



The future of British farming outside the EU

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Executive summary

This report sets out six proposals for domestic agricultural policy after the UK leaves the EU. These are game-changing ideas that have the potential to transform farming and land use at the scale and pace required to meet multiple challenges - from tackling climate change and nature degradation to supporting rural livelihoods and improving public health. Every farming practice we talk about here already happens on the ground in the UK, but is currently the exception rather than the norm.

There is growing consensus on some of the key principles that should underlie new policy:

- We need to maintain high environmental and farm animal welfare standards.
- Public money should pay for public goods such as clean water, farmland wildlife, carbon storage and reducing greenhouse gas emissions.
- Government should maintain the overall annual farm payment budget of around £3.2 billion.
- We need a joined up approach that looks at land in the round – farming, forestry, water, wilderness – taking account of public health, food poverty and international development.
- Policies must work for farmers and growers, and help them move towards sustainable business models.
- We need a renewed focus on supply chains to improve resilience, farmer incomes, and environmental sustainability.
- Public participation in debate and decisions on the future of farming is critical.

Proposal 1: a national agroforestry strategy

Agroforestry brings trees into fields. They can be in neat rows through crops like wheat, dotted through pasture like parkland, or planted closer together to provide cover for plants or animals.

Agroforestry is game-changing because it can increase yields and farm profitability, boost resilience through diversity, and deliver big environmental benefits at the same time. At scale, it would dramatically help mitigate soil erosion, nitrogen leaching, and biodiversity loss while increasing carbon sequestration.

To deliver these benefits, the government should work with the agricultural, forestry and land use sectors to develop a national agroforestry strategy. This should include:

- A target of agroforestry on 50% of all farms by 2030.
- Clear ownership and accountability within government.
- Capital grants and maintenance payments.
- Fiscal measures and procurement policies to grow the domestic market.
- Incentives for longer term farm tenancies.
- Investment in research, knowledge exchange and advice.

Proposal 2: investing in soil

The fundamental importance of soil health to farm productivity, food security, climate change and public health has been neglected by government for far too long. Recent statements from UK ministers on soil health are welcome, but have not been matched by action.

The government's existing soil health commitments provide a starting point for a new UK policy framework: the global *4 per 1000* soil carbon initiative, aiming to increase soil organic carbon by 0.4% each year; and the aim for all English soils to be managed sustainably and degradation threats tackled successfully by 2030.

Strong policies to restore and protect soil health in the UK's post-CAP agricultural framework should include:

- Soil stewardship payments to incentivise farmers to increase the organic matter in the soil – including through existing farm assurance schemes such as organic and LEAF.
- Regular soil organic matter monitoring and reporting by farmers to form a well-maintained national database, alongside investment in soil health research, data collection and monitoring.

- Encouraging soil health improvement by making it a requirement of tenancies that soil health is not degraded during their term.
- A nitrogen budget for each nation of the UK - following Scotland's lead.
- Modelling and piloting of new mechanisms to lower nitrogen such as fiscal measures.

Proposal 3: a tipping point for organic

The public benefits delivered by organic farming have been well documented by independent research over decades. They include more wildlife and biodiversity, healthier soils and carbon storage, flood protection, clean water, lower pesticide and antibiotic use, more jobs and healthier food.

While only 3% of farmland in the UK is organic, British consumers are demanding more organic produce, with the UK organic food and drink market seeing four years of successive growth. With organic farmland more or less stable, much of this growth is being met by imports, particularly of raw materials for animal feed.

In some other countries, organic farming accounts for up to a fifth of production, and sets new norms for policy, business and the public. Reaching such a tipping point would be game-changing. We propose an organic strategy for England, developed by government in partnership with the organic sector, which includes:

- An expansion of organic promotion and marketing – including opportunities for export.
- Maintaining, improving and expanding the organic conversion and maintenance payments, as currently operating under Countryside Stewardship for England.
- A particular focus on increasing production of home-grown organic fruit and veg and animal feed, to meet demand and reduce the high reliance on imports.
- Better procurement policies (see also Proposal 6).
- Assessing the expansion of organic and other certification systems as a gateway to automatic eligibility for farmers to receive payments.
- Research, innovation, knowledge sharing through 'field labs' and farming advisory services.
- Encouraging agricultural colleges to offer more courses in organic and agroecological farming practices alongside new organic apprenticeships.
- Maintaining the legal base for organic standards, ensuring alignment with the EU organic regulation.

Proposal 4: a good life for farm animals

Insisting on a good life for all farm animals as a core part of post-Brexit agricultural policy would be game-changing. It would mean switching to better farming systems, not just making tweaks, also brings benefits to public health through dietary changes.

The Farm Animal Welfare Council defines three levels of welfare: a life not worth living, a life worth living, and a good life. A good life involves more than simply being free from pain or disease. It means ensuring animals have the choice to feel the sun on their backs and to follow their urges to care, graze, root and play.

