

Farming for the future

“green alliance...”

How paying for public goods can create a thriving rural economy



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Authors

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Green Alliance

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Summary

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All farms could become economically viable through a mix of agricultural income and payments for carbon sequestration.”

Farms of the future will need to provide public goods from their land, alongside food, if the UK is to meet its climate and nature goals. Only a quarter of England’s farms are currently making a profit from food production alone. Most rely heavily on subsidies to make ends meet.

Land can deliver a range of vital public goods: it can store carbon, provide habitats for nature, prevent flooding and improve water quality. It makes sense that farmers are paid public money in exchange for these benefits, since they flow well beyond the farm to benefit society. This is meant to be the guiding principle behind England’s new Environmental Land Management (ELM) scheme but it is becoming increasingly less clear as ELM is rolled out.

In this analysis, we explore what pursuing ELM’s original vision would mean for future farm incomes. Here, we explore future income when farms are paid for carbon sequestration which is just one of the public goods ELM should deliver. We find that all farms could become economically viable through a mix of agricultural income and payments for carbon sequestration, when those payments match the value attached to climate change mitigation elsewhere in the economy. Payments for other public goods could increase incomes further.

For instance, under the previous Common Agricultural Policy, grazing farms were dependent

“Sustainable Farming Incentive public benefits are too little to justify the high payments needed to keep unprofitable farms afloat.”

on direct support payments. However, we find these farms could maintain that income, despite the withdrawal of direct payments, by creating biodiverse, native woodland on half of their land, if the carbon they store is valued at the same rate as the UK’s Emissions Trading Scheme (ETS).¹

Upland farmers could increase their incomes by 50 per cent if they planted woodland on two thirds of their land, whilst continuing to graze the remaining land. At the other end of the spectrum, already profitable cereal farms on lowland peat soils could triple their returns by rewetting their land to reduce emissions.

Although paying for environmental outcomes can increase farm incomes, not every approach currently supported by the government’s current ELM scheme is sufficient to make all businesses profitable when paid for its carbon value. For instance, we find that adding agroforestry to grazing farms stores too little carbon to bail out loss making livestock production with payments set at the UK ETS rate.

This insight is at the heart of ELM’s current failings, particularly the Sustainable Farming Incentive which is one of the three arms of ELM. This scheme will only fund relatively small-scale measures like agroforestry. The resultant public benefits are too little to justify the high payments needed to keep unprofitable farms afloat. Yet this is the scheme that the Department for Environment, Food and Rural Affairs (Defra) wants most farmers to join. If ELM pays public money for public goods, as planned, the Sustainable Farming Incentive scheme simply will not deliver enough public benefit to keep many farms afloat.

The solution is not to increase payments for low impact interventions, which would reduce their

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The solution is to pay farmers for better value for money, higher impact interventions.”

value for money even further, but to pay farmers instead for better value for money, higher impact interventions, such as woodland planting and peat restoration. Currently, the opportunity to do so is reserved for the very few farms allowed into Defra’s Landscape Recovery programme, another arm of ELM. In restricting access to this scheme, and making it so complicated to join and execute, Defra is effectively preventing most farmers from increasing their earning potential and delivering the best value for money to the taxpayer. This is undermining farm viability and inevitably gives rise to calls for top up payments, which is an inefficient use of public funds.

To get ELM back on track, we recommend the following:

- **Reform ELM payments** to reflect the quantity and quality of public goods delivered rather than the income forgone.
- **Set a fair price for public goods.** Defra should assess the carbon price needed to deliver the scale of change required to meet greenhouse gas reduction targets, and use this as the incentive to drive change. As well as being applied across ELM, the same carbon price should be offered under the Woodland Carbon Code and Peatland Carbon Code as they are important and worthwhile schemes but the emissions reductions they deliver are currently undervalued.
- **Level up farm incomes and minimise trade-offs with food production,** by directing most of the ELM budget towards those areas and farm types that have the greatest potential to deliver public goods but which are less well suited to producing food.

