan Stanley projects the market will reach around £80 billion in 2030 and more than £200 billion by 2050.<sup>227</sup>

### Private investment could replace public funding, but current supply of credits is low

Over the past few years, DEFRA has supported carbon sequestration and nature enhancement initiatives through the Nature for Climate Fund as well as Landscape Recovery projects. The £750 million fund running from 2021-25 is providing at least £500 million for woodland creation and management, and over £50 million for peatland restoration.<sup>228</sup>

The Nature for Climate Fund currently sits outside of the farming budget. But from 2025 onwards, it will effectively be folded into ELMs, with various peatland restoration and tree planting actions included in Countryside Stewardship.<sup>229</sup> Some Landscape Recovery projects will also incorporate these initiatives. But overall public funding is likely to decline.

The Government hopes that the private sector will shoulder some of the burden by purchasing credits from farmers and landowners that carry out carbon sequestration and nature restoration projects. Research from the Green Finance

Institute illustrates this will be needed. It estimates the 2022–32 finance for nature gap is £27 billion in England and £56 billion across the UK, only some of which will be closed by public schemes such as ELMs.<sup>230</sup> The Government’s goal is to attract at least £500 million per year of private finance into nature recovery by 2027 and more than £1 billion by the end of the decade.<sup>231</sup>

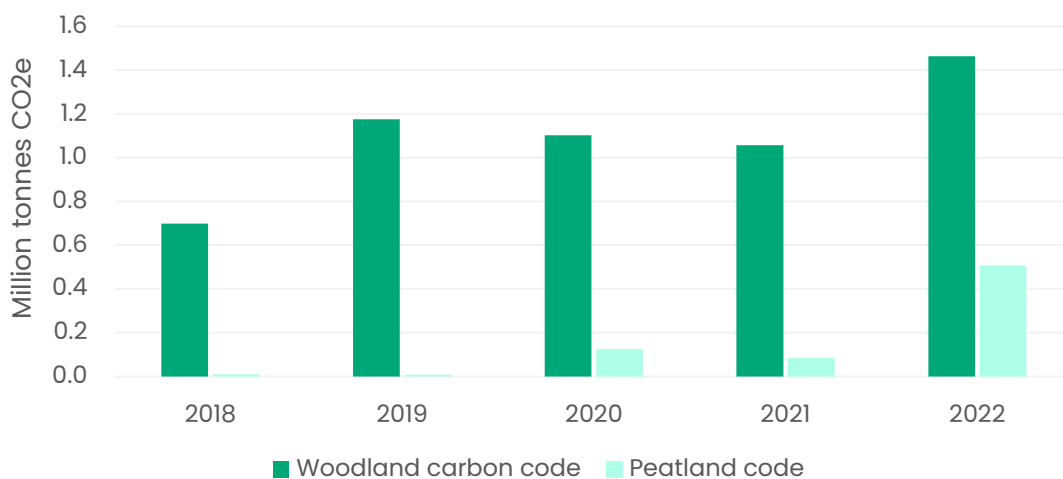
The Climate Change Committee’s (CCC) calculations suggest there could be demand for 66 million carbon credits from FTSE 350 UK-listed companies in 2030. The CCC assumes these companies account for half of overall demand, meaning the total could exceed 130 million credits. At £25 per credit, the middle of the range of UK nature-based carbon credit prices, that would represent over £3 billion of annual demand.<sup>232</sup> Some of that demand is likely to be satisfied through overseas projects, although the figures imply there would be sufficient demand for domestic credits to meet the Government’s target.

But, as shown in Figure 26, current supply is very low. Only around 1.5 million woodland carbon units were created in 2022. And while peatland carbon unit creation grew rapidly last year, it stood at just 500,000.<sup>233</sup> The CCC estimates that only 2.6% of UK woodland and 0.6% of peatland are currently or will in the near future be used for carbon credits.<sup>234</sup>

**Figure 26: Woodland Carbon Code and Peatland Code carbon unit creation in the UK**

Source: DEFRA

Note: Woodland Carbon Code figures calendarised based on financial years data



### Inconsistent measurement standards and pricing uncertainty risk undermining private markets

The CCC notes a key reason why supply of nature-based carbon credits is low is due to “ongoing debate about whether and how to enter the market”.<sup>235</sup> Farmers and landowners are hesitant to sell credits before the industry has developed

further because of concerns about verifying how much carbon is sequestered and receiving a fair price.

The unregulated voluntary carbon credits market has been flooded with low quality products sold at low prices. A study in the journal *Science* found that many projects considerably overstate emissions avoided and could worsen climate change if used for offsets.<sup>236</sup> The revelations about worthless credits have hit buyers' confidence, causing the market to collapse.<sup>237</sup>

### **Official standards are only in place for some credits and are typically not mandatory**

The Government recognises the importance of ensuring credits meet their claims. It backed schemes that introduced the Woodland Carbon Code and the Peatland Code, which can be used to certify the carbon savings from woodland creation and peatland restoration respectively.<sup>238 239</sup>

Natural England developed the biodiversity metric that will be used to calculate biodiversity net gain in the upcoming regulations for housing and commercial developments that require an overall increase in nature.<sup>240</sup> And DEFRA is working with the British Standards Institute to develop standards for future nature investment.<sup>241</sup> But, other than the biodiversity net gain metric, the use of these standards is voluntary, risking the sale of low quality, unverified credits.

Carbon sequestration in soil has a plethora of codes and tools provided by private companies. The Natural Environment Investment Readiness Fund funded a project by the Soil Carbon Alliance to create a soil carbon code. But it ended up developing minimum standards due to the number of schemes already present.<sup>242</sup> The CCC has highlighted that this risks a lack of “consensus around what a tonne of soil carbon represents”, which could result in variable credit quality and hinder even meticulous providers' ability to sell credits.<sup>243</sup>

### **Farmers and landowners do not have certainty over the price they will receive for credits**

DEFRA provides some pricing certainty for woodland carbon credits producers through the £50 million Woodland Carbon Guarantee Scheme. The scheme enables producers to sell verified woodland carbon credits to the Government at a guaranteed price instead of selling to private buyers.

But the average prices that have been offered in the seven auctions held so far have ranged from £17.31 to £24.11 per credit.<sup>244</sup> That is far below the price range recommended by the High-Level Commission on Carbon Prices of £46 to £92. And it is much lower than the CCC's estimate that woodland creation costs £65 to £105 per tonne of CO<sub>2</sub>.<sup>245</sup> Guarantee schemes are not provided to any other carbon or nature credits markets.

### 3. Investment in infrastructure and new technology has been too low

The agriculture industry faced chronic underinvestment during the 2010s. Greater investment in R&D, machinery and infrastructure could improve productivity and environmental outcomes. As businesses, farmers should consider making these investments to become more efficient as well as lower their pollution.

But with many farms generating little profit and the transition from BPS to ELMs taking place, they have limited capacity to invest. This problem was illustrated by focus group members, many of whom mentioned the cost of machinery and equipment as a top concern.

“I mean the trajectory for me of machinery and things like that’s just gone crazy. The figures that they talk for machinery now is phenomenal. The amount of money they’re talking, if that carries on, it’s going to end up where most farmers won’t buy any machinery.”

Male, 44, arable farmer, East Anglia

“I think everybody sitting in this meeting would think we all need to know that actually we can dare invest in some of this machinery to keep us going because for example, I had a tractor that I bought in 2016, the same tractor today is £60,000 dearer. It’s exactly the same tractor. Well, I’m not earning £60,000 more for my crops year on year as I was then. So the biggest problem I face is, so I’ve got a tractor with a blown engine, the engine’s £13,000 to fix, plus another seven for labour. I’ve got a £20,000 bill on a tractor that’s probably only worth £30,000 when I’m done. And yet a new one’s £125,000.”

Male, 47, arable farmer, Cambridgeshire

DEFRA has introduced new funding programmes for innovation and investment. But some technologies and infrastructure that could provide environmental benefits are not receiving enough funding. And other barriers to investment, such as planning rules and food regulations, remain a hindrance.

#### R&D funding remains low by historic standards and does not target key technologies

#### **Farming Innovation Programme boosts agriculture R&D but spending is still low**

Agriculture R&D funding received a boost from the launch of the Farming Innovation Programme in October 2021. The programme commits to spend over £270 million by 2029 and it has already run competitions providing up to £120 million.<sup>246 247</sup>

The programme is focused on environmental and economic sustainability. Most competitions are broad-based, open to solutions to productivity, environmental impact, progression towards net zero and resilience. They are mainly aimed at businesses, with academic institutions unable to lead projects under most of the competitions. And they provide funding for a mix of early-stage and industrial research.

DEFRA has also announced plans to extend the Farming Innovation Programme to include the Accelerating Development of Practices and Technologies (ADOPT) fund in 2024. This will make £44 million available to test and trial new technology and techniques on farms.<sup>248</sup>

Other Government R&D initiatives have also directed funding towards sustainable agriculture. The Transforming UK Food Systems Strategic Priorities Fund provided £47.5 million to research on “healthy people and a healthy natural environment”.<sup>249</sup>

The Biotechnology and Biological Sciences Research Council (BBSRC) and Innovate UK ran a £16 million competition for the development of novel low emission food production systems, which included alternative proteins and controlled environment agriculture.<sup>250</sup> And in May 2023, it announced almost £80 million of funding for the John Innes Centre, a global centre of excellence for plant and microbial science, to research “sustainable, resilient and robust high-yielding crops”.<sup>251</sup>

DEFRA’s R&D expenditure in 2021 was less than three-fifths its level in 2010 in real terms. The introduction of the Farming Innovation Programme and the planned extension of the programme next year have boosted spending. But if DEFRA’s R&D investment were to return to the proportion of the Government’s total it accounted for in 2010, it would rise to around £220 million.<sup>252</sup> Innovation funding remains well short of that level.

### **R&D funding is not targeted at the main environmental and economic opportunities**

Farming Innovation Programme competitions are typically open to all types of farming, and a wide range of challenges and potential solutions. While some other R&D initiatives have been more focused, they are the minority for the agriculture sector.<sup>253</sup> The broad scope of the Farming Innovation Programme funding can be seen in the wide range of focus areas of winners of four of the competitions run last year (see Figure 26).<sup>254</sup>

**Figure 27: Focus topics of winners of climate smart funding, sustainable farm-based protein, feasibility round two, and research starter round two competitions**

Source: UKRI



This allows Government funding to cover a large number of issues and technologies, with the potential for the private sector to support those that develop successfully. But it risks spreading the funding too thinly across different areas rather than identifying key emerging technologies that can tackle environmental impacts and present the most attractive growth opportunities.

Some environmental impacts can be addressed by tackling the other drivers of existing problems. Public and private incentives to create woodland and wetlands can help afforestation and peatland restoration rates. SFI and CS options to establish and maintain natural features, such as hedgerows, can enhance nature on farms. And investment in manure storage and processing infrastructure can tackle agriculture’s contribution to water pollution.

But R&D investment in new technologies could play a major role in tackling other challenges and provide growth opportunities.

**Table 3: Technologies that could solve key agricultural environmental challenges and present economic opportunities**

Source: Global Research Alliance on Agricultural Greenhouse Gases, HM Government, Future Foods, Good Food Institute Europe, UK Centre for Ecology and Hydrology, DEFRA, Quadram Institute, Food Standards Agency

Note: BBSRC = Biotechnology and Biological Sciences Research Council, JIC = John Innes Centre

<b>Problem</b>	<b>Technology solution</b>	<b>Technology benefits</b>	<b>R&amp;D funding and gaps</b>	<b>Other gaps</b>
Livestock emissions	Methane suppressing feed additives	Over 20% emissions mitigation	DEFRA has not funded methane suppressing additive innovation	Products not currently available in the UK
Livestock emissions	Alternative proteins	Significantly lower emissions and water pollution than intensive meat production	The Government has invested over £40 million in the last ten years The Good Food Institute (GFI) states this should increase to at least £49 million per year	
Peat farming emissions	Low emission farming techniques	Paludiculture (farming on rewetted peat) could be a net carbon sink	DEFRA has provided £20 million for low emission peatland farming innovation The Lowland Agriculture Peat Task Force Chair's report recommended funding further R&D, especially more trials and new machinery	
Crop resilience	Gene editing	Crop disease resistance, climate resilience, and less need for fertilisers or pesticides	BBSRC is providing £77 million to JIC for plant and microbial science research between 2023 and 2028	Secondary legislation to enable British farmers to use gene edited crops

## Infrastructure and equipment funding has increased but many farmers are missing out, some problems are not addressed, and planning needs reform

The Farming Investment Fund was launched in November 2021, replacing the Countryside Productivity Grant Scheme. It is split into the Farming Equipment and Technology Fund and the Farming Transformation Fund. The former offers grants from £1,000 to £25,000 for a wide range of items, such as direct fertiliser drilling equipment and soil health monitor packages.<sup>255</sup> The latter provides £15,000 to £500,000 grants for larger equipment and infrastructure, such as slurry storage and on-farm reservoirs.<sup>256</sup> <sup>257</sup> Grants contribute 40-50% of the total cost of items.

### Funding to reduce water pollution is insufficient

DEFRA provided £34 million in the Slurry Infrastructure Grant's first round, which only 374 farms were able to access.<sup>258</sup> One focus group member noted they missed out because the grant was not big enough.

"We applied for the slurry grant for a tin tower, but we didn't get it. So we've registered our interest if it extends further, I guess... there were only like 200 farms who were going to get it and we weren't in a high risk area, so we kind of knew we weren't going to get it, but we applied anyway to register interest because they wanted a vague number of, I guess, farms who need to add additional storage."

Female, 24, mixed farmer, East Devon

In August 2023, the Government announced it would provide an additional £166 million of funding for slurry storage and precision spreading equipment.<sup>259</sup> This announcement was part of plans to relieve housebuilders of their nutrient neutrality obligations (rules requiring new developments in a river catchment to avoid increasing the amount of nutrients entering the river), which was rejected by the House of Lords.<sup>260</sup> But DEFRA has since announced £74 million will be made available in round two, with £147 million in total between rounds two and three.<sup>261</sup>

<sup>262</sup>

At the same level of funding per grantee, that would enable a total of 2,000 farms to add slurry infrastructure. There are 5,337 dairy farms in England, but the grant is also available to beef and pig farms.<sup>263</sup> <sup>264</sup> If three in four farms accessing the grant are dairy farms, that would equate to just over a quarter of all dairy farms in England.

That is a considerable proportion but would not resolve the full extent of inadequate storage levels. Research by the Environment Agency in 2012/13 found that half of dairy farms in nitrate vulnerable zones did not have sufficient slurry storage and, overall, dairy farms' storage capacity is less than 50% of the legal

minimum. Recent case studies from the River Axe and Poole Harbour suggest that the problem has worsened, finding 95% and 75% non-compliance with slurry storage requirements respectively.<sup>265 266</sup>

The Slurry Infrastructure Grant and the Farming Equipment and Technology Fund's slurry items help address water pollution from beef, dairy and pig farming.<sup>267</sup> But poultry manure is also a major cause of water pollution, notoriously in the Wye Catchment.<sup>268</sup> Around 15% of poultry farms in England process the animals' waste through anaerobic digestion but this does not resolve the problem as the digestate is still high in phosphates when it is spread on fields.<sup>269 270</sup> And anaerobic digesters require other feedstock, such as maize, to operate.

Alternative options that still avoid simply spreading waste on fields are drying and pelleting or composting, both of which create stable fertiliser that could be transported and sold.<sup>271</sup> But these systems are expensive, with costs ranging from around £400,000 to the low millions.<sup>272</sup> Nearly half of poultry farmers generate less than £25,000 profit per year so struggle to afford this infrastructure.<sup>273</sup>

### **Funding for infrastructure that enhances climate resilience is too low**

The funding provided by the Water Management Grant does not adequately address the arable and horticulture industries' need to enhance climate resilience. The first two rounds are worth £20 million in total, with individual awards of £35,000-£500,000 covering 40% of total costs.<sup>274 275</sup> On-farm reservoirs can be installed for less than £250,000 but can cost considerably more.<sup>276 277</sup> Assuming an average award of £100,000, the grants will have supported just 200 farms to improve water management.

Yet less than one in ten of England's 43,000 arable and horticultural farms have on-farm water storage.<sup>278 279</sup> During last year's drought, farmers highlighted the need to construct more water storage facilities on farms.<sup>280</sup> And The Lowland Agriculture Peatland Taskforce recommended new investment in water storage and management.<sup>281</sup>

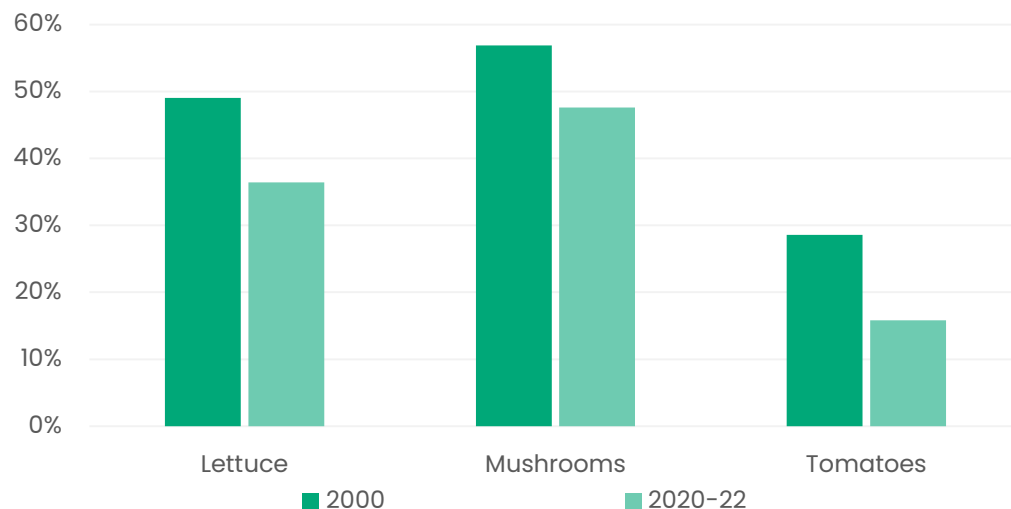
At the Farm to Fork Summit in May 2023, the Government announced it would increase funding for the horticulture sector, including backing for controlled environment agriculture.<sup>282</sup> And the Lowland Agriculture Peatland Taskforce report suggested unlocking opportunities for vertical farming so some peat farmers can convert parts of their farms to wetter management practices.<sup>283</sup> But the Farming Investment Fund does not currently support controlled environment agriculture.