The scale of indoor, intensive farms is increasing, pushing out smaller family farms to make way for industrial systems that affect local communities and the environment as well as the animals themselves.

We propose that the UK sets the ambition that all farm animals should have a 'good life' within ten years. Hand-in-hand with stronger regulation, this will require public investment to help farmers adjust their infrastructure and businesses. This will require:

- Defining a good life by urgently supporting the development of a rigorous framework that can score farms, supply chains and assurance schemes against the tiers set out by the Farm Animal Welfare Council.
- Mandatory method of production labelling to empower consumers, level the playing field and allow more farmers to shift from volume to quality production.
- Banning the routine, preventative use of antibiotics in livestock farming and strict targets to reduce farm antibiotic use 50% by 2020, and 80% by 2050.
- Incentives and funding to make the transition to extensive, high welfare farming systems, ensuring such systems are the most attractive option for farmers and investors.

Proposal 5: back farmer innovation

The success of UK agriculture post-Brexit will depend on innovation by farmers. Policies should recognise and support this.

The starting point is that thousands of UK farmers already investigate, experiment, design and develop. Helping them share the risk and increase the rigour of this would benefit all of agriculture, at relatively low cost.

The UK spends around £450 million a year on agricultural research and innovation. Only a fraction of this, perhaps as little as 1%, goes to practical projects led by farmers. We propose:

- A dedicated farmer innovation fund with a budget of at least 10% of the UK's public agricultural research and development budget.

- Innovation support services to help farmers apply and make the most of new funds, building on experience from other countries of doing this through the European Innovation Partnership (EIP-Agri), and of home-grown initiatives such as Innovative Farmers.
- Rewarding practical research by incentivising individual researchers and institutions to pay more attention to the impact of their research, for example, through awards schemes for researchers working on farmer-led projects; training; and involvement of farmers and practitioners in reviewing research grant applications.

Proposal 6: making the most of public procurement

Making the most of public procurement could be game-changing. The UK public sector serves some 3.5 million meals each weekday across settings as varied as schools, nurseries, care homes, hospitals and prisons. In total, the UK public sector spends £2.4 billion each year procuring food and catering services.

While the cost of sourcing higher quality ingredients is perceived as a barrier, this can be counterbalanced by re-formulating menus. 71% of public sector institutions meeting Food for Life Served Here criteria report the implementation was cost neutral and 29% report overall cost savings. Research by the New Economics Foundation demonstrated £3 in social return for every £1 invested in Food for Life, with most of the benefit experienced by local businesses and local employers.

The UK could improve the health and food habits of the next generation by further upping ambitions for school food. It could also help drive demand for food that meets the highest standards, helping to achieve economies of scale in processing and lowering consumer prices. Government should help make this happen by:

- Implementing the Balanced Scorecard approach across the whole public sector - not just central government.
- Requiring public procurement decisions to place a weighting of at least 60% on quality, with price not to exceed a 40% weighting.
- Comparing the cost-effectiveness of delivering public benefits through direct agri-environment payments to farmers compared with growing the demand for assured products such as organic through public procurement – with a view to topping up public catering budgets where cost is a genuine barrier.
- Using schemes such as Food for Life Served Here for independent verification, to increase the uptake of assurance schemes and grow the market for more sustainable farming and food.

Introduction

In June 2016, the referendum put the UK on a path towards leaving the European Union. Whether viewed as a tragedy or a triumph, there is little doubt that Brexit represents major risks for the future of British farming, alongside potential opportunities.

The greatest risks are beyond the reach of agricultural policy alone.¹ They include trade deals that erode health, environmental and animal welfare standards, and budget cuts that make it impossible to secure essential public goods such as clean water. Everyone who cares about farming, food and the countryside shares an interest in protecting our standards and public investment, from conservation groups to consumer champions and the farming industry.

Yet the policies we make specifically about agriculture are vitally important. For decades, the EU Common Agricultural Policy (CAP) has wrapped our farming in a blanket. It has helped provide stability for many farm businesses, a consistent food supply and support for rural communities, and it has contributed increasingly to the conservation and protection of the environment. However, as most of its budget pays landowners simply for the area they farm, it has also smothered efforts to tackle the challenges we face through food and farming (Box 1).

Box 1: challenges for food and farming

While not exhaustive, the following present major challenges:

Climate change - Agriculture plays a critical role in both causing and combatting climate change. Collectively, agriculture, forestry and other land uses account for 24% of global greenhouse gas emissions and, in 2014, the UK's agricultural sector was responsible for 49.1 million tonnes of carbon dioxide equivalent (CO₂e), around 9% of total national emissions.^{2 3} For the UK to achieve its climate goals, our agricultural practices will have to change dramatically. Isolated islands of good practice and innovation are simply not enough to achieve anything close to the changes required. We will need to reorient our farming and food system very considerably if we are to mitigate and adapt to the realities of climate change.