Introduction

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If more investment was targeted at farms that produce the least food, meeting national net zero and nature targets would cost the taxpayer less.”

The new Environmental Land Management Scheme (ELM) in England is an opportunity to use public money to increase the incomes of most farms, in exchange for public goods that benefit society.

Under the previous EU scheme, the Basic Payment Scheme, direct payments were made per area farmed, meaning the largest one per cent of farms received as much funding as the bottom 50 per cent. Half of the funding went to just ten per cent of farms.² This left many, particularly small farms in the uplands, effectively earning below the minimum wage.

ELM is a new scheme for England based instead on payments for public goods. Its intention is to reward farmers for delivering benefits to society, such as carbon sequestration, nature restoration and flood mitigation. This is fairer: farms are paid for the benefits they provide, regardless of their size.

But, at present, ELM's payment rates for public goods are based on income forgone, which means arable farms still receive higher compensation than grazing farms. This is unfair and inefficient. If more investment was targeted at farms that produce the least food, meeting national net zero and nature targets would cost the taxpayer less and have a lower impact on food production. By paying for outcomes in this way, the least profitable farms would benefit most: this investment would keep them in business whilst already profitable arable farms could continue to focus on making an income from food production.

In this report, we explore what the future incomes of a range of farm business types could be, following the phase out of the Basic Payment Scheme. We look at the potential of mixing agricultural incomes with payments to reduce greenhouse gas emissions and store carbon. But, rather than basing future payments on income forgone, we instead

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Peatland restoration is only happening at a fifth of the rate needed.”

base our calculations on how much public good, in the form of greenhouse gas reduction, is delivered. We set payments in line with the UK's emissions trading scheme (UK ETS) which, in 2022, offered an average price of £75 per tonne of CO₂. We are not calling for agriculture's inclusion in the ETS, but we use this rate as the value already placed on emissions reduction elsewhere in the economy. This is a conservative rate given the government has estimated that the carbon price necessary to deliver a net zero economy is £252 per tonne of CO₂.³ The UK ETS rate, while lower than this, is still a substantial increase on payments currently offered to farmers for carbon reduction. For instance, carbon credits generated through the Woodland Carbon Code typically attract a price of just £10-20 per tonne of CO₂ on the voluntary carbon market.

We assess returns from planting woodland and peatland restoration. These activities have the greatest potential to reduce emissions from land use, if combined with changes in meat and dairy consumption, which would avoid emissions simply shifting overseas through higher food imports. The Climate Change Committee's 2023 progress report has exposed very slow progress on both fronts. It shows that, across the UK, peatland restoration is only happening at a fifth of the rate needed to meet government targets and the rate of woodland planting needs to more than double.

We also look at agroforestry, which combines tree planting and food production in the same land area. There are many ways farmland could be managed to integrate farming and environmental delivery, but we study agroforestry for its readily quantifiable carbon storage.

In all cases, we do not assess the 'carbon leakage' from food production being moved elsewhere. To deliver genuine emissions reductions, it will be important to avoid any such displacement with simultaneous yield increases or lower meat and dairy consumption. The interventions we have assessed may also benefit the environment in other ways that we do not quantify, such as through creating habitats for wildlife, mitigating flooding or improving water quality. Payments for these public goods could be further sources of farm income.

Analysis of farm incomes, now and in the future

Farm incomes at present

Only arable farms tend to make a profit from food production alone

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Grazing and mixed farms make a loss from producing food.”