Increasing the volume of vegetables grown in controlled environment facilities could capitalise on the horticulture growth opportunity identified in the Government Food Strategy.<sup>284</sup> And it could enhance food security given the UK only produces 54% of vegetables it consumes.<sup>285</sup>

Simply returning to levels of self-sufficiency the country had in 2000 for lettuce, mushrooms and tomatoes would result in 110,000 additional tonnes of production worth £175 million at 2021 prices.<sup>286</sup> And reaching the same levels of controlled environment agriculture as France would see the sector triple in size, producing over £700 million additional revenue.<sup>287 288</sup>

**Figure 28: UK domestic production as a % of consumption of selected vegetables in 2000 and 2020–22 average**

Source: DEFRA



The cost of controlled environment agriculture facilities varies greatly depending on the type of facility, the technology incorporated, and the scale. Typical greenhouses can cost £200 to £500 per square metre.<sup>289 290</sup> Thanet Earth, the world’s largest greenhouse in Kent, cost £125 million to build. But standing at 55 hectares, that is only £227 per square metre.<sup>291</sup> A 2.5 hectare vertical farm opened in Norwich in summer 2023 cost £33 million, equivalent to £1,320 per square metre.<sup>292</sup>

Facilities are very energy intensive so can generate greater emissions than field-based production. Using renewable energy sources or accessing waste heat can avoid this drawback. But research by Savills suggests that co-locating a greenhouse with a source of waste heat can raise costs by 44%.<sup>293</sup>

Major projects such as Fischer Farms’ vertical farm and Thanet Earth are backed by large private food businesses and asset managers. But many lowland peat farmers and other small businesses would struggle to invest at least tens of thousands of pounds for commercial scale greenhouses or vertical farms.

### Planning barriers limit how much water investment takes place

Farmers’ financial capacity and funding limits are not the only barriers to installing more infrastructure. These investments can also face delays and blockages from the planning system.

Small slurry stores and on-farm reservoirs can be built under permitted development rights but most need full planning permission, which can be time-consuming and expensive.<sup>294</sup> Planning consultants recommend applying for planning permission for slurry storage a year before a decision is required and allowing at least two years for on-farm reservoirs.<sup>295 296</sup>

One of the main factors causing lengthy processes is understaffed planning departments. Industry experts have also noted that the best planning officers are often recruited by developers, leaving farmers to deal with inexperienced officers or locums from other areas. Another problem is the number of organisations that can be involved in planning decisions. Planning applications can include full consultation with Natural England and the Environment Agency as well as local stakeholder groups, which can result in additional surveys and assessments being requested.<sup>297</sup>

A further issue is the differing aims of the organisations that can be involved. Industry experts note that Natural England and the Environment Agency are often at odds with one another. Natural England officers have written to local councils recommending they reject slurry storage applications due to worries about farmers subsequently increasing cattle numbers. This has resulted in instances where the Environment Agency has then advised the same farmers that they do not have enough storage. This planning blockage has occurred for farms that have had Slurry Infrastructure Grant applications approved by DEFRA.

Focus group participants also identified that the lack of consistency in the planning system creates problems for investment.

“The strange thing that I've found is that some of the things that you think would be a difficult challenge have gone through with very little problem. And we needed planning permission to build some sheds and they said, well, you can't build them there. You can see them from the road, which is about two miles away, so you're going to have to build them here. Okay then, so we'll build them there, which is obviously what we've done, but it was an additional cost and actually you can see them from the road more there than we would've done putting them next to our other buildings.”

Male, 47, arable farmer, Cambridgeshire

“The biggest trouble is that the planning generally has no common sense. There's no set kind of guidance on it. I think they can go around to one farm and say, yeah, absolutely fine, and then go to another farm and say, no, you need to do this. And there's no rhyme or reason for it.”

Male, 36, pastoral farmer, East Devon

DEFRA is aware of planning barriers restraining environmental action. During the summer, it conducted a call for evidence on planning issues associated with agricultural items, including nature-based water storage, slurry stores and reservoirs.<sup>298</sup>

### **Some technological items that can improve productivity and reduce environmental impacts are not being funded**

Some focus group members complained about the lack of funding for GPS systems, which can lower environmental impacts by reducing distances tractors cover as well as optimising application of fertilisers and pesticides. Although the Productivity and Slurry Grant does include two GPS items, the highest contribution is around £1,000, while advanced GPS systems can cost closer to £10,000.<sup>299 300</sup>

“I can't ever understand the infrastructure grant, where you get 40% or 50%, why isn't there a proper GPS system on there? There's everything else. We sort of want it, but I can't really justify seven or eight grand for the system I want. And there's all this other crap on there, which really is just investing in your farm as far as you get all this robotic milking and scrapers and all of that. The GPSs would be a lot more beneficial for the environment and for the farmer and I can't make out why that's not on there.”

Male, 31, mixed farmer, Mid Devon

Drones can also improve the efficiency of applying pesticides, fertilisers and seeds. PwC's *Skies Without Limits* report estimates drones can decrease pesticide use by over 30%.<sup>301</sup> Precision drone spraying can also reduce soil compaction from heavy machinery, and access difficult to reach areas on wet ground.<sup>302</sup>

Drones are already used in farming around the world. In Japan, drones account for 40% of rice crop spraying.<sup>303</sup> But drone use on farms in the UK is at a much earlier stage. At the start of 2023, the Civil Aviation Authority (CAA) granted the first operational authorisation for agricultural spraying to XAG Agricultural Drones.<sup>304</sup> This could enable the uptake of technology that the *Skies Without Limits* report calculates could save the UK agriculture industry more than £1 billion by 2030.<sup>305</sup>

But the cost of drones could be a barrier to adoption. A monitoring drone may cost just a few hundred pounds but more advanced drones can cost tens of thousands.<sup>306</sup> The XAG spraying drones cost £27,000 and £35,000 (plus VAT) for the smaller and larger models respectively.<sup>307</sup> But the Farming Equipment and Technology Fund does not currently offer grants for drones.

### Farmers are missing out on grants because of their structure and rules

The structure and rules of the grants prevent some farms, particularly smaller ones, from accessing them. The Farming Equipment and Technology Fund does not allow the purchase of second hand items and all grants are paid in arrears.<sup>308</sup> Receiving payments in arrears was cited by a focus group member as preventing them from participating.

“There's a lot out there. But the thing is with these grant systems is 90%, well I think the majority of them you have to outlay the money and you then get the money back in six months' time. No disrespect, but we haven't got the money there to outlay in the first place, so we can't do it.”

Female, 54, mixed farmer, Cambridgeshire

## 4. The communities that underpin farming are not being fostered

Close communities and strong relationships in agriculture can help to tackle the twin economic and environmental challenges. Farmers that work together can accelerate progress on environmental issues and improve productivity. And county councils can support new entrants into the industry by renting land for them to farm. But the Government is not providing enough support to facilitate these solutions.

### Not enough farmers are supported to support each other

Focus groups held for Onward suggested farmers are not keen on the concept of training. One participant suggested that in a training course “you teach the lecturers more than they teach you”. But learning from other farmers is very popular. Several focus group members noted that farm walks and discussions with other local farmers offered some of the best advice.

“The best thing I’ve done really is farm walks. I’ve been on several farm walks looking at it and seeing how they’ve been getting on. That seems to be where you learn most.”

Male, 35, mixed farmer, East Devon

“So if you want advice on your particular soil type or your particular farming, you sort of need like-minded farmers that do the same kind of thing. So yeah, sometimes I find the agronomists give you a kind of black and white answer where you need the grey sometimes. So I would generally stick to people who understand exactly your farm and your farm type. Different farmers. We’re part of a national discussion group that would be more beneficial to me than the agronomist as such.”

Male, 36, pastoral farmer, East Devon

“You need a village when you’re a farmer, so you need your professionals, but you also need your other local farmers who you can speak to. We’re family farmers, so it’s a couple of generations along. So there’s what they’ve learned through the years from the family and how they’ve worked the land.”

Female, 51, arable farmer, East Anglia

DEFRA finances farmer-to-farmer learning through the Facilitation Fund. The fund enables the formation of farm cluster groups and provides three years of funding to conduct farm visits, training sessions, and the testing of soil and plants.<sup>309</sup> Since being launched in 2015, it has funded around 220 groups with over 6,000 members.

Some groups have gone on to expand and take advantage of private nature markets. The Environmental Farmers Group launched in May 2022 by bringing together numerous clusters in the Avon Catchment in south-west England. As of May 2023, the group has over 100 subscribing members covering more than 45,000 hectares and has completed its first major nature markets trade. It uses the expertise of the organisation to trade biodiversity improvements, water management and carbon sequestration.<sup>310</sup>

The latest Facilitation Fund round for 2024-27 offers each group up to £50,000 and a total of £2.5 million, potentially supporting 50 clusters.<sup>311</sup> Participants at the Sustainable Food Trust’s Strategies for Financing and Scaling the Agricultural Transitions event in autumn 2023 claimed that one of the best things DEFRA has done is funding cluster groups. But they were frustrated that there is a limit on the number of groups that could be supported and that funding was only offered for three years.

## Young farmers are not given sufficient access to experience, land or finance

Intergenerational turnover in the farming industry could lead to greater environmental action being taken. Focus groups held for Onward demonstrated that younger farmers were more likely to participate in ELMs. And former DEFRA Secretary George Eustice noted that older farmers are more resistant to green farming methods.<sup>312</sup>

One of DEFRA's attempts to encourage a demographic transition was to offer incentives to older farmers to exit the industry. In 2022, the department ran a lump sum exit scheme offering up to £100,000 for farmers to retire or leave the industry by mid-2024.<sup>313</sup> But it did not have much of an impact, with only 2,700 applications submitted, and 500 subsequently withdrawn.<sup>314</sup>

When it comes to helping farmers into the industry, the Rock Review into tenant farming pinpoints four factors that hold back potential new entrants: limited experience, which is a particular issue for potential tenants as they are seen as higher risk by landlords; minimal advice on how to build a farming business; limited access to finance; and lack of access to land.<sup>315</sup>

DEFRA is trying to address the advice barrier. Between December 2022 and spring 2023, they piloted a New Entrant Support Scheme, which aimed to advise people with limited farming experience how to develop business plans and provide tactical support.<sup>316</sup> The scheme's ultimate goal was to improve participants' chances of accessing land and finance. The initial findings suggest participants have more confidence to pitch business plans to potential landlords but it is unclear that their opportunities to access land have actually increased.<sup>317</sup>

On access to finance, the Basic Payment Scheme (BPS) offers young farmers additional funding worth up to 17.5% of their BPS payment.<sup>318</sup> But as BPS is phased out, these payments will diminish. And DEFRA does not provide financial support for potential new entrants to access the industry.

"I genuinely find it a concern that there are not more young people getting into farming, but can you blame them? If you were, let's say an 18, 20 year old person now and you wanted to take on a farm and start farming, you'd be knackered before you started because the banks wouldn't give you the money. It is a very difficult line to follow and I think it's incredibly sad."

Male, 47, arable farmer, Cambridgeshire

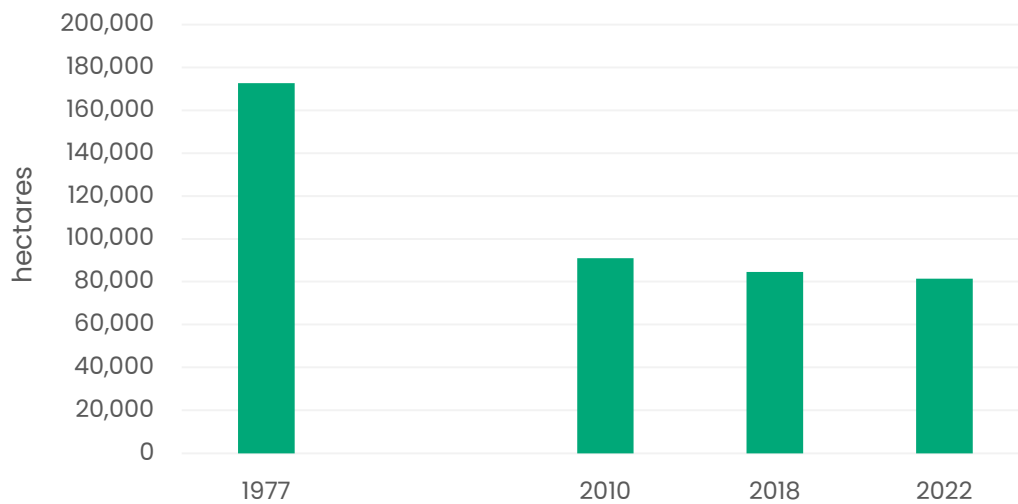
County council farms, which are owned by local authorities and let to farmers, can provide access to land and experience. But research by the Campaign to Protect Rural England found that the total area of county farms halved between 1977 and 2018, including a 7% drop since 2010.<sup>319</sup> Recent DEFRA data is incomplete but it suggests the negative trend has continued since 2018, with a further 4% loss.<sup>320</sup>

Cambridgeshire is the only notable exception to county councils reducing their farmland. It has expanded its estate by almost 1,500 hectares since 2010.<sup>321</sup> Its estate is also noteworthy for promoting sustainable farming and biodiversity through organising farm walks, benchmarking and discussion groups.<sup>322</sup>

**Figure 29: Total county farms area in England**

Source: Campaign for the Protection of Rural England, DEFRA

Note: 2022 figure based on latest available data for authorities not reporting in that year



## 5. Domestic and international relationships are not being harnessed for the good of farmers

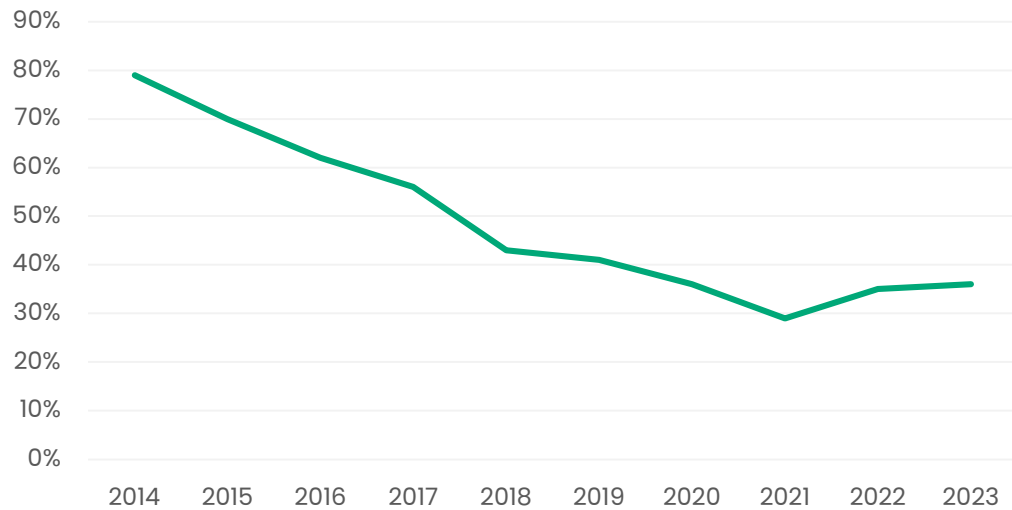
### Farmers suffer from the power of supermarkets and food manufacturers

Farmers are affected by a plethora of problems with their larger customers, ranging from last minute order cancellations to unexplained fees on invoices.<sup>323</sup> In response to this long standing issue, the groceries supply code of practice was introduced in 2009, mandating fair dealing between supermarkets and their suppliers.<sup>324</sup> In 2013, the Groceries Code Adjudicator was created to enforce the code.<sup>325</sup>

The adjudicator has helped to meaningfully improve the relationships between supermarkets and suppliers. The proportion of suppliers reporting issues with the code has fallen considerably in the last decade. But the rate of issues jumped in 2022 as supermarkets squeezed suppliers while inflation was high, and it has remained elevated this year.<sup>326</sup> More than 10% of suppliers reported refusals or unreasonable delays to considering price increases by five of the largest 13 retailers in 2022.<sup>327</sup>

**Figure 30: Percentage of suppliers that have had issues with the groceries code of practice**

Source: Groceries Code Adjudicator



The Groceries Code Adjudicator is only able to investigate supermarkets following a complaint. So it is reliant on suppliers feeling confident that complaints will not cause a backlash. And the adjudicator’s responsibilities only cover the interaction between supermarkets and their direct suppliers. Any farmers selling to wholesalers, food manufacturers or other intermediaries are not protected by the code.<sup>328</sup>

The unfair treatment of farmers has been highlighted in the pig farming and horticulture sectors.

- In 2022, DEFRA carried out a consultation on contractual practices in the pig sector and nearly two-thirds of respondents disagreed that sales agreements are always honoured.<sup>329</sup> Defra has committed to introduce new regulations to develop fairer trading in the pig supply chain, reflecting the consultation responses.<sup>330</sup>
- In September 2023, the Get Fair About Farming campaign sent an open letter to the ‘big six’ supermarkets asking for better treatment.<sup>331</sup> It also launched a petition to the Government requesting reform of the groceries supply code of practice, which has received more than 100,000 signatures and is scheduled for debate in Parliament in January 2024.<sup>332</sup>

Changes to trade have created barriers to exports and threaten domestic sales

### **Post-Brexit labour shortages appear to have been resolved but trade barriers remain a problem**

When Brexit came into force, two major changes to the British food industry's relationship with the EU took effect. It reduced access to labour and created barriers to exports.

Brexit led to substantial shortages of casual agriculture workers in 2021. But the quota on seasonal worker visas has been raised from 30,000 to 45,000, with the Government able to raise it by a further 10,000 if necessary.<sup>333</sup> Including the optional increase, the quota exceeds the highest number of casual workers there have been in any year this century, so the change should resolve the problem.<sup>334</sup>

But barriers to trading with the EU remain an issue. While the UK has retained tariff and quota free trade with the bloc, additional paperwork and border checks are hindering exports. 30% of meat exports are now checked by EU authorities.<sup>335</sup> And the Sanitary and Phytosanitary Certification working group estimated that Export Health Certificate requirements cost at least £60 million each year. They highlighted the costs could rise further because of a shortage of vets coming to the UK from the EU. The administrative burden has resulted in some businesses stopping exporting to the EU altogether.<sup>336</sup>

### **New trade deals have created more competition for British farmers**

An intended benefit of leaving the EU is opening up more markets for UK exports. But two new trade deals agreed so far, with Australia and New Zealand, have done more to damage British farmers' domestic competitiveness than create export opportunities. Modelling by the Agriculture and Horticulture Development Board (AHDB) estimates the deals will lead to additional beef and lamb imports that equate to 2% and 5% of UK domestic production respectively.<sup>337 338</sup>

But Australia and New Zealand currently have significant access to the Chinese market. AHDB notes that if that changes, exports to the UK could be much higher.<sup>339</sup> The duty-free quota for Australia alone will rise over ten years to levels that are equivalent to more than 10% of UK domestic beef and a quarter of domestic lamb production.<sup>340 341</sup> And the deal gives substantial access to high value cuts of meat, which could particularly impact British farmers.<sup>342</sup> Yet there is negligible opportunity for UK farming exports to these countries, with cheese the only meaningful beneficiary.<sup>343</sup>

Since the trade deals with Australia and New Zealand were agreed, there has been a change of leadership in Government. Following the UK Farm to Fork Summit in May 2023, the Prime Minister committed to six principles to ensure farmers benefit from future trade deals:

1. Consider the full impacts and opportunities of trade agreements on domestic agriculture.
2. Protect sensitive sectors, including, where appropriate, through permanent quotas.
3. Prioritise new export opportunities for food and drink producers.
4. Protect UK food standards, preventing chlorine-washed chicken or hormone-treated beef from entering the market.
5. Safeguard UK's ability to maintain high environmental, animal welfare and food standards.
6. Remove market access barriers outside of free trade agreements.<sup>344</sup>


These new principles would resolve the problems that were encountered in previous trade deals. Minette Batters, the NFU President, noted that the UK's deal to join the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) was a "far more considered and balanced outcome (than the Australia and New Zealand deals), particularly with respect to managing market access in our most vulnerable sectors".<sup>345</sup>

Although British farmers have been better protected, the trade deal still presents environmental concerns. The UK will remove tariffs on palm oil despite its link to deforestation and allow access to products that use pesticides or animal raising practices that are banned in the country.<sup>346</sup>

Sticking to the principles may also prevent the UK from striking trade deals. The Canadian meat industry has launched a campaign against the UK's accession to the CPTPP unless it allows imports of hormone-fed beef.<sup>347</sup>

# Recommendations





To tackle farming's twin economic and environmental problems, the Government should implement policies that address the five identified root causes: reforming incentives, developing private markets, increasing investment, strengthening communities, and improving domestic and international relationships.