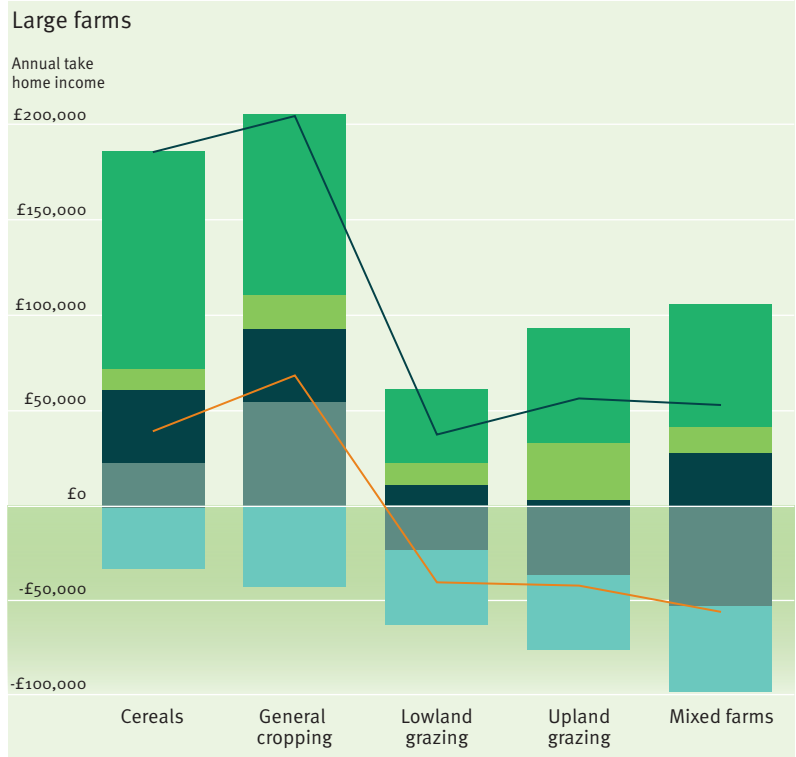
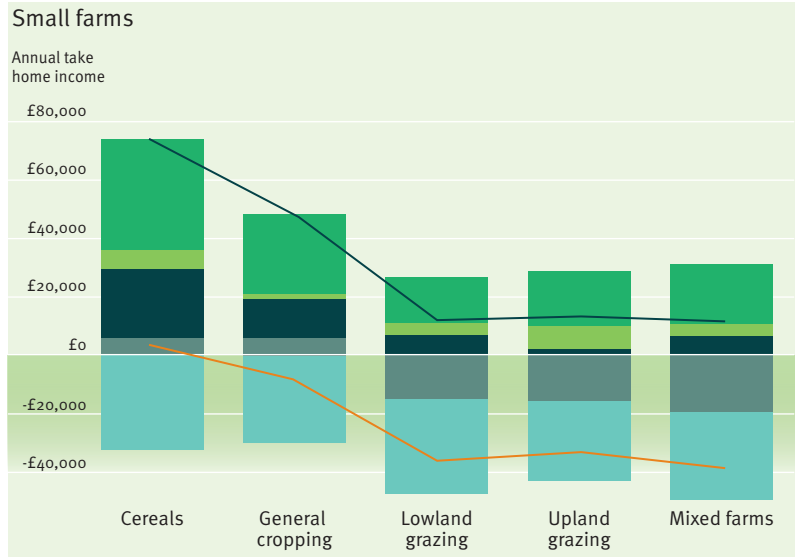
In 2019, direct payments through the Basic Payment Scheme made up more than half of farm incomes. Some, but not all, farms depended on these payments which are being phased out gradually between 2021-2027.

Cereal and general cropping businesses tend to make money producing food. Without direct payments, large cereal and general cropping businesses make a decent profit, even after taking account of the labour provided by farmers and their families, although smaller enterprises make very little. (Here we define cereal farms as those that dedicate more than two thirds of their land to cereals and combinable crops; the remainder of businesses where crops comprise at least two thirds of their output are classified as general cropping farms).

Grazing and mixed farms make a loss from producing food. Even with direct payments, these farms depend on the farmer and their family members working for nothing. Income from diversification and the agri-environment schemes that preceded ELM was not enough to make them profitable without direct payments.⁴

A viable future for grazing and mixed farms depends either on making changes to their food production or focusing more on delivering other services, such as public goods.

Grazing and mixed farms are not profitable without unpaid labour⁵



- Basic Payment Scheme (BPS)
- Agri-environment
- Diversification
- Farming
- Unpaid labour
- Net income including BPS, unpaid labour
- Net income paying labour, less BPS



Payments to store
carbon could make
loss making farms
profitable

Upland grazing farms: planting woodland

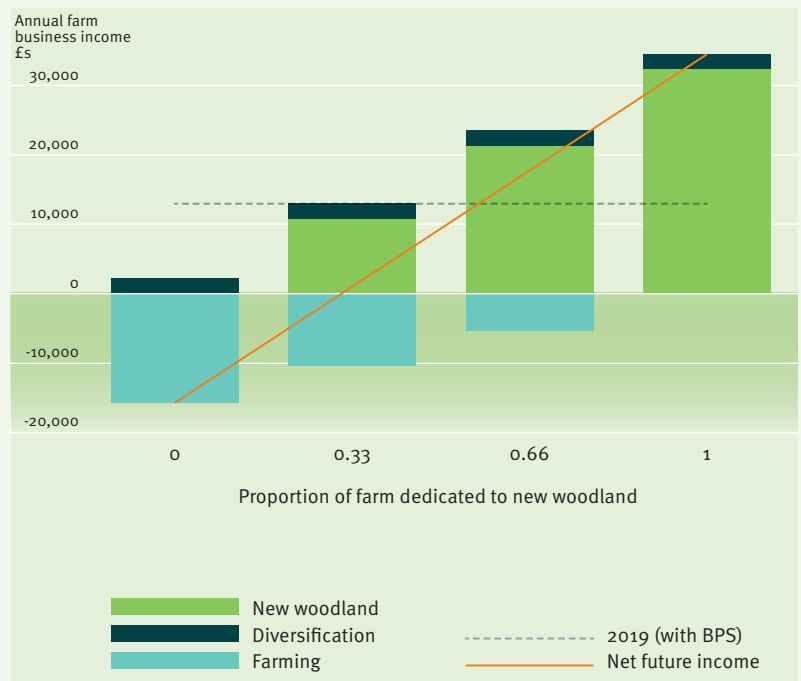
“
Upland grazing farms are generally not viable without direct payments.”

The future of grazing farms in the uplands depends on what ELM has to offer. Even with direct payments and the unpaid labour of the farmer and their family, upland grazing farms earned an average of just £12,700 in 2019. These farms are generally not viable without direct payments, even with income from diversification and the agri-environment schemes that preceded ELM.

Payments for carbon sequestration at £75 per tonne of CO₂ (see full methodology at bit.ly/3FoltN2) could restore these farm incomes to 2019 levels, before direct payments were phased out, if farmers chose to plant native, biodiverse woodland on half of their land.

As the graph below shows, if farms chose to dedicate more land to planting woodland, they could almost treble their 2019 income.

Small upland grazing farms near treble their 2019 income by planting woodland on half their land



Upland grazing farms: peat restoration

Farms on peat soils can reduce their greenhouse gas emissions by rewetting their soils to prevent carbon-rich matter being lost from the soil to the atmosphere.

An upland farm on peat soil, paid at the rate we propose to rewet all their land, could maintain their 2019 income.

Rewetting peat also benefits wetland species so biodiversity payments could add further income, although we have not included this in our assessment.

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Rewetting peat also benefits wetland species so biodiversity payments could add further income.”

Payments for emissions avoided by rewetting see upland peat farms retain their 2019 income despite subsidy withdrawal⁶