### Recommendation 1: Deliver a five point plan to make ELMs work for farmers and the environment.

The introduction of Environmental Land Management schemes (ELMs) represents the right direction of travel. But as outlined above, farmers are frustrated with the payment rates and the capacity of organisations charged with delivering them. And the schemes do not encourage farmers to change their practices sufficiently to meet the UK's environmental targets. The Government should take rapid action in five areas to turn the schemes around:

1. Introduce bonuses for more environmental actions
2. Back regenerative farming
3. Address fractured bureaucracy to administer the schemes more effectively
4. Recruit outside advisers to agree more nature enhancing projects
5. Remove inheritance tax barriers to nature restoration

#### Recommendation 1.1: Offer bonus payments to farmers to carry out environmental actions on more of their land.

To encourage greater participation, DEFRA could increase all payment rates above the income forgone plus costs level. But this would not necessarily incentivise greater ambition. It already offers management fees worth £20 per hectare up to £1,000 for Sustainable Farming Incentive (SFI) agreements to drive entry to the scheme.<sup>348</sup>

To promote greater participation and ambition, DEFRA should instead offer bonus payments to farmers for carrying out environmental actions on most of their land. This would provide the encouragement that the original tiering approach to SFI aimed for but would maintain the flexibility farmers requested.

DEFRA should also incentivise farmers to undertake an ecologically coherent package of actions that will generate the optimal combination of environmental benefits and food production for their land. To achieve this, it should offer bonus payments for accessing advice on which actions to conduct on which parts of land.

Onward's analysis of the latest Countryside Stewardship (CS) statistics suggests environmental actions are conducted on around 40% of total land controlled by farms that have entered the scheme. The average area based payment for current CS agreements is around £200 per hectare. The average rate is likely to rise as woodland creation and peatland restoration are added to CS and because the average value of SFI options is over £350.<sup>349 350</sup>

Assuming the average action paid around £260 and 20% bonus payments were offered for all land on which actions are undertaken above the current average level of 40%, a medium-sized 50 hectare farm carrying out actions on 65% of land would receive an additional £650. If 5% bonus payments were offered for accessing advice on where to undertake actions, the same farm would gain a further £425.

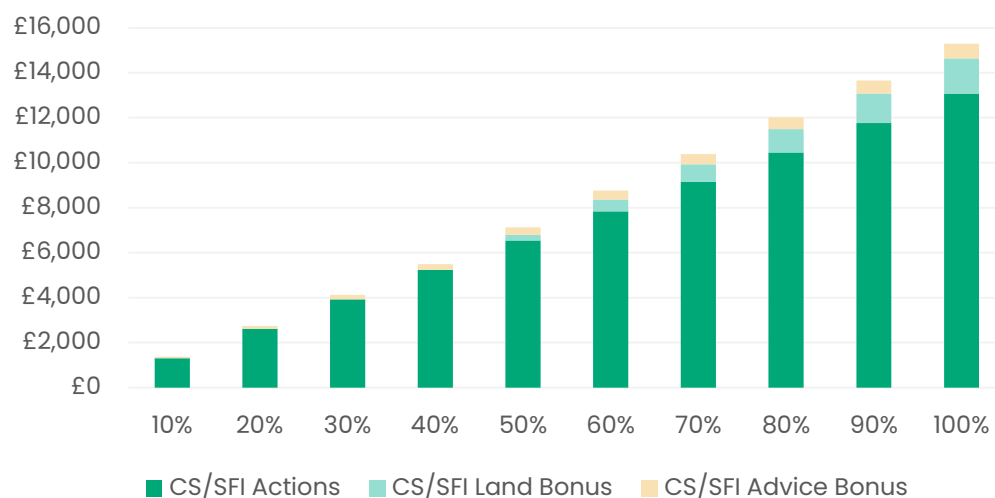
Under a scenario where:

- The Government reaches its target that 70% of farms enter ELMs.
- The average amount of land in ELMs on which environmental actions are carried out is 55%.
- 60% of farms access advice on where to undertake actions.
- 70% of farms in SFI or CS carry out actions on more than 40% of land.
- The average proportion of land on which environmental actions are carried out by farms exceeding the 40% threshold is 65%.

The bonus payments would only add £85 million to the total ELMs costs.

**Figure 31: Example of CS or SFI payments received for a 50 hectare farm if bonus payments were introduced**

Source: DEFRA, Onward analysis



**Recommendation 1.2: Run a trial of Countryside Stewardship multi-year options for the transition to and maintenance of regenerative farming.**

Mid-tier CS already provides 16 offers for conversion to and maintenance of organic farming.<sup>351</sup> Yet it does not have an equivalent grant for regenerative farming. Farmers could effectively receive payments to conduct regenerative farming, but the administrative burden is significant as they must choose multiple actions to adopt and provide evidence of each of them being carried out.

A regenerative farming offer would provide more flexibility for farmers, particularly during the transition from conventional methods. They could

experiment with the optimal location to plant legume fallows and herbal leys, discover which crop rotations work best on their farm, and steadily transition to no-till farming.

Unlike organic farming, regenerative agriculture does not currently have a certification so it would require alternative assessments to ensure compliance. Instead of focusing on the inputs (the actions undertaken), the offer should analyse the outputs. The option should involve measuring soil carbon and biodiversity at the start of the agreement, an interim measure after three years and a final measure after five years.

DEFRA should launch a trial regenerative agriculture offer. It should pay £300 per hectare to the whole farm, in line with the median organics conversion payment, plus the bonuses in recommendation 1.1.<sup>352</sup> It should also cover the costs of DEFRA agency advisers or certified third party organisations measuring soil carbon and biodiversity.

Including land and advice bonuses, the regenerative agriculture offer would pay a small 20 hectare farm £6,300 per year and a medium-sized 50 hectare farm £17,550 per year.

The trial would allow DEFRA to assess whether an outcomes based approach would be more attractive for farmers and encourage greater environmental improvements. It would also allow it to test soil carbon and biodiversity measurement methodologies, which would support the long term potential to develop large scale, well-functioning private finance markets (see recommendation 2.1).

**Recommendation 1.3: Create an integrated “Environmental Land Management Advice Service” and give the Rural Payments Agency a short-term funding boost to improve IT systems.**

#### **“Environmental Land Management Advice Service”**

Farmers potentially have to deal with several DEFRA agencies for ELMs agreements. The farming community’s perception of these organisations is, at best, mixed.

Farmers think very highly of Catchment Sensitive Farming. But Natural England advisers have had challenging relations with farmers recently. And while the Rural Payments Agency’s (RPA) field officers’ reputation among farmers has improved due to a shift in focus from inspections to advisory visits, many farmers are still wary of them.<sup>353</sup>

Integrating advisory services into an umbrella organisation that is branded around supporting farmers to make the most out of the new schemes would improve trust

and engagement with the farming community. It could also reduce the administrative burden of applications for farmers.

This reform would present efficiency opportunities for the agencies. RPA field officers, and Natural England and Catchment Sensitive Farming CS advisers both conduct thousands of farm visits each year.<sup>354 355</sup> Integrating services would enable advisers to more easily coordinate efforts, so they can reach more farmers, prioritise which farmers to visit, and ascertain where enforcement action may be required.

DEFRA should bring together advisers from the Rural Payments Agency, Natural England, and Catchment Sensitive Farming into the “Environmental Land Management Advice Service”.

All advisers should be able to help farmers work out which scheme and which set of environmental actions would be optimal for their land. And they should be able to assist farmers to complete SFI and mid-tier CS applications. Advisers that provide specialist functions, such as supporting higher tier CS agreements or water related actions, should continue to do so.

The Environmental Land Management Advice Service’s primary aim should be to encourage as many farms as possible to enter ELMs, and support farmers to carry out environmental actions on most of their land. But it should also advise farmers on accessing the Farming Investment Fund for items that can reduce pollution or enhance the environment. And it should encourage farmers to work together to tackle environmental issues through forming cluster groups.

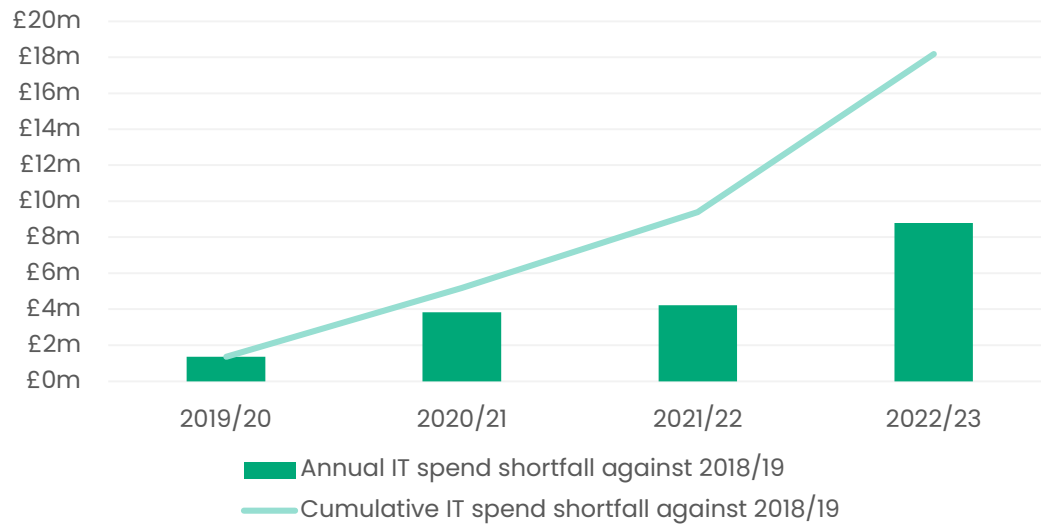
### **Short-term funding boost for the Rural Payments Agency**

In 2024, the number of SFI actions will more than double and CS actions will increase.<sup>356</sup> The RPA could have similar struggles administering the schemes as it did in 2023 without better technological capabilities. And the agency’s difficulties resulted in farmers losing confidence in the schemes, which puts the Government’s targets for increased uptake of ELMs at risk.

DEFRA should give the RPA a short-term £18 million funding boost, equivalent to the shortfall in IT spending in recent years. The funding should be used to address technical issues before SFI and CS application windows open in 2024.

**Figure 32: Rural Payments Agency IT expenditure shortfall compared to 2018/19**

Source: Rural Payments Agency



**Recommendation 1.4: Enlist third party organisations to deliver more higher tier Country Stewardship and Landscape Recovery agreements.**

Entering higher tier CS and Landscape Recovery schemes involves considerable work for farmers. Applications are very detailed and require interaction with officers from at least one of Natural England and the Environment Agency. But it is the administrative capacity of these organisations that limits the number of scheme agreements rather than a lack of demand from the most environmentally-conscious farmers.

A petition launched in September 2023 by the Vice Chair of Nature Friendly Farming Network called for more support for higher tier agreements, claiming there has been an 80% decrease in successful scheme applications compared to ten years ago.<sup>357</sup> Only £37 million has been allocated to Landscape Recovery projects in 2022 and 2023, despite DEFRA planning to commit up to £50 million per year.<sup>358 359 360</sup>

Increasing the number of Natural England and Environment Agency advisers could enable more farmers to join these schemes. But, since 2019/20 Natural England's headcount has increased by over two-fifths and its spending has more than doubled.<sup>361 362</sup> The Environment Agency has quadrupled the number of employees in agriculture since 2021.<sup>363 364</sup> And the organisations still do not have the capacity to approve enough higher tier CS and Landscape Recovery agreements.

Instead, DEFRA should accredit third party organisations to advise on the scheme and complete agreements. This model is already utilised for various certifications, such as organic food and the Peatland Code.<sup>365 366</sup> DEFRA should pay the organisations a fee for each successful application.

DEFRA should initially focus on accrediting organisations that can work with farmers in the uplands. The uplands are some of the least favoured areas of land for farming. Analysis by Green Alliance shows that the least productive 20% of land contributes only 3% of food produced in the UK.<sup>367</sup>

Three quarters of the lowest quality farmland is used for grazing cattle and sheep, which typically loses money from agriculture (see figure 3).<sup>368 369</sup> And much of the upland lamb is light lamb that is exported to southern Europe and the Middle East.<sup>370 371</sup> Supporting upland farmers to enter higher tier CS or Landscape Recovery agreements could improve their profitability without affecting UK food security.

### **Recommendation 1.5: Amend agricultural property relief to include land that has undergone nature restoration.**

Currently if a farmer carries out a nature restoration project, they would lose agricultural property relief. This could be worth around £200,000 for a small 20 hectare farm and almost £500,000 for a medium-sized 50 hectare farm.<sup>372</sup>

The Government should amend the Inheritance Tax Act 1984, Part 5, Chapter 2 on agricultural property so that land that has undergone nature restoration remains eligible for 100% tax relief.<sup>373</sup> It could do this by changing the definition of “agricultural property” to include any land that has an Environmental Land Management scheme agreement. Or it could replicate section 124C on “Land in Habitat Schemes” for “Land in Environmental Land Management schemes”.

For tenanted farmland, the Government should restrict 100% agricultural property relief to farm business tenancies of eight or more years, as the Rock Review recommended.<sup>374</sup> This would encourage longer term tenancies and enable tenant farms to enter longer term ELM schemes, such as higher tier CS. It can do this by amending section 116, 2C to stipulate that tenancies must be at least eight years.

### **Recommendation 2: Develop accounting, regulatory and pricing frameworks to underpin well-functioning private nature markets.**

#### **Recommendation 2.1: Develop mandatory standards for private biodiversity and soil carbon credits.**

Private carbon and nature markets could offer farmers new income streams. But concerns about measuring carbon sequestration or nature improvements, and ensuring the benefits are permanent, risk blocking the markets’ development.

DEFRA should create a “Soil Carbon Code” and “Biodiversity Enhancement Code” to measure the creation of credits in the same way as the Woodland Carbon Code and Peatland Code are currently used.

The “Soil Carbon Code” should build on the work of the Soil Carbon Alliance. It should pay particular attention to the difficulty of ensuring carbon gains are permanent, which has damaged the effectiveness of the soil carbon markets in Australia.<sup>375</sup> The “Biodiversity Enhancement Code” should utilise existing biodiversity net gain standards and DEFRA’s standards development programme with the British Standards Institute.

The Government should stipulate that all nature-based carbon credits created in the UK are certified to the relevant standard (where standards are available) by an approved accreditation organisation, such as the Soil Association.<sup>376</sup> A Government regulator should also conduct regular audits of accreditation bodies to ensure the standards are adhered to.

The Government should aim to work with other countries to create internationally consistent standards.

- It has committed to partner with France to mobilise global nature finance.<sup>377</sup> This should start with the development of the “Biodiversity Enhancement Code”.
- Australia has had a soil carbon market since 2015 but it has come under scrutiny for overinflating sequestration rates.<sup>378</sup> The Australian government commissioned an independent review into the market in 2022 and has since provided funding to develop more accurate carbon measurement solutions.<sup>379</sup> Ireland launched a National Agricultural Soil Carbon Observatory in 2020 to monitor soil carbon emissions and removals.<sup>381</sup> The Government should discuss partnering with Australia and Ireland to create joint standards.

## Recommendation 2.2: Create the “Nature Credits Bank” for nature-based carbon and biodiversity credits.

Farmers considering carrying out nature-based projects or converting to regenerative farming to sell carbon or nature credits will need to be confident they will profit from doing so. But, in the global voluntary carbon market, credits have sold for as little as £1 per tonne of CO<sub>2</sub>.<sup>382</sup>

DEFRA should carry out a project assessing the cost for farmers and landowners to create nature-based carbon and biodiversity credits. It should use the findings of this project to set a base price for the credits, which would mean the average credit receives an attractive return on investment.

DEFRA should then create the “Nature Credits Bank” to buy credits from producers that cannot receive the base price in the private market. The bank could subsequently sell these credits to private buyers if prices rise above the base level.

This would give confidence to farmers that they will generate an adequate return, encouraging growth in supply of credits. While it could mean UK credits are more

expensive than overseas credits, the combination of mandatory measurement standards and the bank underpinning prices would assure purchasers that they are receiving a genuine tonne of removed carbon or unit of biodiversity increase.

This should support private demand and limit how many credits the bank actually needs to purchase. But DEFRA should provide the bank with sufficient capital to maintain well-functioning markets. This should initially be £50 million, in line with the Woodland Carbon Guarantee Scheme.<sup>383</sup> DEFRA should regularly reassess capital requirements as the private market for nature-based credits expands.

### Recommendation 3: Direct innovation spending to capitalise on four key areas of environmental and economic opportunity.

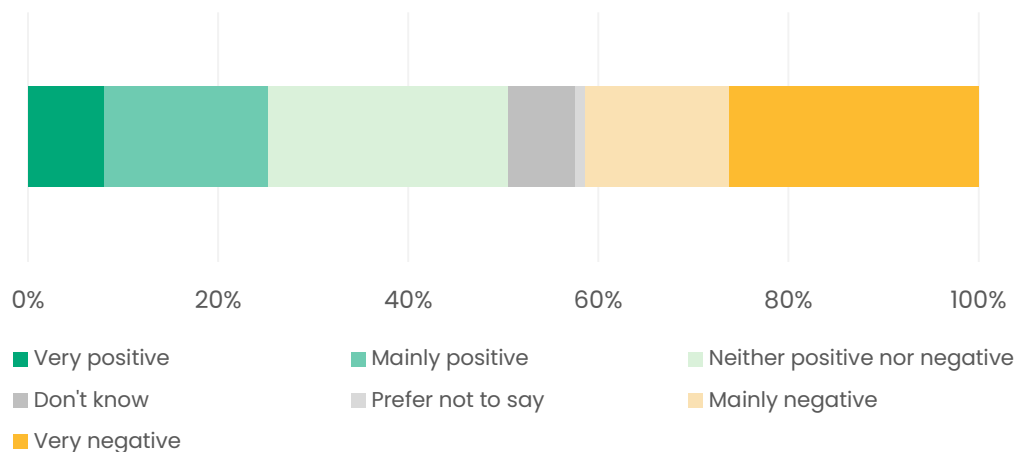
#### Recommendation 3.1: Fund innovation in methane suppressing feed additives, approve their use and mandate the inclusion of additives in feed once product choice is available to farmers.