Lowland grazing farms: peat restoration

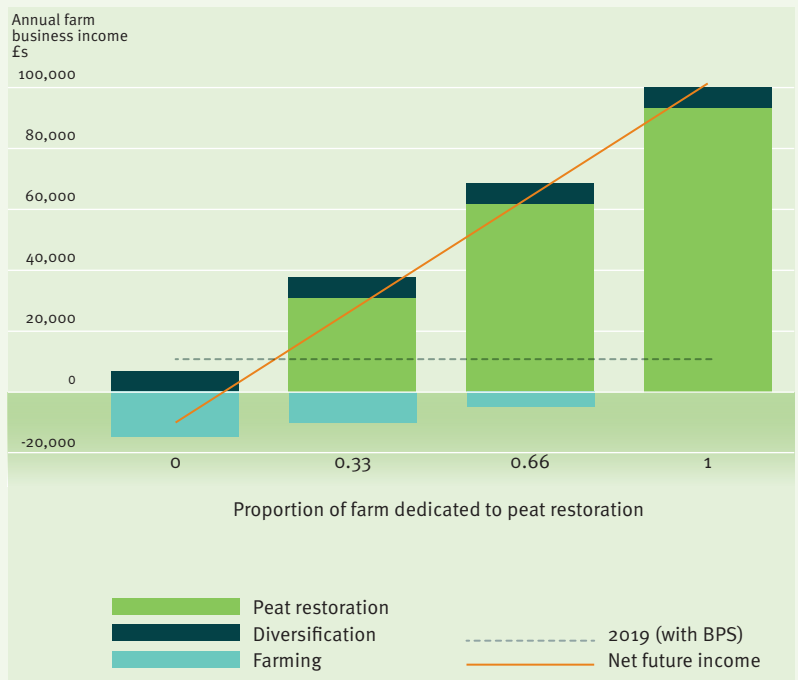
Greenhouse gas emissions from grazed lowland peatlands are far higher than in the uplands.

In 2019, including income from direct payments and agri-environment schemes, small lowland grazing farms made just £4,900 on average. Diversification activities added £6,700, giving an overall average income of £11,600.

There is huge potential to reduce emissions from this land by rewetting it whilst drastically increasing farm income. In an example where a fifth of a lowland grazing farm is on peat soil, the farm could maintain its 2019 income by rewetting just that land, but farms on mostly peat soils have the potential to increase their income eight fold.

“
Farms on mostly peat soils have the potential to increase their income eight fold.”

Rewetting peat could increase lowland grazing farm incomes eight fold



Payments for carbon storage may not attract already profitable farms

General cropping farms: planting new woodland

General cropping farms are economically viable based on food production alone and are important contributors to UK food supplies. Diversification, particularly renting out farm buildings, adds substantially to their income.

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Creating woodland
would not increase
the income of large
general cropping
farms.”**

Creating woodland and being paid for it at the UK ETS carbon price would not increase the income of large general cropping farms since food production is so profitable. However, small general cropping farms could increase their income by dedicating some of their land area to new woodland, though this activity would not make up for the income lost from the withdrawal of direct payments.

Small general cropping farms could earn more from woodland than food production



Woodland creation would not increase the income of large general cropping farms



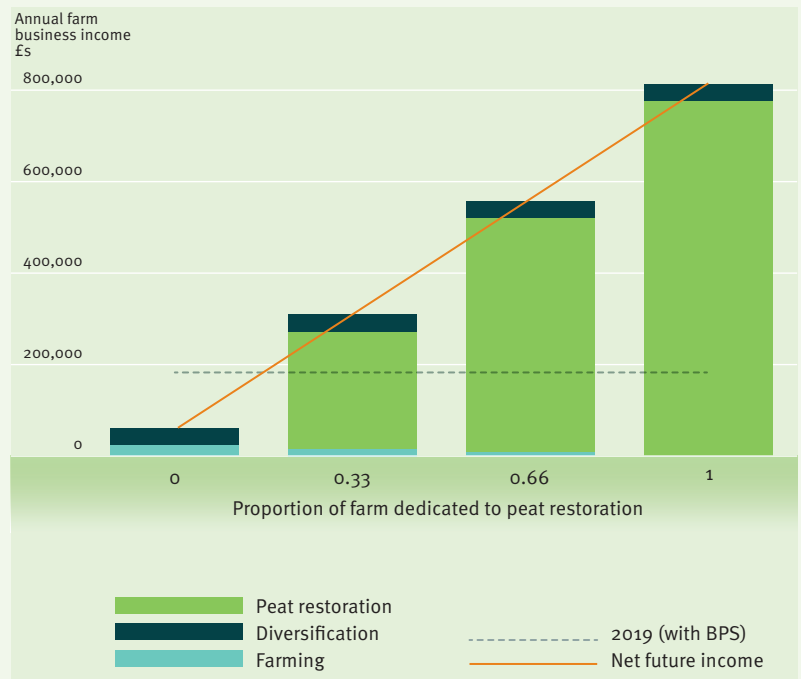
Cereal farms: peat restoration

“**Large cereal farms mainly on peat soils could earn in excess of £800,000 a year by rewetting their land.**”

Cereal farms are profitable on food production alone, but less so than general cropping farms. Though direct support payments added substantially to their income, in 2019 these farms would have earned £61,800 without them. However, the small number of farms on lowland peat produce cereals with a carbon footprint higher than that of soya grown on deforested land in the Brazilian Amazon.⁷

As the greenhouse gas emissions are so high, reducing them by rewetting land would be highly lucrative. Large cereal farms mainly on peat soils could earn in excess of £800,000 a year by rewetting their land. However, farms are likely to need a contract longer than the maximum 10 years currently offered under the Countryside Stewardship scheme to make this substantial change to their business.

Emissions from cereal farms on peat soils are so high that restoration is highly lucrative



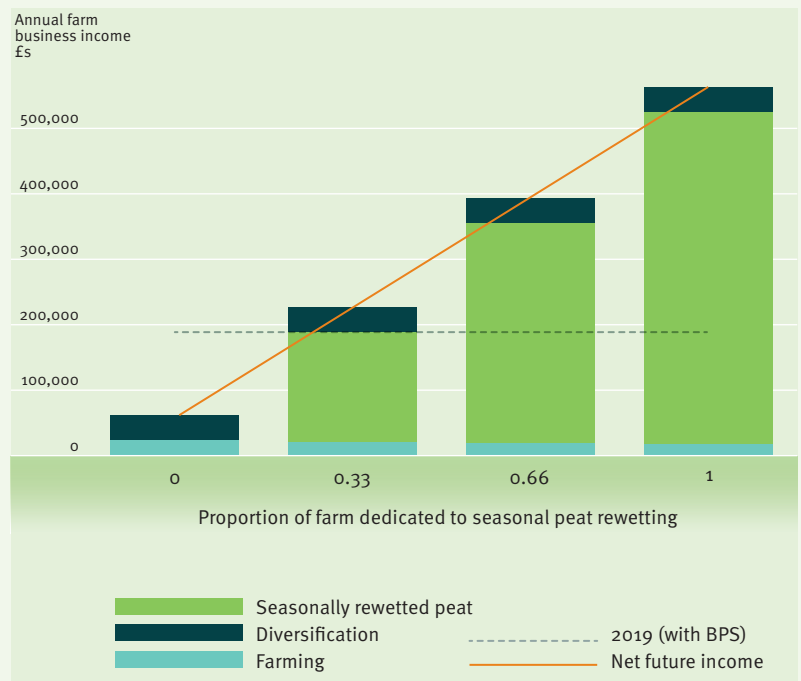
Cereal farms on peat: seasonal rewetting

Although not as profitable as full rewetting, seasonal rewetting could more than double the income of cereal farms on peat.

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Seasonal rewetting could more than double the income of cereal farms on peat.”

Seasonal rewetting means soil is flooded in winter, which reduces emissions, before land is drained to allow for spring sown cereal production. Importantly, milling wheat, which is the most exacting, profitable grade, can be obtained from spring sown varieties.

Rewetting peat soils on cereal farms in winter could increase income whilst maintaining spring cropping



Upland farms are not viable if paid to make small changes that save little carbon

Upland grazing farms: agroforestry

Agroforestry systems introduce trees into grazed or cropped fields. When stored carbon is paid at the UK ETS price, practicing agroforestry will still not earn enough to make upland grazing farms economically viable.

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Practicing agroforestry will still not earn enough to make upland grazing farms economically viable.”

Because the typical agroforestry system we modelled has an eighth of the trees of a mixed woodland, the amount and value of carbon stored is too low to offset losses from grazing livestock.