Dutch company DSM currently dominates the international methane suppressing feed additive market with its 3-NOP product Bovaer.<sup>384</sup> But the Global Research Alliance on Agricultural Greenhouse Gases has found a lack of evidence that 3-NOP can improve productivity or work without being included in every mouthful of feed. The organisation recommends research is conducted to address these issues and to design products for extensive grazing livestock.<sup>385</sup>

Farmers' feelings on methane suppressing feed additives also imply a need for more innovation. In 2022, the Government conducted a call for evidence on the additives. The responses showed farmers' perceptions are mixed, with more viewing them negatively than positively. Several respondents called for additional research.<sup>386</sup> This suggests there is an opportunity to develop and launch new products.

**Figure 33: Farmers' perception of using methane suppressing feed products in livestock diets**

Source: DEFRA



Bovaer is expected to cost €50 - €55 (£43.50 - £48) per cow per year.<sup>387</sup> Assuming other products would have similar costs and all UK dairy cattle were using additives, the domestic market could be worth £90 million to £100 million annually.<sup>388</sup> And there could be a major export opportunity.

As part of the Farming Innovation Programme's climate smart funding competition, DEFRA and UKRI committed £2 million to a company to research "innovative approaches to reduce environmental impact of the UK beef supply chain".<sup>389</sup> The programme should commit the same amount to methane suppressing feed additives research through an early-stage innovation funding competition.

It should follow this with a product development competition for the early-stage projects that show promising results. Funding could match the previous industrial research and feasibility studies competitions in the Farming Innovation Programme at £12.5 million.<sup>390</sup>

In the meantime, the Government should accelerate plans to make methane suppressing feed additives available in the UK. Bovaer is available in over 40 countries, including the EU, Australia and Brazil.<sup>391</sup> The Government's Net Zero Growth Plan released in March 2023 stated methane suppressing products would be available in the UK by 2025.<sup>392</sup> It should aim to adopt legislation approving the use of methane suppressing feed additives as soon as possible.

The Climate Change Committee recommends mandating the inclusion of methane suppressing additives in feed products for UK beef and dairy systems by 2025.<sup>393</sup> But this could result in farmers having to use additives that have consequences for their cattle, such as reducing yields or damaging their stomachs.<sup>394</sup> The Government should mandate their inclusion, but only once more products are available to farmers.

### **Recommendation 3.2: Create an innovation cluster for plant-based and fermentation-made proteins centred in a new Investment Zone in North Yorkshire.**

The Government's Food Strategy highlights the alternative protein sector as a key growth opportunity.<sup>395</sup> Green Alliance estimates the UK alternative protein industry could be worth £6.8 billion per year and create 25,000 jobs by 2035, including 4,000 in traditional farming and food production.<sup>396</sup> Plant-based proteins offer growth potential for farmers as the UK is currently an importer of many of their core ingredients, such as chickpeas, lentils, soya bean and yellow pea.<sup>397 398</sup>

And the availability of high quality, affordable alternative proteins is needed before reducing livestock numbers can become a realistic prospect. Henry Dimbleby's government-commissioned National Food Strategy argues for a 30% reduction in meat consumption over ten years. But the report's deliberative dialogues and

polling found significant opposition to mandatory measures to reduce meat consumption.<sup>399</sup> And the Prime Minister ruled out taxing meat in his net zero speech in September 2023.<sup>400</sup>

After several years of strong growth, sales of plant-based meat substitutes fell by 6% in 2022 and are expected to flatline or decline again in 2023.<sup>401</sup> Sales have suffered due to high prices, product quality issues and perceptions they are highly processed.<sup>402</sup>

One of the reasons plant-based products are expensive is because new companies struggle to gain access to commercial production facilities.<sup>403</sup> More funding for product development could help bring down prices. And more research could help to enhance products' taste and texture. The Good Food Institute (GFI) argues that the Government should more than double its R&D funding for alternative proteins. And it recommends creating industrial clusters, highlighting the Golden Triangle, the north-east and Yorkshire, and the Cambridge-Norwich corridor as potential locations.<sup>404</sup>

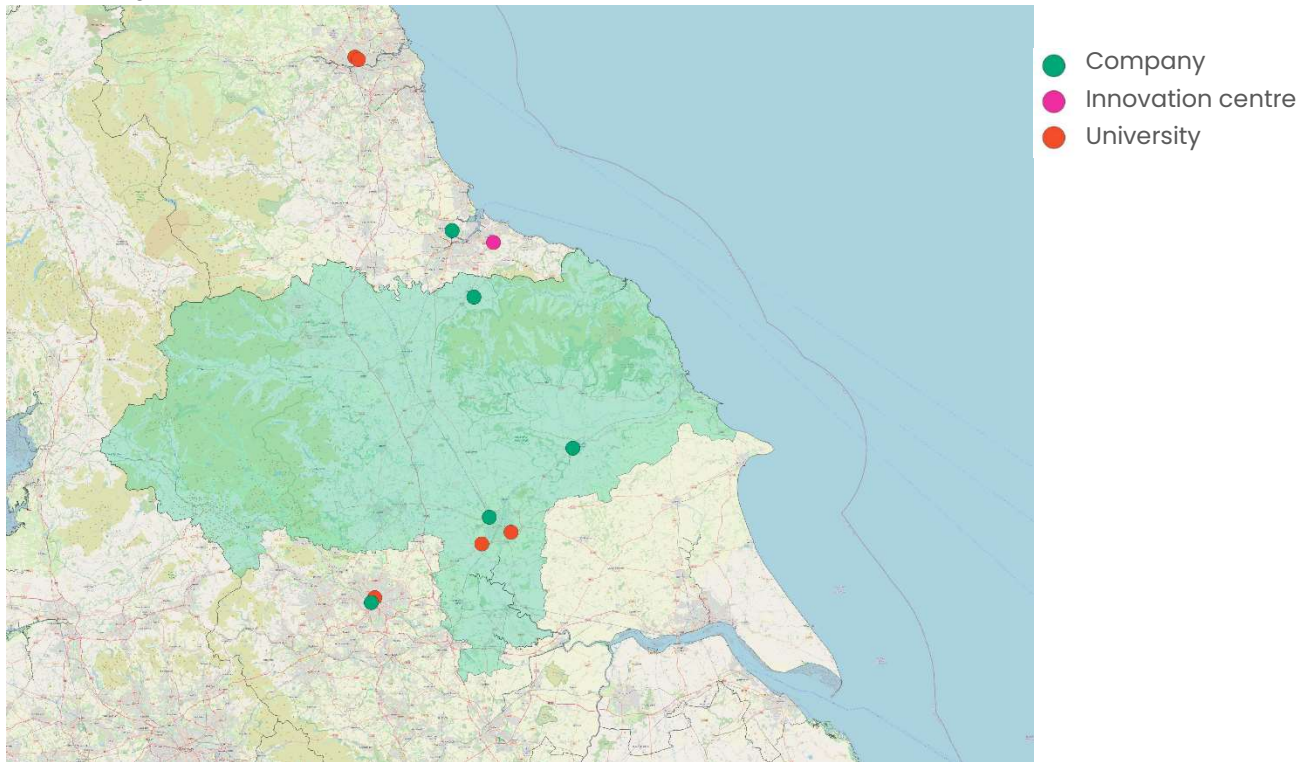
The Canadian government provides a blueprint for expanding alternative protein innovation. It has established the Protein Industries Canada supercluster and provided C\$350 million (£200 million) of public funding between 2018 and 2028.<sup>405</sup> It is expected to generate C\$15 billion (£8.8 billion) of GDP and nearly 11,000 jobs by 2031.

The Government should create an innovation cluster for plant-based and fermentation-based proteins centred in North Yorkshire because the region has the infrastructure and expertise to expand the industry.

- The York and North Yorkshire Combined Authority devolution deal targets growth in the bioeconomy and agri-tech sectors.<sup>406</sup> This includes the development of BioYorkshire, a public-private partnership for innovation in net zero food production and farming alongside other sectors. It is being led by the University of York, Fera Science and Askham Bryan College.<sup>407</sup>
- Quorn is the only company in the world producing mycoprotein (protein produced from fungus) at commercial scale.<sup>408</sup> The business is headquartered in Stokesley, North Yorkshire, and operates the world's largest alternative protein production facility just outside the county. Several other alternative protein manufacturers are based in Yorkshire.<sup>409</sup>
- The Centre for Process Innovation, located just outside North Yorkshire, is investing £2 million to create a food grade precision fermentation facility to support businesses conducting innovation projects.<sup>410</sup>
- Universities in the surrounding regions conduct a lot of research on alternative proteins. Northumbria University works closely with Quorn.<sup>411</sup> Leeds University is researching how to produce more palatable plant-based proteins.<sup>412</sup> And Newcastle University has spun out multiple companies developing cultivated meat technologies.<sup>413</sup>

**Figure 34: Map of companies, innovation centres and universities involved in alternative proteins in North Yorkshire and surrounding areas**

Source: Google Maps



The Government should also create a new agri-tech Investment Zone in North Yorkshire so private investors will benefit from relief from stamp duty, business rates and national insurance contributions as well as enhanced capital allowances, and structures and buildings allowance.<sup>414</sup>

The Government should provide £30 million annual funding to the innovation cluster. This would be competitive with the funding provided by the Canadian government to Protein Industries Canada. It should aim to crowd-in private investment that exceeds public funding, as Canada has achieved.

**Recommendation 3.3: Create a low emission peatland farming innovation centre, and fund the development of machinery and equipment.**

UK peatland soils' vegetable production is worth more than £700 million and the peatland in East Anglia supports a food chain worth £3 billion per year.<sup>415 416</sup> Low emission peatland farming needs to be developed to support food security and maintain an economically valuable industry.

The Lowland Agriculture Peat Task Force Chair's Report recommended the Government should support more field trials and modelling, and advance new technologies, such as lower ground pressure machinery and breeding water tolerant crops.<sup>417</sup> Some of the Paludiculture Exploration Fund (paludiculture is

farming on rewetted peat) grantees are conducting research into water tolerant crops but funding has not been directed to new machinery development.<sup>418</sup>

The Government should run an innovation funding competition for R&D into new machinery that can operate on wetter peat soils. It should initially commit £12.5 million, in line with industrial research and feasibility studies competitions in the Farming Innovation Programme.<sup>419</sup>

To coordinate efforts to develop a thriving industry, the Government should create a low emission peatland farming centre in the Norwich Research Park with a satellite in the West of England.

- The Norwich Research Park, in East Anglia, is home to several agricultural research institutes, including the John Innes Centre and The Sainsbury Laboratory, which are focused on crop productivity and resilience, and plant health.
- Innovate UK is planning to merge its three agri-tech centres into an innovation Catapult.<sup>420</sup> This includes the Agricultural Engineering, Precision and Innovation Centre, which develops, funds, and commercialises new precision agricultural technologies. Norwich has been mentioned as a potential location.<sup>421</sup>
- Several Paludiculture Exploration Fund winners were in the west and north-west of England. They included Harper Adams, which plans to become a “paludiculture research, development, demonstration and knowledge transfer facility”.<sup>422 423</sup>

#### Recommendation 3.4: Fund gene editing research that widens crop varieties, and accelerate secondary legislation for gene edited products.

Gene editing can benefit from the UK’s crop science research infrastructure, such as the John Innes Centre (JIC). Brookfield Consulting estimates JIC’s plant and microbial science research contributes to £300 million of gross value added in the UK with a return on investment of £14.22 per £1 invested.<sup>424</sup>

Gene editing innovation funding is secure for the next few years after the Biotechnology and Biological Sciences Research Council (BBSRC) announced £80 million funding for JIC between 2023 and 2028.<sup>425</sup> But there are concerns that gene editing could reinforce an agricultural system that is too focused on yield, with ever lower crop diversity.<sup>426</sup> This may prevent the technology from delivering a long term solution to resilience. The BBSRC should stipulate that its funding is used for research that helps to widen crop variety as well as improve sustainability and resilience characteristics.

The Government paved the way for the development of a domestic gene editing industry by passing the Genetic Technologies (Precision Breeding) Act in March 2023.<sup>427</sup> But it needs to pass secondary legislation for the regulatory environment that will underpin the industry.

The secondary legislation should follow the Food Standards Agency's recommendations that it should merely be notified by businesses of their plan to market gene edited crops that are very similar to traditionally bred varieties and only undertake assessments of products with traits where the risks are not fully understood. It should also address the need under current laws for ministers to make individual decisions for all product authorisations through secondary legislation, which could slow adoption.<sup>428</sup>

The FSA's position paper notes the secondary legislation is not set to be laid until summer 2024.<sup>429</sup> That timeline could clash with a general election, so there is a risk it could be delayed even further.

Developing a gene editing industry would be a clear Brexit benefit. The EU has proposed new regulations supporting gene editing. But there is disagreement among and within member states over the extent to which regulations should be relaxed, which could cause delays to legislation.<sup>430</sup> The UK Government should accelerate the adoption of secondary legislation ahead of the general election to introduce a supportive regulatory framework to allow the UK to capitalise on this opportunity.

## **Recommendation 4: Increase grant funding and reduce planning barriers to tackle water pollution and enhance climate resilience.**

**Recommendation 4.1: Continue Slurry Infrastructure Grant funding after upcoming rounds and introduce a Farming Transformation Fund grant for poultry manure fertiliser production systems.**

### **Continue Slurry Infrastructure Grant funding beyond upcoming rounds**

DEFRA will reportedly make £147 million available in rounds two and three of the slurry infrastructure grant.<sup>431</sup> But even this level of funding will not cover all farms with insufficient slurry storage.

DEFRA should continue to run slurry infrastructure grants after rounds two and three. £25 million annual funding would support more than 1,000 additional farms by the end of the decade, assuming the same level of individual grant awards. Assuming three-quarters of grantees are dairy farms, that would result in almost 45% of all dairy farms installing more storage by 2030. This would go a long way to dealing with the levels of non-compliance, helping to tackle water pollution from agriculture, which affects 40% of water bodies in England.

### **Introduce a "Poultry Manure Management Grant"**

DEFRA should introduce a "Poultry Manure Management Grant" to provide funding for poultry farmers to purchase systems that convert manure into

fertiliser pellets. This would reduce river pollution near poultry farms and produce organic fertilisers that can be used by other farms instead of synthetic products.

The grant should offer similar individual payments as existing grants, providing up to £500,000 and contributing 50% of the cost. The total grant should be worth £30 million each year. If the average farm claims £300,000, this would fund 100 farms each year.

There are 2,500 poultry farms in England, but DEFRA should initially focus on areas that would have the biggest environmental impact as it did with round one of the Slurry Infrastructure Grant.<sup>432</sup> There are roughly 300 intensive poultry farms in the English side of the Wye catchment where the most dramatic river pollution has occurred.<sup>433</sup> A £30 million annual grant would enable all English poultry farms in the Wye catchment without existing manure processing facilities to access funding within three years.

**Recommendation 4.2: Increase Water Management Grant funding and introduce a Farming Transformation Fund grant for controlled environment agriculture facilities that use renewables or waste heat.**

#### **Increase the Water Management Grant**

Over 35,000 arable and horticultural farms in England do not have water storage.<sup>434 435</sup> If all of those farms received a minimum sized grant of £35,000, it would cost over £1 billion and if they received a £100,000 grant, it would cost over £3 billion. That is unrealistic.

But DEFRA should provide more funding for water storage. It should increase future Water Management Grant rounds to £30 million and conduct one round each year. Assuming this change begins in 2025 and average grant awards are £100,000, this would support 1,800 farms to add water storage by the end of the decade. The Government should give preference to farms in areas that are the most likely to suffer from drought and generate the strongest yields.

#### **Introduce a “Controlled Environment Farming grant”**

DEFRA should introduce a “Controlled Environment Farming grant” to support lowland peat farmers and small businesses to build new greenhouses and vertical farms. This will help to expand the horticulture industry and enhance climate resilience, improving food security.

Greenhouses can generate yields 15 times higher than field production and Fischer Farms claims its vertical farm’s yields are 250 times greater.<sup>436 437</sup> If an average yield 15 times greater than field production can be achieved, around 275 hectares of greenhouses would be needed to reach self-sufficiency levels from 2000. And at 250 times, only 16 hectares of vertical farms would be needed. Given the different

technology costs, this would entail between £200 million and £900 million of total investment.

DEFRA should provide £30 million per year to the “Controlled Environment Farming grant”. It should include two separate types of individual grants. The first should offer up to £1 million and contribute up to 50% of total costs to install small vertical farms on lowland peat farms that are trialling low emission farming techniques. The second should offer the same funding but only contribute up to 25% of total costs for other farms and small businesses to build greenhouses or vertical farms. All grants should stipulate that the facilities install renewable energy or co-locate with waste heat sources.

#### Recommendation 4.3: Reduce planning barriers for slurry stores and on-farm reservoirs.

Generally permitted development rights already allow the building of small slurry stores and on-farm reservoirs. The Government could simply allow all slurry stores and on-farm reservoirs to be built under permitted development rights to accelerate development. But this could have environmental consequences if slurry stores are erected close to rivers or residential buildings, or constructing reservoirs damages the soil.

Instead, DEFRA should develop a strategic plan for agriculture planning processes. It should determine where additional slurry storage and on-farm reservoirs are required, and inform local planning officers of their priority compared to other issues that are considered in planning decisions.

DEFRA should also hire a team of regional water pollution and security planning experts to advise local planning officers and provide decisions on disputed applications. It should split England into the same ten regions as Catchment Sensitive Farming does.<sup>438</sup> Senior planning officer salaries are around £50,000.<sup>439</sup> To attract talented advisers, it should have a total budget of around £750,000 for salaries and other costs.

#### Recommendation 5: Remove the barriers to accessing the Farming Investment Fund so more farmers can improve productivity and environmental performance.

##### Recommendation 5.1: Offer interest free loans to farmers accessing Farming Investment Fund grants.

Paying grants up front would address the cash flow difficulties that prevent some farms accessing them. But the Government pays grants in arrears across several departments as it reduces fraud risk.

Instead, DEFRA should adopt a model utilised in France where Crédit Agricole offered interest free loans to farmers that were accessing subsidies for the purchase of equipment.<sup>440</sup> DEFRA should provide financing to banks to offer interest free loans up to the value of grants provided by the Farming Investment Fund. This will enable farmers that do not have cash available to pay upfront for the grant money that they will receive in arrears to access schemes without an additional cost.

Asset finance interest rates can vary significantly but Government-backed debt should be at the low end of the spectrum at around 3%.<sup>441</sup> Including the below recommendations for new grants and higher existing grants, the Farming Investment Fund is likely to be £200 million to £250 million per year. If loans were accessed for all of that funding, it would likely cost the Government less than £5 million as the average grant would last less than a year.

### Recommendation 5.2: Update the Farming Equipment and Technology Fund to include drones and more sophisticated GPS systems, and allow the purchase of second hand equipment.

DEFRA should add crop spraying drones that have received regulatory approval and higher specification GPS systems to the Productivity and Slurry Items grant. The grants should contribute 40% of the total cost of items, in line with existing GPS systems and arable items.<sup>442</sup>

DEFRA should also change the rules for the Farming Equipment and Technology Fund to allow the purchase of second hand items. This will help more farmers improve productivity and environmental performance. The rules for second hand items should be the same as those for the Farming Transformation Fund grants.

- The item has not previously been purchased with public funding
- It is fit for purpose
- It does not cost more than an equivalent new item
- It is expected to last for at least five years.<sup>443</sup>

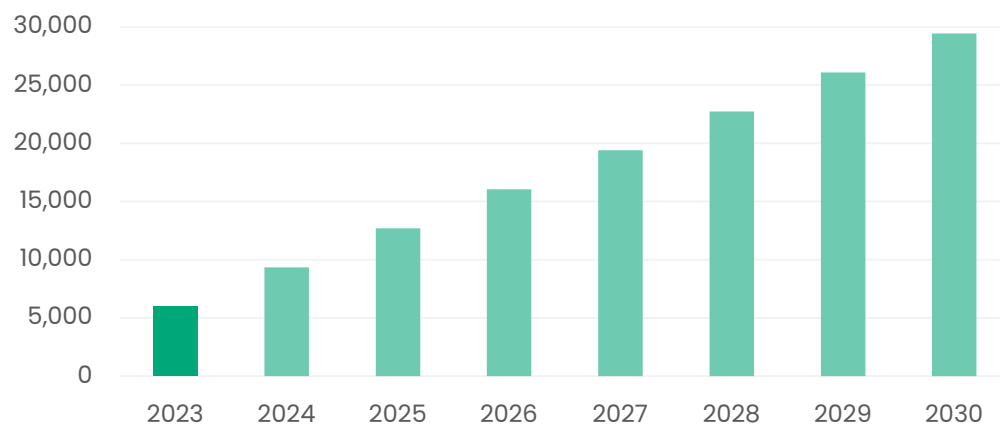
### Recommendation 6: Bring farmers together to tackle environmental challenges by expanding the number of cluster groups.

DEFRA should increase the Facilitation Fund from £2.5 million to £10 million per year and offer £80,000 to each group to be funded for five years.

This would fund 125 new cluster groups each year. The average number of farmers in each group is 27.<sup>444</sup> If this remains the same, the new clusters could incorporate over 20,000 farmers by 2030. More than a quarter of farmers in England would be part of a cluster.

**Figure 35: Estimated number of farmers in cluster groups with £10 million annual funding**

Source: Game and Wildlife Conservation Trust, Onward analysis



**Recommendation 7: Support the next generation by increasing the number of county farms, introducing a land mobility programme, and financing access to agricultural land – and complete implementation of the Rock Review recommendations.**

**Recommendation 7.1: Provide £30 million annual funding for councils to purchase land for county farms and incorporate regenerative agriculture training.**

Resurrecting county council farms can provide more access to land and experience for new entrants. The Rock Review described county farms as a “low-risk, low-cost entry pathway for young farmers or new entrants who do not necessarily have the capital to begin their farming career”.<sup>445</sup> And DEFRA states that it “wants to encourage local authorities to retain and invest in” their county farms.<sup>446</sup>

DEFRA should offer £28.5 million per year to councils to purchase agricultural land. This would enable councils to buy around 1,200 hectares of land annually.<sup>447</sup> At an average of 20 hectares, this would allow 60 new farmers to enter the industry each year. And it would return the area of county farms to nearly its 2010 level by the end of the decade (assuming no existing land is sold).

DEFRA should stipulate that land purchased with the funding can only be let to new entrants, and that councils require tenants to adopt regenerative practices. It should offer £1.5 million per year to councils that purchase land to provide training and advice on regenerative agriculture practices.

### Recommendation 7.2: Launch a Land Mobility Programme to bring older farmers and potential successors together.

DEFRA should run a “Land Mobility Programme” to bring together older farmers and potential successors. It should have the same focus as the Northern Ireland programme, helping pairs to develop business agreements.

From 2017 to 2023, Northern Ireland ran a Land Mobility Scheme to help address potential new entrants’ lack of access to experience and land.<sup>448</sup> It did this by matching older farmers with young people hoping to enter the industry. And it developed business options, such as long term leasing, profit sharing arrangements and farm partnerships.<sup>449</sup> The scheme facilitated 125 deals covering over 7,500 hectares.<sup>450</sup>

The Northern Ireland scheme was given an initial £120,000 funding for project costs and a project manager over two years.<sup>451</sup> England has 18 times as much agricultural land as Northern Ireland but it should be able to benefit from economies of scale.<sup>452 453</sup> Catchment Sensitive Farming breaks the country into ten regions.<sup>454</sup> DEFRA should provide £1 million annually to hire one manager for each of those regions and cover the central project costs.

### Recommendation 7.3: Offer young farmers new financing options to access agricultural land.

The UK can take advantage of international precedents to structure financial support for new entrants to farming.

Japan offers new young farmers up to 3m yen (£16,600) per year for their first two years of operation and up to 1.5m yen (£8,300) for the next three as well as up to 1.2m yen (£6,600) annually for two years of training costs. Since the scheme started, the annual number of new entrants has more than doubled.<sup>455</sup>

A similarly generous scheme in the UK could cover the annual cost of tenancies. The average farm business tenancy, the main form of tenancy agreement, costs £7,700 per year.<sup>456</sup> DEFRA should provide new tenant farmers up to £7,500 per year towards their rent for their first three years.

The Central Association of Agricultural Valuers estimates that there around 50 new entrants taking up farm business tenancies in England and Wales each year but notes this may be an underestimate.<sup>457</sup> Assuming the grant scheme led to an increase in new entrants taking tenancies to 100 per year, this would result in around 300 farmers benefitting from the scheme in any given year. The grant would cost no more than £2.5 million in total.

The grants would not go very far to help farmers that are buying land to enter the sector. Arable and pastoral land currently cost £26,900 and £19,800 per hectare respectively.<sup>458</sup> A small 20 hectare farm would cost at least £395,000.<sup>459</sup>

Providing low cost finance would be a cost-efficient approach. Developed countries across the world offer this to new farmers.

- In Australia, the Regional Investment Corporation, a government-backed specialist finance provider for farmers, offers agri-starter loans to new entrants of up to A\$2 million (£1 million) that are interest only for five years and charge interest below commercial rates.<sup>460 461</sup> It delivered A\$40 million (£210 million) of loans in its first two years.<sup>462</sup>
- Farm Credit Canada, a government-linked specialist agriculture and food lender, offers preferential rate loans worth up to C\$1.5 million (£900,000) for farmers below 40 and up to \$150,000 (£90,000) to those who started their business in the last three years.<sup>463 464</sup>

The Government should fund banks to offer new entrants interest free mortgages for agricultural land worth up to £400,000 for the first three years. That would support the purchase of around 15 hectares of arable land and 20 hectares of pastoral land.<sup>465</sup> Assuming a 25 year term and a 5% interest rate, that would cost £56,500 per farmer.

According to industry experts, the majority of new entrants are tenant farmers. If around 50 farmers access the interest free mortgage scheme each year, the annual cost would be no more than £3 million.

## Recommendation 8: Expand the Groceries Code Adjudicator's powers and trial new contracts that increase certainty for farmers.

### Recommendation 8.1: Expand the Groceries Code Adjudicator's powers to more effectively support farmers.

The Groceries Code Adjudicator has helped to mitigate supermarkets abusing their power over their typically much smaller suppliers. But its ability to support farmers is limited by not being able to initiate its own investigations and only monitoring the relationship between retailers and their direct suppliers.

The responses to DEFRA's consultation on problems in the pig supply chain suggested the introduction of a regulator for dispute mechanism, with some specifically mentioning the Groceries Code Adjudicator.<sup>466</sup>

The Groceries Code Adjudicator is under the Department for Business and Trade's (DBT) remit. DBT should expand the regulator's powers so that it can:

- Monitor and enforce fair dealing throughout the UK food supply chain to cover the relationship between farmers and food manufacturers, wholesalers and intermediaries.
- Initiate its own investigations into supermarkets and other customers in the supply chain that it suspects of mistreating suppliers.

This should help farmers to generate stronger profit as it will be more difficult for businesses in the middle of the food chain to squeeze them. This should give farmers more capacity to invest in sustainability.

### **Recommendation 8.2: Trial longer term supermarket contracts that increase certainty for farmers.**

The Get Fair About Farming campaign's petition asked the Government to alter the groceries supply code of practice so that supermarkets have to pay what they agreed to pay, buy what they committed to buy, and pay on time.<sup>467</sup> The overall campaign also requested that retailers agree on fair specifications and commit to the long term.<sup>468</sup>

These changes would improve profitability and cash flow for farmers. And they would reduce food waste by providing farmers more certainty over production volumes. WRAP estimates 1.6 million tonnes of food is wasted each year at the farmgate, equivalent to 3.2% of all food harvested.<sup>469</sup> Lowering food waste could help to reduce emissions and other environmental impacts by enabling less overall production.

Longer contracts with more fixed purchasing requirements may work for supermarkets and food manufacturers too. For example, Tesco has longer-term agreements with around 100 strategic partners. These suppliers have the security to invest more in technology and efficiencies to create savings, some of which they pass onto the retailer.<sup>470</sup> But mandating longer contracts across the supply chain, and reducing supermarkets' and food manufacturers' order flexibility with all suppliers could cause a dent in their margins, which could in turn have consequences for prices on the shelves.

DBT should run a trial programme in which a group of supermarkets and large food manufacturers offer farmers multi-year contracts, with prices and volumes agreed on a quarterly basis at the start of each period. It should assess whether any impact on costs to households outweighs the benefits to farmers before pursuing a permanent regulatory change.

### **Recommendation 9: Negotiate a veterinary agreement with the EU to reduce barriers to exporting food.**

The Government has adopted a more pragmatic approach to its relationship with the EU during 2023. This began with the agreement of the Windsor Framework in February, which amended the Northern Ireland Protocol to smooth trade flows in the UK internal market and safeguard Northern Ireland's place in the union.<sup>471</sup>

Before the Windsor Framework was agreed, disputes over the implementation of the Northern Ireland Protocol resulted in the UK being locked out of the Horizon Europe research programme. This meant UK scientists were missing out on access

to a €95 billion (£83 billion) research funding pool.<sup>472</sup> Following the Windsor Framework being signed, the Government secured a bespoke agreement in September to rejoin Horizon as an associate member with improved financial terms for the UK.<sup>473</sup>

The Government's focus on securing bespoke agreements that improve upon the original Brexit deal could help ease the food industry's access to the bloc.

The Sanitary and Phytosanitary working group recommends securing a veterinary agreement with the EU to reduce the amount of certification and border checks required.<sup>474</sup> And the CBI notes that if the UK could agree a deal similar to the one between the EU and New Zealand, it could drastically reduce border checks without affecting its ability to make trade deals in the future. Under the EU-New Zealand veterinary agreement only 1-2% of food products entering the bloc are subject to physical checks, compared to around 30% of UK agri-food products.<sup>475</sup>

But New Zealand's favourable deal with the EU has developed over several decades. They first reached an agreement on sanitary measures for trade in animals and animal products in 1996 but it was only in 2015 that health certificate equivalence was agreed.<sup>476</sup> The equivalence-based model minimises the need for border checks without affecting the ability to strike trade deals with other countries.<sup>477</sup> Trade experts explained that the deal reflects high levels of trust between the countries and flexibility on both sides, and benefits from the distance between New Zealand and the bloc.

The UK may struggle to achieve as attractive an initial agreement without accepting greater regulatory alignment, including for imported products, due to its proximity. The EU could request an agreement that is closer to the deal it has with Switzerland, which involves a Common Veterinary Area, which would limit agri-food freedoms on new trade deals.<sup>478</sup>

The Government should negotiate a mutual recognition agreement on veterinary standards with the EU that balances the need to minimise border checks and certification requirements for agri-food exporters with the requirement to maintain flexibility to strike new trade deals. It should target a deal that is as close to the EU-New Zealand agreement as possible and has the potential to move closer to that position over time.

# Appendix



**Table 4: Recommendations summary - economic and environmental challenges addressed**

Note : Dark green = primary impact, light green = secondary impact. P = profitability, G = growth, D = demographics, R = climate resilience, E = emissions, W = water pollution, B = biodiversity.

Recommendations	Economic				Environmental		
	P	G	D	R	E	W	B
<b>1.1:</b> Offer bonus payments to farmers to carry out environmental actions on more of their land.	Dark Green				Dark Green	Light Green	Dark Green
<b>1.2:</b> Run a trial of Countryside Stewardship multi-year options for the transition to and maintenance of regenerative farming.	Dark Green			Light Green	Dark Green	Light Green	Dark Green
<b>1.3:</b> Create an integrated “Environmental Land Management Advice Service” and give the Rural Payments Agency a short-term funding boost to improve IT systems.	Dark Green				Dark Green	Light Green	Dark Green
<b>1.4:</b> Enlist third party organisations to deliver more higher tier Country Stewardship and Landscape Recovery agreements.	Dark Green			Light Green	Dark Green	Light Green	Dark Green
<b>1.5:</b> Amend agricultural property relief to include land that has undergone nature restoration.	Dark Green			Light Green	Dark Green	Light Green	Dark Green
<b>2.1:</b> Develop mandatory standards for private biodiversity and soil carbon credits.		Dark Green			Dark Green	Light Green	Dark Green
<b>2.2:</b> Create the “Nature Credits Bank” for nature-based carbon and biodiversity credits.	Dark Green	Dark Green			Dark Green	Light Green	Dark Green
<b>3.1:</b> Fund innovation in methane suppressing feed additives, approve their use and mandate the inclusion of additives in feed once product choice is available to farmers.		Dark Green			Dark Green		
<b>3.2:</b> Create an innovation cluster for plant-based and fermentation-made proteins centred in a new Investment Zone in North Yorkshire.		Dark Green			Dark Green	Light Green	
<b>3.3:</b> Create a low emission peatland farming innovation centre, and fund the development of machinery and equipment.		Dark Green			Dark Green		
<b>3.4:</b> Fund gene editing research that widens crop varieties, and accelerate secondary legislation for gene edited products.		Dark Green		Dark Green	Light Green	Light Green	Dark Green
<b>4.1:</b> Continue Slurry Infrastructure Grant funding after upcoming rounds and introduce a Farming Transformation Fund grant for poultry manure fertiliser production systems.	Dark Green					Dark Green	
<b>4.2:</b> Increase Water Management Grant funding and introduce a Farming Transformation Fund grant for controlled environment agriculture facilities that use renewables or waste heat.	Dark Green			Dark Green	Light Green		
<b>4.3:</b> Reduce planning barriers for slurry stores and on-farm reservoirs.	Light Green			Dark Green	Light Green	Dark Green	
<b>5.1:</b> Offer interest free loans to farmers accessing Farming Investment Fund grants.	Light Green	Dark Green			Light Green	Light Green	Light Green
<b>5.2:</b> Update the Farming Equipment and Technology Fund to include drones and more sophisticated GPS systems, and allow the purchase of second hand equipment.	Light Green	Dark Green			Dark Green	Light Green	Dark Green
<b>6:</b> Bring farmers together to tackle environmental challenges by expanding the number of cluster groups.	Light Green			Light Green	Dark Green	Light Green	Dark Green
<b>7.1:</b> Provide £30 million annual funding for councils to purchase land for county farms and incorporate regenerative agriculture training.			Dark Green		Light Green	Light Green	Light Green
<b>7.2:</b> Launch a Land Mobility Programme to bring older farmers and potential successors together.			Dark Green		Light Green	Light Green	Light Green
<b>7.3:</b> Offer young farmers new financing options to access agricultural land.			Dark Green		Light Green	Light Green	Light Green
<b>8.1:</b> Expand the Groceries Code Adjudicator’s powers to more effectively support farmers.	Dark Green				Light Green		Light Green
<b>8.2:</b> Trial longer term supermarket contracts that increase certainty for farmers.	Dark Green				Light Green		Light Green
<b>9:</b> Negotiate a veterinary agreement with the EU to reduce barriers to exporting food.		Dark Green			Light Green		

Some of the recommendations involve additional spending. The main areas the Government should increase expenditure are:

- Providing bonuses for farmers to carry out more environmental actions (recommendation 1.1).
- Expanding the Farming Innovation Programme (recommendation 3).
- Expanding the Farming Investment Fund (recommendations 4.1 and 4.2).
- Increasing funding for councils to purchase farmland for new entrants (recommendation 7.1).

As shown in table 5, all recommendations can be delivered while remaining within the £2.4 billion farming budget.

**Table 5: Farming and countryside programme historical and forecast spending (£ million)**

Source: DEFRA

Note: Sustainable Farming Incentive only in future years.

Scheme	2020/21	2021/22	2022/23	2025/26	2028/29
Direct Payments (Basic Payment Scheme)	1,873	1,654	1,384	745	0
Countryside Stewardship, Sustainable Farming Incentive and Environmental Stewardship	427	458	572	1,063	1,544
Plant Health	0	0	1	1	1
Environmental Land Management Trials and Testing	6	3	3	0	0
Environmental Land Management National Pilots	0	0	12	0	0
Landscape Recovery	0	0	1	40	50
Farming in Protected Landscapes	0	11	20	0	0
Nature for Climate Fund	0	0	12	0	0
Livestock Information Transformation Programme	11	23	25	5	0
Species Survival Fund	0	0	2	2	2
Technical Assistance	13	20	40	44	46
Farming Investment Fund	0	2	35	240	208
Institute for Agriculture and Horticulture	0	2	2	2	2
Farming Innovation Programme	0	3	15	80	100
Farm Resilience	1	5	8	9	9
New Entrants	0	0	1	40	40
Rural Growth and LEADER	63	75	58	17	6
CMO (Common Market Organisation)	56	37	39	43	45
Environmental Land Management Advice Service	-	-	-	1	1
Environmental Land Management Third Party Organisations	-	-	-	1	2
Farming Cluster Groups	-	-	-	10	10
Water Pollution and Security Planning Experts	-	-	-	1	1
<b>Total</b>	<b>2,450</b>	<b>2,293</b>	<b>2,230</b>	<b>2,344</b>	<b>2,066</b>