Payments for any additional public goods generated from agroforestry could add to the income presented here.

The carbon value of agroforestry does not make grazing farms viable



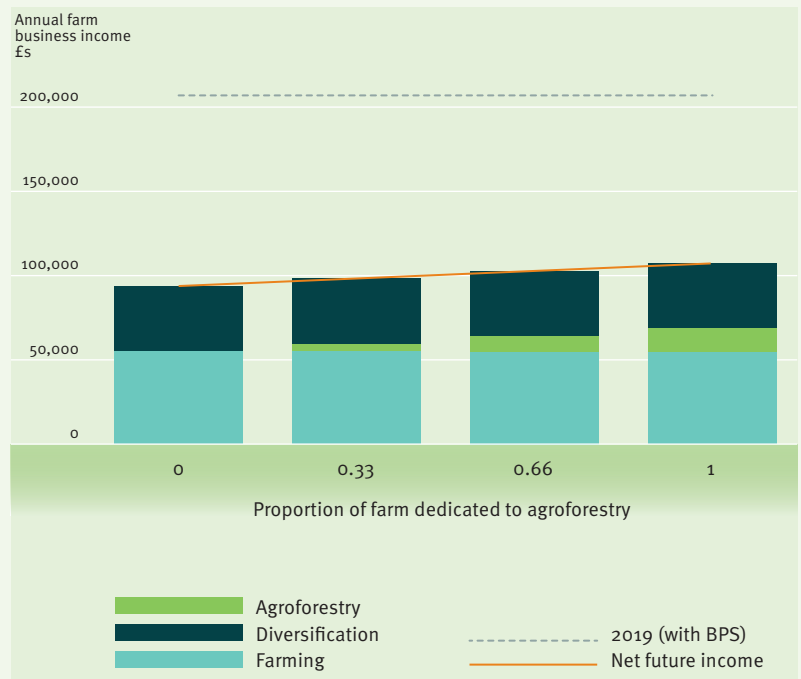
General cropping farms: agroforestry

“**Agroforestry, when carried out for its carbon value, may be unattractive for farms other than possibly as a more stable income stream.**”

The government has a target for agroforestry to cover ten per cent of arable land in England by 2050. The value of carbon stored in these trees would do little more than offset the value of the crops they replace. This suggests agroforestry, when carried out for its carbon value, may be unattractive for farms other than possibly as a more stable income stream than food production.

Payments for any additional public goods generated from agroforestry could add to the income presented here.

The carbon stored by agroforestry adds little additional income to general cropping farms



Conclusions



Changing public support will benefit farms and the environment

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The least profitable grazing farms have the most to gain.”

Our analysis shows that all farms in England have the potential to support viable businesses. Despite the withdrawal of the Basic Payment Scheme, they can be profitable from food production, the delivery of public goods or a combination of the two, provided the public goods are fairly rewarded through ELM.

The least profitable grazing farms have the most to gain from this; dedicating a whole farm to environmental delivery could double its net income. For upland farmers who wish to continue conventional farming, their 2019 income could be maintained while keeping half the farm as grazing land, with the remaining half given over to new, biodiverse woodland. Upland grazing farms on peat soils can also retain their 2019 income by rewetting most of their land.

Farms on the 3% of farmland that is lowland peat could greatly profit from payments to reduce emissions. Greenhouse gas emissions are so high from lowland grazing farms that full rewetting could raise their incomes eight fold. Highly profitable arable farms on lowland peat soils produce food with a higher carbon footprint than soya from deforested land in Brazil.⁸ Fully rewetting the soils on these farms and paying to avoid the carbon emissions would raise their already profitable incomes from £200,000 per year to over £800,000 a year. On other soils, creating woodland would also increase the incomes of small general cropping farms, even though food production is profitable, though large general cropping farms make more from food production than they would from creating woodland.