# Endnotes



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- <sup>1</sup> Department for Environment, Food & Rural Affairs, 'Agriculture in the United Kingdom 2022', 6th November 2023
- <sup>2</sup> Office for National Statistics, 'Regional gross value added (balanced) by industry: all ITL regions', 25th April 2023
- <sup>3</sup> Department for Environment, Food & Rural Affairs, 'Agricultural Workforce in the United Kingdom at 1 June', 20th October 2023
- <sup>4</sup> Office for National Statistics, 'Regional gross value added (balanced) by industry: all ITL regions', 25th April 2023
- <sup>5</sup> Department for Environment, Food & Rural Affairs, 'Government Food Strategy', 13th June 2022
- <sup>6</sup> Department for Environment, Food & Rural Affairs, 'United Kingdom Food Security Report 2021', 16th December 2021
- <sup>7</sup> Department for Environment, Food & Rural Affairs, 'Farm Business Income by type of farm in England', Onward analysis
- <sup>8</sup> Department for Environment, Food & Rural Affairs, 'Total income from farming in the UK', 25th May 2023
- <sup>9</sup> Sustain, 'Unpicking food prices: Where does your food pound go, and why do farmers get so little?', 2 December 2022
- <sup>10</sup> Department for Environment, Food & Rural Affairs, 'Latest agricultural price indices', 23rd November 2023
- <sup>11</sup> Energy & Climate Intelligence Unit, 'Fertiliser prices in 2022/2023 and selected company fertiliser performance', 19th July 2023
- <sup>12</sup> Department for Environment, Food & Rural Affairs, 'Latest agricultural price indices', 23rd November 2023
- <sup>13</sup> European Commission, 'The basic income support for sustainability (BISS)'
- <sup>14</sup> Rural Payments Agency, 'Guide to cross compliance in England 2022', 10th December 2021
- <sup>15</sup> Department for Environment, Food & Rural Affairs, 'Farm Business Income by type of farm in England', Onward analysis
- <sup>16</sup> Department for Environment, Food & Rural Affairs, 'Farming and Countryside Programme annual report 2022 to 2023', 18th September 2023
- <sup>17</sup> NFU, 'BPS 2023 – essential information', 10th October 2023
- <sup>18</sup> Department for Environment, Food & Rural Affairs, 'Environmental Land Management (ELM) update: how government will pay for land-based environment and climate goods and services', 21st June 2023
- <sup>19</sup> Farmers Weekly, 'Transition survey reveals depth of concern over policy and costs', 7th August 2023
- <sup>20</sup> Department for Environment, Food & Rural Affairs, 'Total factor productivity for England by farm type', 19th January 2023
- <sup>21</sup> Office for National Statistics, 'Business investment by industry and asset', 31st October 2023
- <sup>22</sup> Department for Business, Innovation and Skills, 'Eight great technologies', 24th January 2013
- <sup>23</sup> Brookfield Consulting, 'Impact of the John Innes Centre 2022', February 2023
- <sup>24</sup> Office for National Statistics, 'Research and development expenditure by the UK government', 30th March 2023
- <sup>25</sup> UK Research and Innovation, 'Annual Report and Accounts 2022-23', 13 July 2023
- <sup>26</sup> Office for National Statistics, 'Research and development expenditure by the UK government', 30th March 2023
- <sup>27</sup> Department for Environment, Food & Rural Affairs, 'Defra's Evidence Investment Strategy, 2010-13 and beyond', 8th April 2011
- <sup>28</sup> Office for National Statistics, 'Research and development expenditure by the UK government', 30th March 2023
- <sup>29</sup> Office for National Statistics, 'UK business: activity, size and location', 27th September 2023
- <sup>30</sup> Department for Environment, Food & Rural Affairs, 'Agricultural Workforce in the United Kingdom at 1 June', 28th September 2023
- <sup>31</sup> House of Commons Library, 'Seasonal Worker visas and UK agriculture', 26th June 2023
- <sup>32</sup> Animal and Plant Health Agency, Department for Environment, Food & Rural Affairs, 'Export plants and plant products from Great Britain and Northern Ireland', 24th November 2023
- <sup>33</sup> Animal and Plant Health Agency, Rural Payments Agency, Department for Environment, Food & Rural Affairs, 'Export or move food, drink and agricultural products', 1st November 2023
- <sup>34</sup> Department for Environment, Food & Rural Affairs, 'Agriculture in the United Kingdom 2022', 6th November 2023
- <sup>35</sup> NFU, 'Australia and New Zealand trade deals come into force', 11th May 2023
- <sup>36</sup> Office for National Statistics, 'The occupations most dependent on older and younger workers', 31st May 2023

- 
- <sup>37</sup> Nomis, 'annual population survey - workplace analysis'
- <sup>38</sup> May et al, 'Preventing young farmers from leaving the farm: Investigating the effectiveness of the young farmer payment using a behavioural approach', March 2019
- <sup>39</sup> Farming Life, 'Farming should be a young person's game - but it's not!', 8th March 2021
- <sup>40</sup> May et al, 'Preventing young farmers from leaving the farm: Investigating the effectiveness of the young farmer payment using a behavioural approach', March 2019
- <sup>41</sup> Higher Education Statistics Agency, 'Statistical bulletins and first releases', Onward analysis
- <sup>42</sup> Farmers Weekly, 'Opinion: No shortage of young people keen to get into farming', 1st February 2022
- <sup>43</sup> Lantra, 'Finance and access to land continue to top the barriers facing new farming entrants, reveals research from NFYFC and Lantra', June 2023
- <sup>44</sup> Department for Environment, Food & Rural Affairs, 'United Kingdom Food Security Report 2021', 16th December 2021
- <sup>45</sup> The Guardian, 'UK farmers warn of rotting crops after Storm Babet flooding', 25th October 2023
- <sup>46</sup> Environment Agency, 'The state of the environment: soil', June 2019
- <sup>47</sup> Woodland Trust, 'Can woods and trees reduce flooding'
- <sup>48</sup> Woodland Trust, 'Hedgerows'
- <sup>49</sup> den Herder et al, 'Current extent and stratification of agroforestry in the European Union', 20th March 2017
- <sup>50</sup> Khoury et al, 'Crop genetic erosion: understanding and responding to loss of crop diversity', 13th September 2021
- <sup>51</sup> Gaba, Pareek and Singla-Pareek, 'Raising Climate-Resilient Crops: Journey From the Conventional Breeding to New Breeding Approaches', 30 December 2021
- <sup>52</sup> Food and Agriculture Organization of the United Nations, 'Building on gender, agrobiodiversity and local knowledge', 2006
- <sup>53</sup> Savills, 'Spotlight: Controlled Environment Horticulture', 28th March 2023
- <sup>54</sup> Apex Publishers, 'Greenhouse Heating Types of Fuels for Greenhouses'
- <sup>55</sup> Department for Environment, Food & Rural Affairs, 'Latest horticulture statistics', 30th October 2023
- <sup>56</sup> GlobeNewswire, 'Greenhouse Horticulture Market to Hit Revenue of \$66.76 Billion by 2032', 16th March 2023
- <sup>57</sup> Statistics Netherlands, 'Upscaling of greenhouse vegetable production', 18th April 2018
- <sup>58</sup> GlobeNewswire, 'Greenhouse Horticulture Market to Hit Revenue of \$66.76 Billion by 2032', 16th March 2023
- <sup>59</sup> Earth Observatory, 'Almería's Sea of Greenhouses', 24th May 2022
- <sup>60</sup> Netherlands Enterprise Agency, 'Sector study on covered horticulture in France', May 2021
- <sup>61</sup> Department for Environment, Food & Rural Affairs, 'Water usage on farms: Results from the Farm Business Survey, England 2015/16', 31st January 2017
- <sup>62</sup> Farmers Weekly, 'Harvest 2022: Counting the yield cost of the drought', 2nd September 2022
- <sup>63</sup> NFU, 'NFU position: Water company strategic supply infrastructure'
- <sup>64</sup> The Guardian, 'England needs new reservoirs or food supplies will be at risk, warns NFU chief', 23rd February 2023
- <sup>65</sup> The Guardian, 'We need reservoirs built': drought leaves UK farms begging for government aid', 13th August 2022
- <sup>66</sup> Department for Environment, Food & Rural Affairs, 'United Kingdom Food Security Report 2021', 16th December 2021
- <sup>67</sup> Financial Times, 'Lex in depth: how investors are underpricing climate risks', 17th August 2023
- <sup>68</sup> Christian Aid, 'Cooking up a storm: The climate threat to food supply chains in UK, Germany & Italy', 13th September 2023
- <sup>69</sup> Energy & Climate Intelligence Unit, 'Climate, Fossil Fuels and UK Food Prices: 2023', 27th November 2023
- <sup>70</sup> Department for Environment, Food & Rural Affairs, 'Government Food Strategy', 13th June 2022
- <sup>71</sup> The Times, 'Fears over food may trigger civil unrest in future, experts warn', 16th October 2023
- <sup>72</sup> Yorkshire Dales National Park Authority, 'Natural Flood Management Measures - a practical guide for farmers', August 2017
- <sup>73</sup> Climate Change Committee, 'Progress in reducing emissions: 2023 Report to Parliament', 28th June 2023
- <sup>74</sup> Department for Environment, Food & Rural Affairs, 'Water targets: Detailed Evidence report', 6th May 2022
- <sup>75</sup> Burns et al, 'Agricultural Management and Climatic Change Are the Major Drivers of Biodiversity Change in the UK', 23rd March 2016

- 
- <sup>76</sup> Climate Change Committee, 'Progress in reducing emissions: 2023 Report to Parliament', 28th June 2023
- <sup>77</sup> Ibid
- <sup>78</sup> Ibid
- <sup>79</sup> Climate Change Committee, 'Progress in reducing emissions: 2022 Report to Parliament', 29th June 2022
- <sup>80</sup> Climate Change Committee, 'Progress in reducing emissions: 2023 Report to Parliament', 28th June 2023
- <sup>81</sup> Climate Change Committee, 'Progress in reducing emissions: 2022 Report to Parliament', 29th June 2022
- <sup>82</sup> Ibid
- <sup>83</sup> Our World in Data, 'Fertilizers'
- <sup>84</sup> Soil Association, 'Fixing Nitrogen: The challenge for climate, nature and health'
- <sup>85</sup> Climate Change Committee, 'Progress in reducing emissions: 2022 Report to Parliament', 29th June 2022
- <sup>86</sup> Department for Environment, Food & Rural Affairs, 'United Kingdom Food Security Report 2021', 16th December 2021
- <sup>87</sup> The British Survey of Fertiliser Practice, 'Fertiliser use on farm crops for crop year 2022', July 2023
- <sup>88</sup> Ibid
- <sup>89</sup> Climate Change Committee, 'Progress in reducing emissions: 2023 Report to Parliament', 28th June 2023
- <sup>90</sup> UK Centre for Ecology & Hydrology, 'Peatlands factsheet'
- <sup>91</sup> Economist Impact, 'Data point: a wet, wild, wonderful world', 11th February 2022
- <sup>92</sup> Department for Environment, Food & Rural Affairs, 'Lowland Agricultural Peat Task Force Chair's report', 29th June 2023
- <sup>93</sup> UK Centre for Ecology & Hydrology, 'Peatlands factsheet'
- <sup>94</sup> IUCN UK Peatlands Programme, 'Productive lowland peatlands', September 2019
- <sup>95</sup> Climate Change Committee, 'Progress in reducing emissions: 2022 Report to Parliament', 29th June 2022
- <sup>96</sup> Department for Environment, Food & Rural Affairs, 'Lowland Agricultural Peat Task Force Chair's Report', 29th June 2023
- <sup>97</sup> Climate Change Committee, 'Progress in reducing emissions: 2023 Report to Parliament', 28th June 2023
- <sup>98</sup> NIAB, UK Centre for Ecology & Hydrology, 'The future of vegetable production on lowland peat: for climate, nature, and people', 30th October 2023
- <sup>99</sup> Department for Environment, Food & Rural Affairs, 'Lowland Agricultural Peat Task Force Chair's report', 29th June 2023
- <sup>100</sup> Climate Change Committee, 'Progress in reducing emissions: 2023 Report to Parliament', 28th June 2023
- <sup>101</sup> Environment Agency, 'State of the water environment indicator B3: supporting evidence', 22 May 2023
- <sup>102</sup> Department for Environment, Food & Rural Affairs, 'Water targets: Detailed Evidence report', 6th May 2022
- <sup>103</sup> Ibid
- <sup>104</sup> Department for Environment, Food & Rural Affairs, 'Soil Nutrient Balances', 8th March 2023
- <sup>105</sup> House of Commons Environmental Audit Committee, 'Water quality in rivers: Fourth Report of Session 2021–22', 5th January 2022
- <sup>106</sup> Environment Agency, 'Agriculture and rural land management: challenges for the water environment', October 2021
- <sup>107</sup> Environment Agency, '2021 river basin management plans: Agriculture and rural land management', October 2019
- <sup>108</sup> Crop Fertility Services, 'Chicken Manure vs. Cow Manure – Comparing Fertilizer For Organic Crop Farming'
- <sup>109</sup> RePhOKUs, 'Re-focusing Phosphorus use in the Wye Catchment', May 2022
- <sup>110</sup> The Times, 'How £4 chicken is killing one of Britain's biggest rivers', 14th February 2023
- <sup>111</sup> Ibid
- <sup>112</sup> House of Commons Environmental Audit Committee, 'Water quality in rivers: Written evidence from the RePhOKUs Project', 17th November 2021

- 
- <sup>113</sup> House of Commons Environmental Audit Committee, 'Water quality in rivers: Written evidence from Friends of the Upper Wye', 16th September 2021
- <sup>114</sup> Herefordshire Wildlife Trust, 'What's polluting the River Wye?'
- <sup>115</sup> The Times, 'Supermarkets fund farm wetlands to stop pollution', 31st October 2023
- <sup>116</sup> Sustain, 'Factory farm corporation owns up to links between chicken litter and pollution', 14th August 2023
- <sup>117</sup> The Guardian, 'Nearly half of Britain's biodiversity has gone since industrial revolution', 10th October 2021
- <sup>118</sup> Natural History Museum, 'Natural History Museum reveals the world has crashed through the 'safe limit for humanity' for biodiversity loss', 11th October 2021
- <sup>119</sup> State of Nature Partnership, 'State of Nature report 2023', 26th September 2023
- <sup>120</sup> State of Nature Partnership, 'State of Nature report 2019', 3rd October 2019
- <sup>121</sup> Burns et al, 'Agricultural Management and Climatic Change Are the Major Drivers of Biodiversity Change in the UK', 23rd March 2016
- <sup>122</sup> Joint Nature Conservation Committee, 'UK Biodiversity Indicators 2023, Birds of the wider countryside and at sea', 14th November 2023
- <sup>123</sup> Joint Nature Conservation Committee, 'UK Biodiversity Indicators 2023, Insects of the wider countryside (butterflies)', 14th November 2023
- <sup>124</sup> Joint Nature Conservation Committee, 'UK Biodiversity Indicators 2023, Plants of the wider countryside', 14th November 2023
- <sup>125</sup> BBC, 'Fertilisers 'reducing diversity'', 1st May 2009
- <sup>126</sup> The Royal Society for the Protection of Birds, 'Pesticides – it's time for a rethink'
- <sup>127</sup> Fera Science Ltd, 'Pesticide Usage Statistics'
- <sup>128</sup> Politico, 'Rural uprising: How Britain's farmers fell out of love with the Conservative Party', 18th July 2023
- <sup>129</sup> Farmers Weekly, 'Editor's View: Defra's disciples have spread far and wide', 3rd November 2023
- <sup>130</sup> Country Life, 'Sir Keir Starmer: 'I want everyone in the countryside to know that I will roll up my sleeves and restore respect'', 6th September 2023
- <sup>131</sup> UK Onward Youtube Channel, 'In Conversation with Steve Reed MP', 8th October 2023
- <sup>132</sup> The Guardian, 'Labour's DEFRA team vows to get tough on pollution and protect farmers', 9th October 2023
- <sup>133</sup> Ends Report, 'Lib Dems 'going strong' on ELMs frustration ahead of by-election amid fears reforms will be 'scapegoated'', 14th June 2022
- <sup>134</sup> Farmers Weekly, 'Libs Dems demand extra £1bn/year for farming', 25 September 2023
- <sup>135</sup> Liberal Democrats, 'For a fair deal'
- <sup>136</sup> Country Land and Business Association, 'The "Rural Wall": The Countryside's voting intentions for the next general election', 2023
- <sup>137</sup> YouGov, 'Wildlife and Countryside Link Survey Results', 30th June 2023
- <sup>138</sup> The Guardian, 'Pollution is damaging UK rivers more than public thinks, report says', 15th September 2021
- <sup>139</sup> Environment Agency, 'Environment Agency publishes Event Duration Monitoring data for 2022', 31st March 2023
- <sup>140</sup> Department for Environment, Food and Rural Affairs, 'Water company fines to be channelled into environmental improvements', 30th November 2022
- <sup>141</sup> Ofwat, 'Ofwat sets out £1.6bn boost for water company investment', 3rd April 2023
- <sup>142</sup> The Times, 'Lib Dems smell a vote winner in polluted swing-seat waters', 10th April 2023
- <sup>143</sup> The Times, 'Middle-aged women 'hold key to winning the next election'', 2nd July 2023
- <sup>144</sup> The Guardian, 'Labour's DEFRA team vows to get tough on pollution and protect farmers', 9th October 2023
- <sup>145</sup> Farmers Weekly, 'Labour to offer more slurry infrastructure cash if it wins power', 9th October 2023
- <sup>146</sup> Farmers Weekly, 'Farmer support for Tories waning as problems mount up', 15th December 2022
- <sup>147</sup> YouGov, 'Times Radio Survey', 11th June 2023
- <sup>148</sup> Onward analysis based on population density of seats
- <sup>149</sup> Survation, 'Archive 2023', Onward analysis
- <sup>150</sup> Election Polling, 'Huntingdon - UK Parliament Constituency'
- <sup>151</sup> FWS Craig, 'British Parliamentary Election Results: 1950-1973', 1983
- <sup>152</sup> FWS Craig, 'British Parliamentary Election Results: 1918-1949', 1969
- <sup>153</sup> Survation, 'Archive 2023', Onward analysis

- 
- <sup>154</sup> Sustain, 'We are to get a new Agriculture Act - so let's have a look at the old one - the 1947 Agriculture Act', 27th July 2017
- <sup>155</sup> Royal Society of Biology, 'Common Agricultural Policy'
- <sup>156</sup> Oxford Academic, 'The 1992 MacSharry Reform', An Inside View of the CAP Reform Process: Explaining the MacSharry, Agenda 2000, and Fischler Reforms', February 2011
- <sup>157</sup> Royal Society of Biology, 'Common Agricultural Policy'
- <sup>158</sup> Unearthed, 'Common Agricultural Policy: Rich List receive millions in EU subsidies', 29th September 2016
- <sup>159</sup> Farmers Weekly, 'Tips to survive and thrive amid falling BPS payments', 27th January 2023
- <sup>160</sup> House of Commons Library, 'Evidence on Countryside Stewardship scheme (CSS0001)', March 2017
- <sup>161</sup> Department for Environment, Food & Rural Affairs, 'Landscape Recovery: first round now open for applications', 1st February 2022
- <sup>162</sup> Department for Environment, Food & Rural Affairs, 'Sustainable Farming Incentive: DEFRA's plans for piloting and launching the scheme', 4th August 2021
- <sup>163</sup> Department for Environment, Food & Rural Affairs, 'Environmental Land Management (ELM) update: how government will pay for land-based environment and climate goods and services', 21st June 2023
- <sup>164</sup> HM Government, 'Applicant's guide: Higher Tier grants 2023', 2nd October 2023
- <sup>165</sup> Department for Environment, Food & Rural Affairs, 'Landscape Recovery: round two', 18th May 2023
- <sup>166</sup> Department for Environment, Food & Rural Affairs Farming, 'Landscape Recovery: your questions answered', 6th May 2022
- <sup>167</sup> Wildlife Trusts, 'Government U-turn on promise to reform farming post-Brexit', 13th June 2022
- <sup>168</sup> Farmers Weekly, 'Eustice: Ditch 'outdated' income foregone payments in ELM', 3rd February 2023
- <sup>169</sup> Sustain, 'Farm policy drama and what really happened', 3rd October 2022
- <sup>170</sup> Department for Environment, Food & Rural Affairs Farming, 'Farming and Countryside Programme Annual Report 2022-23', 25th October 2023
- <sup>171</sup> Farmers Weekly, 'Transition survey reveals depth of concern over policy and costs', 7th August 2023
- <sup>172</sup> The Guardian, 'Government poised to scrap nature 'Brexit bonus' for farmers', 24th September 2022
- <sup>173</sup> Farmers Weekly, 'Transition survey reveals depth of concern over policy and costs', 7th August 2023
- <sup>174</sup> The Guardian, 'Loophole lets farmers pollute England's rivers with excess manure - report', 13th July 2023
- <sup>175</sup> Environment Agency, 'Improving environmental performance through our farming inspections', 20th July 2023
- <sup>176</sup> EPICCentre, 'CAP subsidies harm the environment', 10th December 2018
- <sup>177</sup> OECD Environmental Performance Reviews: New Zealand, 'New Zealand Plans for Agricultural Emissions Prices', 2017
- <sup>178</sup> RNZ, 'Farmers, environmentalists weigh in on farm-level pricing plan', 11th October 2022
- <sup>179</sup> Office for National Statistics, 'UK business; activity, size and location: 2023', 27th September 2023
- <sup>180</sup> Department for Environment, Food & Rural Affairs, 'Agriculture in the United Kingdom 2022', 6th November 2023
- <sup>181</sup> The Guardian, 'Nitrogen wars: the Dutch farmers revolt that turned a nation upside down', 16th November 2023
- <sup>182</sup> The Guardian, 'Rural populist party emerges as big winner in Dutch', 16th March 2023
- <sup>183</sup> Country Life, 'Sir Keir Starmer: 'I want everyone in the countryside to know that I will roll up my sleeves and restore respect'', 6th September 2023
- <sup>184</sup> Liberal Democrats, 'For a Fair Deal'
- <sup>185</sup> Department for Environment, Food & Rural Affairs, 'Environmental Land Management (ELM) update: how government will pay for land-based environment and climate goods and services', 21st June 2023
- <sup>186</sup> Department for Environment, Food & Rural Affairs, 'First farmers receive Sustainable Farming Incentive early payment', 18th October 2023
- <sup>187</sup> Department for Environment, Food & Rural Affairs, 'Environmental Land Management (ELM) update: how government will pay for land-based environment and climate goods and services', 21st June 2023
- <sup>188</sup> Farmers Weekly, 'Transition survey reveals depth of concern over policy and costs', 7th August 2023
- <sup>189</sup> Department for Environment, Food & Rural Affairs, 'Introducing SFI Management Payments and changes to Countryside Stewardship rates', 5th January 2023
- <sup>190</sup> Department for Environment, Food & Rural Affairs, 'SFI: more ways to enhance your income, productivity and the environment', 21st June 2023
- <sup>191</sup> Strutt and Parker, 'Practical pointers on the 2022 Sustainable Farming Incentive', 31st March 2022
- <sup>192</sup> NFU, 'Upland farms worse off under current ELMs offer, NFU modelling reveals', 27th November 2023

- 
- <sup>193</sup> NFU, 'Everything you need to know about the ELMs 2023 prospectus', 25th September 2023
- <sup>194</sup> Agrii, 'Fallacy of 'income foregone' payments for new ELMS revealed', 5th October 2020
- <sup>195</sup> Legislation.gov.uk, 'Agriculture Act 2020'
- <sup>196</sup> Department for Environment, Food & Rural Affairs, 'Total Income From Farming in England', Onward analysis
- <sup>197</sup> Department for Environment, Food & Rural Affairs, 'DEFRA in the media: Our position on income forgone', 14th June 2023
- <sup>198</sup> Farmers Weekly, 'Transition survey reveals depth of concern over policy and costs', 7th August 2023
- <sup>199</sup> Department for Environment, Food & Rural Affairs, 'First farmers receive Sustainable Farming Incentive early payment', 18th October 2023
- <sup>200</sup> NFU, 'Do the right thing' over farm payment delays, NFU tells', 6th September 2023 ministers
- <sup>201</sup> Farmers Weekly, 'Further delays to SFI 2023 launch leave farmers in limbo', 23rd August 2023
- <sup>202</sup> House of Commons Environment, Food and Rural Affairs Committee, 'Performance of the Rural Payments Agency Fifth Report of Session 2017-19', May 2018
- <sup>203</sup> Farmer Weekly, 'Agents flag problems with Rural Payments service', 1st March 2022
- <sup>204</sup> Rural Payments Agency, 'Annual Report and Accounts 2018-2019', 4th July 2019
- <sup>205</sup> Rural Payments Agency, 'Annual Report and Accounts 2022-2023', 18th July 2023
- <sup>206</sup> Natural England, 'Natural England Annual Report and Accounts 1 April 2022 to 31 March 2023', 6th December 2023
- <sup>207</sup> Farmers Weekly, 'What next for Natural England's protected landscapes plans?', 1st September 2023
- <sup>208</sup> Hansard, 'Farming on Dartmoor', 18th April 2023
- <sup>209</sup> Department for Environment, Food & Rural Affairs, 'Nutrient pollution: reducing the impact on protected sites', 28th June 2023
- <sup>210</sup> University of Sussex, 'Biodiversity v Intensive Farming; Has Farming Lost its Way?', 16th January 2015
- <sup>211</sup> Carbon Brief, 'Q&A: Will the UK's new farm payments cut emissions and help nature?', 1st February 2023
- <sup>212</sup> Department for Environment, Food & Rural Affairs, 'Environmental Land Management (ELM) update: how government will pay for land-based environment and climate goods and services', 21st June 2023
- <sup>213</sup> Department for Environment, Food & Rural Affairs Statistics, '2023 - Countryside Stewardship and Environmental Stewardship Data', 18th September 2023
- <sup>214</sup> Department for Environment, Food & Rural Affairs, 'Environmental Land Management (ELM) update: how government will pay for land-based environment and climate goods and services', 21st June 2023
- <sup>215</sup> Department for Environment, Food & Rural Affairs, 'Environmental Improvement Plan 2023', 31st January 2023
- <sup>216</sup> Groundswell, '5 Principles of Regenerative Agriculture'
- <sup>217</sup> Pywell et al, 'Wildlife Friendly farming increases crop yield: evidence for ecological intensification', 7th October 2015
- <sup>218</sup> Farmers Weekly, 'Yields not affected by 'nature-friendly' approach, says report', 5th August 2022
- <sup>219</sup> Farmers Weekly, 'More support for upland farmers demanded in petition', 14th September 2023
- <sup>220</sup> Department for Environment, Food & Rural Affairs, 'Guest post: Upper Duddon Landscape Recovery', 26th June 2023
- <sup>221</sup> Department for Environment, Food & Rural Affairs, 'Landscape Recovery: sharing the successful second round projects', 29th November 2023
- <sup>222</sup> Department for Environment, Food & Rural Affairs, 'How we're making sure all farm businesses can fairly access money released from Basic Payments', 6th June 2022
- <sup>223</sup> The Telegraph, 'Farmers who go green in Natural England scheme face inheritance tax', 29th July 2023
- <sup>224</sup> Department for Environment, Food & Rural Affairs, 'Rock Review: working together for a thriving agricultural tenanted sector', 13th October 2022
- <sup>225</sup> HM Treasury, 'Taxation of environmental land management and ecosystem service markets', 15th March 2023
- <sup>226</sup> Department for Environment, Food & Rural Affairs, 'Understanding biodiversity net gain', 29th November 2023
- <sup>227</sup> Morgan Stanley, 'Where the Carbon Offset Market Is Poised to Surge', 11th April 2023
- <sup>228</sup> Department for Environment, Food & Rural Affairs, 'Nature for people, climate and wildlife', 18th May 2021
- <sup>229</sup> Department for Environment, Food & Rural Affairs, 'Environmental Land Management (ELM) update: how government will pay for land-based environment and climate goods and services', 21st June 2023
- <sup>230</sup> Green Finance Institute, 'The Finance Gap for UK Nature', 1st October 2021

- 
- <sup>231</sup> Department for Environment, Food & Rural Affairs, 'Nature markets: A framework for scaling up private investment in nature recovery and sustainable farming', March 2023
- <sup>232</sup> Climate Change Committee, 'Supply and Demand in the UK Voluntary Carbon Market (Allied Offsets)', July 2022, Onward analysis
- <sup>233</sup> Department for Environment, Food & Rural Affairs, 'Nature markets: A framework for scaling up private investment in nature recovery and sustainable farming', March 2023
- <sup>234</sup> Climate Change Committee, 'Supply and Demand in the UK Voluntary Carbon Market (Allied Offsets)', July 2022
- <sup>235</sup> Ibid
- <sup>236</sup> Science, 'Action needed to make carbon offsets from forest conservation work for climate change mitigation', 24th August 2023
- <sup>237</sup> The Guardian, 'Carbon credit speculators could lose billions as offsets deemed worthless', 24th August 2023
- <sup>238</sup> Woodland Carbon Code, 'UK Woodland Carbon Code'
- <sup>239</sup> IUCN UK Peatland Programme, 'Peatland Code'
- <sup>240</sup> Natural England, 'Biodiversity Net Gain Brochure', April 2022
- <sup>241</sup> Department for Environment, Food & Rural Affairs and BSI, 'Nature Investment Standards Programme', March 2023
- <sup>242</sup> Sustainable Soils Alliance, 'Our Work'
- <sup>243</sup> Climate Change Committee, 'Supply and Demand in the UK Voluntary Carbon Market (Allied Offsets)', July 2022
- <sup>244</sup> Forestry Commission, 'Woodland Carbon Guarantee', 26th September 2023
- <sup>245</sup> Climate Change Committee, 'Supply and Demand in the UK Voluntary Carbon Market (Allied Offsets)', July 2022
- <sup>246</sup> Department for Environment, Food & Rural Affairs, 'Government Food Strategy', 13th June 2022
- <sup>247</sup> UK Research and Innovation, 'Funding finder', Onward analysis
- <sup>248</sup> Department for Environment, Food & Rural Affairs, 'Environment Secretary announces further £45 million for farming innovation as he sets out commitment to champion British agriculture', 30th November 2023
- <sup>249</sup> Transforming UK Food Systems Strategic Priorities Fund, 'About The Programme'
- <sup>250</sup> HM Government Innovation Funding Services, 'Novel low-emission food production systems: Industrial research', January 2023
- <sup>251</sup> Quadram, '£163.9m funding boost to world-leading research institutes at Norwich Research Park', 26th May 2023
- <sup>252</sup> Office for National Statistics, 'Research and development expenditure by the UK government', 30 March 2023, Onward analysis
- <sup>253</sup> UK Research and Innovation, 'Funding finder', Onward analysis
- <sup>254</sup> UK Research and Innovation, '50 winning projects showcase the latest farming innovations', 31 May 2023
- <sup>255</sup> Rural Payments Agency, 'About the Farming Equipment and Technology Fund 2023', 8th November 2023
- <sup>256</sup> Rural Payments Agency, 'About the Slurry Infrastructure grant, who can apply and what it can pay for', 13th October 2023
- <sup>257</sup> Rural Payments Agency, 'About the Water Management Grant Round 2, who can apply and what the grant can pay for', 29th August 2023
- <sup>258</sup> Department for Environment, Food & Rural Affairs, 'Slurry Infrastructure grants: first round summary and our next steps', 4th April 2023
- <sup>259</sup> Department for Levelling Up, Housing & Communities and Department for Environment, Food & Rural Affairs, '100,000 more homes to be built via reform of defective EU laws', 29th August 2023
- <sup>260</sup> Inside Housing, 'Plans to scrap nutrient neutrality rules blocked by Lords', 14th September 2023
- <sup>261</sup> Department for Environment, Food & Rural Affairs, 'Apply now for a Slurry Infrastructure grant', 21st November 2023
- <sup>262</sup> NFU, 'Farming Transformation Fund – Slurry Infrastructure grant round 1', 22nd November 2023
- <sup>263</sup> Department for Environment, Food & Rural Affairs, 'Structure of the agricultural industry in England and the UK at June', 4th October 2023
- <sup>264</sup> Rural Payments Agency, 'About the Slurry Infrastructure grant, who can apply and what it can pay for', 13th October 2023
- <sup>265</sup> Environment Agency, 'Agriculture and rural land management: challenges for the water environment', October 2021

- 
- <sup>266</sup> Environment Agency, '2021 river basin management plans: Agriculture and rural land management', October 2019
- <sup>267</sup> Rural Payments Agency, 'About the Slurry Infrastructure grant, who can apply and what it can pay for', 13th October 2023
- <sup>268</sup> The Times, 'Chicken manure link to pollution in the River Wye', 18th February 2022
- <sup>269</sup> Department for Environment, Food & Rural Affairs, 'Greenhouse gas mitigation practices – Farm Practices Survey England 2021', 24th June 2021
- <sup>270</sup> House of Commons Environmental Audit Committee, 'Water quality in rivers: Written evidence from Friends of the Upper Wye', 16th September 2021
- <sup>271</sup> Farmers Weekly, '4 alternatives to spreading poultry manure on land', 12th July 2019
- <sup>272</sup> Farmers Weekly, 'On-farm poultry manure pelletisers: the options and costs', 25<sup>th</sup> June 2022
- <sup>273</sup> The Times, 'How £4 chicken is killing one of Britain's biggest rivers', 14th February 2023
- <sup>274</sup> NFU, 'Farming Transformation Fund – Water Management Grant Rounds 1 and 2', 29th September 2023
- <sup>275</sup> Department for Environment, Food & Rural Affairs, 'More funding for farmers as new blueprint for water announced', 4th April 2023
- <sup>276</sup> Farmers Weekly, 'So you want to... build a reservoir?', 27th March 2020
- <sup>277</sup> The Guardian, 'We need reservoirs built: drought leaves UK farms begging for government aid', 13th August 2022
- <sup>278</sup> Department for Environment, Food & Rural Affairs, 'Water usage on farms: Results from the Farm Business Survey, England 2015/16', 31st January 2017
- <sup>279</sup> Department for Environment, Food & Rural Affairs, 'Structure of the agricultural industry in England and the UK at June', 4th October 2023
- <sup>280</sup> The Guardian, 'We need reservoirs built: drought leaves UK farms begging for government aid', 13th August 2022
- <sup>281</sup> Department for Environment, Food & Rural Affairs, 'Lowland Agricultural Peat Task Force Chair's Report', 29th June 2023
- <sup>282</sup> Prime Minister's Office, 10 Downing Street, 'Outcomes from the UK Farm to Fork summit', 16th May 2023
- <sup>283</sup> Department for Environment, Food & Rural Affairs, 'Lowland Agricultural Peat Task Force Chair's Report', 29th June 2023
- <sup>284</sup> Department for Environment, Food & Rural Affairs, 'Government Food Strategy', 13th June 2022
- <sup>285</sup> Department for Environment, Food & Rural Affairs, 'United Kingdom Food Security Report 2021', 16th December 2021
- <sup>286</sup> Department for Environment, Food & Rural Affairs, 'Latest horticulture statistics', 30th October 2023, Onward analysis
- <sup>287</sup> Netherlands Enterprise Agency, 'Sector study on covered horticulture in France', May 2021
- <sup>288</sup> Department for Environment, Food & Rural Affairs, 'Latest horticulture statistics', 30th October 2023, Onward analysis
- <sup>289</sup> Keder greenhouse, 'Prices'
- <sup>290</sup> Greenhouse people, 'Robinsons Royale Reach'
- <sup>291</sup> Old Moore's Almanac, 'Thanet Earth: This is What the Largest Greenhouse on Earth Looks Like'
- <sup>292</sup> The Times, 'Farmers swap fields for high-rises', 29th August 2023
- <sup>293</sup> Savills, 'Spotlight: Controlled Environment Horticulture', 28th March 2023
- <sup>294</sup> Swarm Hub, 'Slurry Storage'
- <sup>295</sup> The Farm Consultancy Group, 'Planning for Delays', 10th September 2022
- <sup>296</sup> Farmers Weekly, 'So you want to... build a reservoir?', 27th March 2020
- <sup>297</sup> The Farm Consultancy Group, 'Planning for Delays', 10th September 2022
- <sup>298</sup> Department for Levelling Up, Housing & Communities, 'Consultation on additional flexibilities to support housing delivery, the agricultural sector, businesses, high streets and open prisons; and a call for evidence on nature-based solutions, farm efficiency projects and diversification', 24th July 2023
- <sup>299</sup> Rural Payments Agency, 'Annex 3: FETF 2023 Productivity and Slurry eligible Items', 8th November 2023
- <sup>300</sup> LinkedIn, '5 Things to Know Before Buying A Guidance System', 18th May 2021
- <sup>301</sup> PwC, 'Skies Without Limits v2.0', July 2022
- <sup>302</sup> Ohioline, 'Drones for Spraying Pesticides—Opportunities and Challenges', 24th January 2023
- <sup>303</sup> Ibid
- <sup>304</sup> ADS Advance, 'CAA grants UK's first-ever Operational Authorisation to XAG Agricultural Drones', 17th January 2023

- 
- <sup>305</sup> PwC, 'Skies Without Limits v2.0', July 2022
- <sup>306</sup> Farmers Weekly, 'A grower's guide to buying a drone', 18th April 2017
- <sup>307</sup> Farmers Weekly, 'Olly Harrison sows OSR and cover crop with quadcopter drone', 5th September 2023
- <sup>308</sup> Rural Payments Agency, 'About the Farming Equipment and Technology Fund 2023', 8th November 2023
- <sup>309</sup> Rural Payments Agency, 'Applicant's guide: Facilitation Fund 2023', 23rd October 2023
- <sup>310</sup> Environmental Farmers Group, 'About Us'
- <sup>311</sup> Game & Wildlife Conservation Trust, 'Countryside Stewardship Facilitation Fund: £2.5m Available', 23rd October 2023
- <sup>312</sup> BBC, 'Why we want older farmers to hang up their wellies', 19th May 2021
- <sup>313</sup> Department for Environment, Food & Rural Affairs, 'An update on the Lump Sum Exit Scheme and delinked payments', 8th February 2022
- <sup>314</sup> Farmers Weekly, 'Farmers' lump-sum exit scheme application figures released', 1st November 2022
- <sup>315</sup> Department for Environment, Food & Rural Affairs, 'Rock Review: working together for a thriving agricultural tenanted sector', 13th October 2022
- <sup>316</sup> Department for Environment, Food & Rural Affairs, 'New Entrant Support Scheme: apply for the pilot', 24th November 2022
- <sup>317</sup> Department for Environment, Food & Rural Affairs, 'New Entrant Support Scheme pilots: our initial findings', 9th October 2023
- <sup>318</sup> Rural Payments Agency, 'BPS rules for 2023', 16th March 2023
- <sup>319</sup> Campaign to Protect Rural England, 'Reviving county farms', 12th December 2019
- <sup>320</sup> Department for Environment, Food & Rural Affairs, '68th, 70th, 71st and 72nd annual report to Parliament on smallholdings in England', Onward analysis
- <sup>321</sup> Department for Environment, Food & Rural Affairs, '60th and 72nd annual report to Parliament on smallholdings in England', Onward analysis
- <sup>322</sup> Department for Environment, Food & Rural Affairs, '72nd annual report to Parliament on smallholdings in England', 26th July 2023
- <sup>323</sup> Sustain, 'The review of the Groceries Code Adjudicator must not lead to its abolishment or weakening', 12th September 2022
- <sup>324</sup> Department for Business & Trade, 'Groceries Supply Code of Practice', 4th August 2009
- <sup>325</sup> Groceries Code Adjudicator, 'Annual Report and Accounts 2022/23', 20th July 2023
- <sup>326</sup> Groceries Code Adjudicator, 'GCA Annual Survey 2023', 15th June 2023
- <sup>327</sup> Groceries Code Adjudicator, 'GCA Annual Survey 2022', 14th June 2022
- <sup>328</sup> Tenant Farmers Association, 'Department for Business, Energy & Industrial Strategy: Groceries Code Adjudicator, Statutory Review', 18th October 2022
- <sup>329</sup> Department for Environment, Food & Rural Affairs, 'Contractual practice in the UK pig sector: Summary of responses and UK government response', 6th April 2023
- <sup>330</sup> Pig World, 'Defra aiming to introduce new regulations governing pig contracts next year', 19th September 2023
- <sup>331</sup> Food Ethics Council, 'Open Letter: Dear Supermarkets – It's Time to Get Fair About Farming'
- <sup>332</sup> Petitions UK Government and Parliament, 'Reform the Grocery Supply Code of Practice to better protect farmers'
- <sup>333</sup> House of Commons Library, 'Seasonal Worker visas and UK agriculture', 26th June 2023
- <sup>334</sup> Department for Environment, Food & Rural Affairs, 'Agricultural Workforce in the United Kingdom at 1 June', 20th October 2023
- <sup>335</sup> Farmers Guide, 'Brexit deal: How are farmers affected?', 27th January 2021
- <sup>336</sup> Food Safety News, 'UK group urges agreement with Europe on food checks', 1st March 2022
- <sup>337</sup> Agriculture and Horticulture Development Board, 'Australia and NZ trade deals to come into force at the end of May', 11th May 2023
- <sup>338</sup> Department for Environment, Food & Rural Affairs, 'Agriculture in the United Kingdom 2022', 6th November 2023
- <sup>339</sup> Agriculture and Horticulture Development Board, 'Australia and NZ trade deals to come into force at the end of May', 11th May 2023
- <sup>340</sup> Australian Government Department of Foreign Affairs and Trade, 'Australia-UK FTA negotiations fact sheet'
- <sup>341</sup> Department for Environment, Food & Rural Affairs, 'Agriculture in the United Kingdom 2022', 6th November 2023
- <sup>342</sup> Politico, 'How Boris Johnson sold out Britain's farmers over dinner with the Australian PM', 1st June 2023