This raises important questions around balancing food production with other national priorities that the government will need to resolve in its forthcoming Land Use Framework. If highly productive farmland is turned

“ELM will fail in its mission if its budget is mostly spent on untargeted, small scale, low impact interventions.”

over to woodland or rewetted it will reduce the capacity for food production. Our work suggests prioritising peat rewetting on lowland grazing farms and on lowland cereal farms that produce animal feed, in combination with substituting some meat and dairy products for alternative proteins, is likely to be the best way to decarbonise the agriculture sector without having to offshore UK food production. For this reason, it would also make sense to concentrate new woodland on upland farms.

Our analysis also shows that agroforestry is less financially attractive when paid for the carbon sequestration it provides. It stores relatively little carbon compared to woodland, so the payments for carbon would be insufficient to compensate for grazing income (which is already loss making) and it would do little more than substitute the value of crop production lost on arable farms. This suggests the government could struggle to hit its Carbon Budget Delivery Plan target to attract farmers to dedicate ten per cent of arable land to agroforestry, unless the payments offered were greater than the UK ETS carbon value. This would increase the cost of net zero to the taxpayer, and it would mean upland farmers once again lose out in a scheme that gives comparatively higher payments to lowland arable farmers.

Ultimately, ELM will fail in its mission to increase public goods from land if its budget is mostly spent on untargeted, small scale, low impact interventions, such as those supported under the Sustainable Farming Incentive. Persisting with this approach simply gives greater income to the large arable farms that are already profitable without subsidy, in return for little in the way of public benefit.

Under the current version of ELM, grazing farms have little option but to try to compensate for losing money on food production with relatively low return, low environmental impact actions on their farms. As our analysis shows, their prospects could be turned around if given the opportunity to reorientate their business around targeted delivery of high value environmental interventions that will cut more carbon emissions and slow nature decline, both of which have direct economic and social benefits.

For ELM to be able to fulfil its original purpose to benefit farmers and the environment, we recommend the following three changes to the scheme:

- **Reform ELM payments** to reflect the quantity and quality of public goods delivered rather than the income forgone.
- **Set a fair price for public goods.** Defra should assess the carbon price needed to deliver the scale of change required to meet greenhouse gas reduction targets, and use this as the incentive to drive change. As well as being applied across ELM, the same carbon price should be offered under the Woodland Carbon Code and Peatland Carbon Code as they are important and worthwhile schemes but the emissions reductions they deliver are currently undervalued.
- **Level up farm incomes, and minimise trade-offs with food production,** by directing most of the ELM budget towards those areas and farm types that have the greatest potential to deliver public goods but which are less well suited to producing food.

Endnotes

- 1 We have used the average 2022 carbon price in the UK's ETS to reflect the value awarded to emissions reduction elsewhere in the economy. We are not calling for agriculture's inclusion in the ETS.
- 2 I Bateman and B Balmford, 2018, 'Public funding for public goods: a post-Brexit perspective on principles for agricultural policy', Land use policy, issue 79, pp 293-300
- 3 £252 per tonne of carbon dioxide is the central series value for 2023. From: Department for Energy Security and Net Zero, 2021, 'Valuation of greenhouse gas emissions: for policy appraisal and evaluation'
- 4 Diversified income includes letting buildings for non-farm use, tourism, solar and other renewable energy. We assume that diversified income remains constant, regardless of the level of habitat creation on farms. A minority of diversified income, approximately a tenth, comes from retailing and processing farm produce. This fraction would decline if part of the farm is given over to habitat creation. Habitat creation, in the form of new woodland or peat restoration, however, would open new streams to diversify income so we assume the fraction lost to retailing and processing farm produce would be replaced by other activities, such as renting out farm buildings, tourism or recreation facilities.
- 5 Graphs based on Defra, 2020, 'Farm accounts in England – dataset'. The incomes presented throughout are after the deduction of fixed and variable costs, besides the 'unpaid labour' of farmer and their family.
- 6 Farms on peat may have disproportionately higher 2019 incomes due to above average income from agri-environment schemes, eg farms in the Forest of Dartmoor participating in Higher Level Stewardship agreements.
- 7 Green Alliance, 2023, *The carbon footprint of crops grown on English peatland*
- 8 Ibid

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