- 
- <sup>343</sup> Agriculture and Horticulture Development Board, 'Australia and NZ trade deals to come into force at the end of May', 11th May 2023
- <sup>344</sup> Prime Minister's Office, 10 Downing Street, 'Prime Minister's open letter to British Farmers', 16th May 2023
- <sup>345</sup> NFU, 'How will the Pacific trade deal impact farmers?', 31st March 2023
- <sup>346</sup> WWF, 'New UK trade deal 'rewards environmental destruction', warns WWF', 17th July 2023
- <sup>347</sup> Farmers Weekly, 'Canadian cattle groups say 'no' to UK's entry into CPTPP', 2nd October 2023
- <sup>348</sup> Department for Environment, Food & Rural Affairs, 'Environmental Land Management (ELM) update: how government will pay for land-based environment and climate goods and services', 21st June 2023
- <sup>349</sup> Department for Environment, Food & Rural Affairs, '2023 - Countryside Stewardship and Environmental Stewardship Data', 18th September 2023, Onward analysis
- <sup>350</sup> Department for Environment, Food & Rural Affairs, 'Environmental Land Management (ELM) update: how government will pay for land-based environment and climate goods and services', 21st June 2023
- <sup>351</sup> Rural Payments Agency, 'Applicant's guide: Mid Tier grants and Wildlife Offers 2023', 6th December 2023
- <sup>352</sup> Department for Environment, Food & Rural Affairs, 'Revenue options payment rate changes from 1 January 2023', 30th May 2023
- <sup>353</sup> Rural Payments Agency, 'Field Officers: Offering guidance and support to farmers', 25th November 2022
- <sup>354</sup> Rural Payments Agency, 'Annual Report and Accounts 2022-2023', 18th July 2023
- <sup>355</sup> Natural England, 'Natural England Annual Report and Accounts 1 April 2021 to 31 March 2022', 15th December 2022
- <sup>356</sup> Department for Environment, Food & Rural Affairs, 'Environmental Land Management (ELM) update: how government will pay for land-based environment and climate goods and services', 21st June 2023
- <sup>357</sup> Farmers Weekly, 'More support for upland farmers demanded in petition', 14th September 2023
- <sup>358</sup> Department for Environment, Food & Rural Affairs, 'Guest post: Upper Duddon Landscape Recovery', 26th June 2023
- <sup>359</sup> Department for Environment, Food & Rural Affairs, 'Landscape Recovery: sharing the successful second round projects', 29th November 2023
- <sup>360</sup> Department for Environment, Food & Rural Affairs, 'How we're making sure all farm businesses can fairly access money released from Basic Payments', 6th June 2022
- <sup>361</sup> Natural England, 'Annual report and accounts 2019/20', 3rd February 2021
- <sup>362</sup> Natural England, 'Natural England Annual Report and Accounts 1 April 2022 to 31 March 2023', 6th December 2023
- <sup>363</sup> Farmers Weekly, 'EA to issue more inspections to tackle farm water pollution', 2nd August 2021
- <sup>364</sup> Environment Agency, 'Annual report and accounts for the financial year 2022 to 2023', 26th October 2023
- <sup>365</sup> Department for Environment, Food & Rural Affairs, 'Organic food: approved UK control bodies', 14th July 2023
- <sup>366</sup> IUCN UK Peatland Programme, 'For Projects'
- <sup>367</sup> Green Alliance, 'Land of Opportunity', August 2022
- <sup>368</sup> Department for Environment, Food & Rural Affairs, 'Agriculture in the United Kingdom 2022', 6th November 2023, Onward analysis
- <sup>369</sup> Department for Environment, Food & Rural Affairs, 'Farm Business Income by type of farm in England', Onward analysis
- <sup>370</sup> Farmers Weekly, 'Lamb exports to Middle East up 608% in past two years', 19th December 2019
- <sup>371</sup> National Sheep Association, 'The complementary role of sheep in upland and hill areas', 27th July 2016
- <sup>372</sup> Strutt & Parker, 'English Estates & Farmland Market Review: Autumn 2023', 17th October 2023, Onward analysis
- <sup>373</sup> Legislation.gov.uk, 'Inheritance Tax Act 1984'
- <sup>374</sup> Department for Environment, Food & Rural Affairs, 'Rock Review: working together for a thriving agricultural tenanted sector', 13th October 2022
- <sup>375</sup> The Conversation, 'Here's how to fix Australia's approach to soil carbon credits so they really count towards our climate goals', 29th September 2023
- <sup>376</sup> Woodland Carbon Code, 'Verification - Ongoing check of carbon sequestered'
- <sup>377</sup> Department for Environment, Food & Rural Affairs, 'UK - France Global Roadmap launched to mobilise global nature finance', 22nd June 2023
- <sup>378</sup> The Conversation, 'Here's how to fix Australia's approach to soil carbon credits so they really count towards our climate goals', 29th September 2023

- 
- <sup>379</sup> Australian Government Department of Climate Change, Energy, the Environment and Water, 'Australian Government's response to the Independent Review of Australian Carbon Credit Units (ACCU's)', 9th January 2023
- <sup>380</sup> Australian Government Department of Climate Change, Energy, the Environment and Water, 'National Soil Carbon Innovation Challenge (NSCIC): Round 2 grant guidelines now available', 24th February 2023
- <sup>381</sup> Irish Government Department of Agriculture, Food and the Marine, 'Ministers announces establishment of National Agricultural Soil Carbon Observatory', 23rd November 2020
- <sup>382</sup> S&P Global, 'Voluntary carbon markets: how they work, how they're priced and who's involved', 10th June 2021
- <sup>383</sup> Forestry Commission, 'Woodland Carbon Guarantee', 26th September 2023
- <sup>384</sup> DSM, 'Bovaer'
- <sup>385</sup> Global Research Alliance on Agricultural Greenhouse Gases, 'An evaluation of evidence for efficacy and applicability of methane inhibiting feed additives for livestock', November 2021
- <sup>386</sup> Department for Environment, Food & Rural Affairs, 'Methane suppressing feed products: call for evidence', 26th October 2023
- <sup>387</sup> All About Feed, '"Bovaer is a game changer for dairy farming"', 28th December 2022
- <sup>388</sup> Department for Environment, Food & Rural Affairs, 'Livestock populations in the United Kingdom at 1 June', 3rd May 2023
- <sup>389</sup> UK Research and Innovation, '50 winning projects showcase the latest farming innovations', 31st May 2023
- <sup>390</sup> UK Research and Innovation, 'Funding finder', Onward analysis
- <sup>391</sup> DSM, 'How cows can help us fight climate change'
- <sup>392</sup> Department for Energy Security & Net Zero, 'Powering Up Britain: Net Zero Growth Plan', 4th April 2023
- <sup>393</sup> Climate Change Committee, 'Progress in reducing emissions: 2023 Report to Parliament', 28th June 2023
- <sup>394</sup> NFU, 'Methane suppressing feed products – Defra commits to introduction', 30th October 2023
- <sup>395</sup> Department for Environment, Food & Rural Affairs, 'Government Food Strategy', 13th June 2022
- <sup>396</sup> Green Alliance, 'Appetite for change', August 2023
- <sup>397</sup> Eat Nowadays, 'What Is Plant-Based Meat Made Of? The 8 Most Common Ingredients'
- <sup>398</sup> Department for Environment, Food & Rural Affairs, 'Review of opportunities for diversifying UK agriculture through investment in underutilised crops', 30th September 2022
- <sup>399</sup> National Food Strategy, 'National Food Strategy Independent Review: The Plan', 15th July 2021
- <sup>400</sup> Prime Minister's Office, 10 Downing Street, 'PM speech on Net Zero: 20 September 2023', 20th September 2023
- <sup>401</sup> The Guardian, 'Sales at vegan burger maker Beyond Meat fall by almost a third', 8th August 2023
- <sup>402</sup> Food Business News, 'Plant-based meat market at a crossroads amid declining sales', 22nd August 2023
- <sup>403</sup> Good Food Institute, 'Expand capacity for demonstration-scale and mid-scale co-manufacturing'
- <sup>404</sup> Good Food Institute, 'Alternative protein in the United Kingdom: an ecosystem review', August 2023
- <sup>405</sup> Protein Industries Canada, 'Protein Industries Canada receives federal funding for another five years', 13th February 2023
- <sup>406</sup> Department for Levelling Up, Housing and Communities, 'York and North Yorkshire devolution deal', 1st August 2022
- <sup>407</sup> BioYorkshire, 'What is BioYorkshire?'
- <sup>408</sup> Good Food Institute, 'Alternative protein in the United Kingdom: an ecosystem review', August 2023
- <sup>409</sup> Ibid
- <sup>410</sup> Centre for Process Innovation, 'Food-grade investment sees CPI and Tees Valley lead the way in novel food innovation', 1st July 2022
- <sup>411</sup> Northumbria University, 'Swapping meat for Quorn's mycoprotein may protect against bowel cancer, says study', 16th February 2023
- <sup>412</sup> University of Leeds, 'Making plant-based meat alternatives more palatable', 15th August 2023
- <sup>413</sup> Good Food Institute, 'Alternative protein in the United Kingdom: an ecosystem review', August 2023
- <sup>414</sup> HM Treasury and Department for Levelling Up, Housing & Communities, 'Investment Zones: Policy Offer', March 2023
- <sup>415</sup> Department for Environment, Food & Rural Affairs, 'Latest horticulture statistics', 30th October 2023, Onward analysis
- <sup>416</sup> UK Centre for Ecology & Hydrology, 'Peatlands factsheet'

- 
- <sup>417</sup> Department for Environment, Food & Rural Affairs, 'Lowland Agricultural Peat Task Force Chair's Report', 29th June 2023
- <sup>418</sup> Paludiculture.org.uk, 'Paludiculture Exploration Fund: grant awardees', 29th June 2023
- <sup>419</sup> UK Research and Innovation, 'Funding finder', Onward analysis
- <sup>420</sup> UK Research and Innovation, 'Merger of Agri-Tech Centres paves way for future ambitions', 26th September 2023
- <sup>421</sup> Innovate UK, 'Pioneering Agri-Tech Innovation for a Sustainable Future', 4th October 2023
- <sup>422</sup> Paludiculture.org.uk, 'Paludiculture Exploration Fund: grant awardees', 29th June 2023
- <sup>423</sup> Harper Adams University, 'Harper Adams University to become first UK centre for the study of peat farming', 13th July 2023
- <sup>424</sup> Brookdale Consulting, 'Impact of the John Innes Centre', October 2018
- <sup>425</sup> Quadram, '£163.9m funding boost to world-leading research institutes at Norwich Research Park', 26th May 2023
- <sup>426</sup> Friends of the Earth, 'Editing the Truth: Genome editing is not a solution to climate change', October 2021
- <sup>427</sup> UK Parliament Parliamentary Bills, 'Genetic Technology (Precision Breeding) Act 2023', 27th March 2023
- <sup>428</sup> Food Standards Agency, 'Genetic Technology (Precision Breeding)', 4th September 2023
- <sup>429</sup> Ibid
- <sup>430</sup> Politico, 'Super crops are coming: Is Europe ready for a new generation of gene-edited plants?', 3rd July 2023
- <sup>431</sup> NFU, 'Slurry Infrastructure grant – round 2', 23rd November 2023
- <sup>432</sup> Department for Environment, Food & Rural Affairs, 'Structure of the agricultural industry in England and the UK at June', 4th October 2023
- <sup>433</sup> Task and Finish Group Report, 'The Impact of the Intensive Poultry Industry on Human Health and Wellbeing', July 2022
- <sup>434</sup> Department for Environment, Food & Rural Affairs, 'Water usage on farms: Results from the Farm Business Survey, England 2015/16', 31st January 2017
- <sup>435</sup> Department for Environment, Food & Rural Affairs, 'Structure of the agricultural industry in England and the UK at June', 4th October 2023
- <sup>436</sup> UK Parliament Post, 'Future of Horticulture', 30th October 2023
- <sup>437</sup> Fischer Farms, 'Fischer Farms: The Future of Farming'
- <sup>438</sup> Natural England, 'Catchment Sensitive Farming: advice for farmers and land managers', 21st March 2023
- <sup>439</sup> The Planner Jobs, 'Planning Officer Jobs'
- <sup>440</sup> Crédit Agricole, 'Recovery plan for agriculture – Crédit Agricole offers a subsidy advance to farmers', 16th February 2021
- <sup>441</sup> Swoop Funding, 'Asset Finance Explained'
- <sup>442</sup> Rural Payments Agency, 'Annex 3: FETF 2023 Productivity and Slurry eligible Items', 8th November 2023
- <sup>443</sup> Rural Payments Agency, 'About the Adding Value grant, who can apply and what the grant can pay for', 17th August 2022
- <sup>444</sup> Game & Wildlife Conservation Trust, 'Countryside Stewardship Facilitation Fund: £2.5m Available', 23rd October 2023
- <sup>445</sup> Department for Environment, Food & Rural Affairs, 'Rock Review: working together for a thriving agricultural tenanted sector', 13th October 2022
- <sup>446</sup> Department for Environment, Food & Rural Affairs, '72nd annual report to Parliament on smallholdings in England', 26th July 2023
- <sup>447</sup> Strutt & Parker, 'English Estates & Farmland Market Review: Autumn 2023', 17th October 2023
- <sup>448</sup> Farming UK, 'Funding secured for Land Mobility Scheme in Northern Ireland', 9th June 2017
- <sup>449</sup> Farming Life, 'Farming should be a young person's game – but it's not!', 8th March 2021
- <sup>450</sup> Agriland, 'NI Land Mobility Scheme concludes today', 31st August 2023
- <sup>451</sup> Down News, '£120,000 Funding Secured For Land Mobility Scheme', 8th June 2017
- <sup>452</sup> Department for Environment, Food & Rural Affairs, 'Agricultural land use in England at 1 June 2023', 9th November 2023
- <sup>453</sup> Northern Ireland Government Department of Agriculture, Environment and Rural Affairs, 'Results from the June Agricultural Census 2022', 28th February 2023
- <sup>454</sup> Natural England, 'Catchment Sensitive Farming: advice for farmers and land managers', 21st March 2023

- 
- <sup>455</sup> Farmers Weekly, 'Funding and support for young farmers round the world', 18th December 2022
- <sup>456</sup> Department for Environment, Food & Rural Affairs, 'Farm rents', 13th January 2023, Onward analysis
- <sup>457</sup> The Central Association of Agricultural Valuers, 'The Annual Agricultural Land Occupation Surveys for Great Britain, 2021', September 2022
- <sup>458</sup> Strutt & Parker, 'English Estates & Farmland Market Review: Autumn 2023', 17th October 2023
- <sup>459</sup> Department for Environment, Food & Rural Affairs, 'Structure of the agricultural industry in England and the UK at June', 4th October 2023, Onward analysis
- <sup>460</sup> Australian Government Regional Investment Corporation, 'AgriStarter Loan'
- <sup>461</sup> Farmers Weekly, 'Funding and support for young farmers round the world', 18th December 2022
- <sup>462</sup> Australian Government Regional Investment Corporation, 'Independent Review of the Regional Investment Corporation', February 2021
- <sup>463</sup> Farm Credit Canada, 'Young Farmers'
- <sup>464</sup> Farm Credit Canada, 'Starter Loan'
- <sup>465</sup> Strutt & Parker, 'English Estates & Farmland Market Review: Autumn 2023', 17th October 2023, Onward analysis
- <sup>466</sup> Department for Environment, Food & Rural Affairs, 'Contractual practice in the UK pig sector: Summary of responses and UK government response', 6th April 2023
- <sup>467</sup> Petitions UK Government and Parliament, 'Reform the Grocery Supply Code of Practice to better protect farmers'
- <sup>468</sup> Food Ethics Council, 'Open Letter: Dear Supermarkets – It's Time to Get Fair About Farming'
- <sup>469</sup> The Waste and Resources Action Programme (WRAP), 'Food waste in primary production in the UK', July 2019
- <sup>470</sup> The Grocer, 'How Tesco works with suppliers', 7th August 2019
- <sup>471</sup> HM Government, 'The Windsor Framework: A new way forward', February 2023
- <sup>472</sup> Science, 'U.K. finally rejoins Horizon Europe research funding scheme', 7th September 2023
- <sup>473</sup> Prime Minister's Office, 10 Downing Street, 'UK joins Horizon Europe under a new bespoke deal', 7th September 2023
- <sup>474</sup> Food Safety News, 'UK group urges agreement with Europe on food checks', 1st March 2022
- <sup>475</sup> Confederation of British Industry, 'UK-EU Veterinary Agreement', 9th June 2021
- <sup>476</sup> Official Journal of the European Union, 'Commission Implementing Decision (EU) 2015/1901', 20th October 2015
- <sup>477</sup> Confederation of British Industry, 'UK-EU Veterinary Agreement', 9th June 2021
- <sup>478</sup> Ibid

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