Soil health - Almost a third of the world's arable soils have been lost to erosion and pollution over the last 40 years, and it will take hundreds or thousands of years for these degraded soils to recover naturally.^{4 5} In the UK, we lose an estimated 2.2 million tonnes of topsoil each year, costing around £45 million per year, of which £9 million is in lost production.⁶ The depletion of soil nutrients results in lower yields for farmers, sometimes driving higher fertiliser use, which in turn encourages further soil degradation.

Clean water and flood protection - Our degraded soils are unable to retain water effectively. When rain falls, the water cannot be absorbed, creating excessive and increasing flooding, which is of deep concern when we are seeing an increase in extreme weather events. Partly due to poor management practices, agrochemicals

– such as fertilisers and pesticides - and slurries run off farmland to pollute streams and rivers. Of the 24 megatons of phosphorus fertilisers applied each year, less than 15% is actually absorbed by crops.⁷ These chemicals have created hypoxic dead zones in oceans and rivers.

Wildlife and biodiversity - Industrial agriculture has created devastating environmental impacts globally and in the UK. Biodiversity has decreased and local wildlife species are being pushed to extinction.⁸ As agricultural systems have changed, local habitats (such as woodlands and hedgerows) have disappeared. Hedgehogs, honeybees and birds are increasingly under threat, with an overall decline in wildlife species of 56% since 1970.^{9 10}

Rural economies - UK farms provide more than just food; they are the beating heart of our rural economy and an essential part of our culture and heritage. The farming and food sector provide 3.9 million jobs nationally, with agriculture, forestry and fishing accounting for 15.6% of all rural businesses.^{11 12} However, rural economies are increasingly under pressure with farming communities facing new tensions. Farmers are increasingly reliant on migrant labour, predominantly from Eastern Europe, and are already struggling to find workers.¹³

Food security - Despite shocking rates of food waste, the UK has unacceptably high rates of food poverty. While an estimated 10 million tonnes of food is wasted annually in the UK, 8.4 million British people are food insecure.^{14 15} In 2015/16, use of Trussell Trust foodbanks hit a record high, with over one million emergency three-day food packages distributed over the year.¹⁶ There have been warnings that this situation could now worsen due to inflation, a lack of farm workers, and less favourable trade arrangements.^{17 18 19}

Public health - Farming, food and public health are intimately linked. Poor diet is the number one driver of ill-health around the world, ahead of smoking.²⁰ In the UK, almost two-thirds of adults and one third of children aged 10-11 are overweight or obese.²¹ The economic costs of our increasingly unhealthy lifestyles are huge too, with obesity alone estimated to cost the UK economy £47 billion per year, around 3% of the UK's GDP.²² Poor diet is also responsible for a host of medical conditions including diabetes, increased blood pressure, heart disease, stroke, tooth decay and some cancers.²³ Treatment is costing the NHS considerably.²⁴ Changes in dietary habits could dramatically reduce the incidence of these diseases. Additionally, widespread and excessive antibiotic use in livestock has contributed to a crisis in antibiotic resistance. Farm animals account for 40% of all UK antibiotics doses, primarily for preventative purposes.²⁵ An estimated 5,000 people die each year from antibiotic resistance illnesses in the UK.²⁶

The challenges are monumental, and topping them is climate change. In signing the Paris climate change agreement, the UK has pledged to reduce greenhouse gas emissions drastically, reaching zero net emissions in the latter half of this century.²⁷ Covering three-quarters of our countryside, farming has more potential than almost any other industry to give more back to nature than we take, and to be our green lungs.²⁸ However, as other sectors make greater progress in reducing their carbon emissions, agriculture is set to account for an ever growing share of

the UK's contribution to climate change.²⁹

When we leave the EU, the blanket comes off. In its place, the UK needs a set of policies that help our farming, countryside and rural communities adjust fast to address these challenges, in everyone's interest.

What would that look like in practice? And what policies would help get us there?

There is growing consensus on some of the key principles that should underlie new policy:

- The public expects high environmental and farm animal welfare standards – higher, in many cases, than our farming currently ensures – and a race to the bottom on standards would anyway damage exports, which are a priority for Government.³⁰
- Public money should pay for public goods. These include clean water, healthy soil, higher levels of farmland wildlife, improving public health, mitigating climate change and flooding, good animal welfare and a beautiful countryside. It will be impossible to argue that public money should go to farmers simply because of the number of hectares of land they own or control.
- We won't succeed on the cheap. It would take at least the current £3.2 billion that UK farmers currently receive under the CAP to reverse the declines in wildlife, properly tackle climate change, and make the transition to a fair and resilient farming system.
- We need a joined up approach that looks at land in the round – farming, forests, water, wilderness – and takes the wider impact of policies on health, food poverty and international development into account.³¹
- To work for the public, our policies must also work for farmers and growers, and recognise that some are locked into unsustainable business models by long term investments in buildings, equipment and markets. They need help to reorient their businesses or pass on to successors. Telling farmers to 'sink or swim' will do no favours for the environment and animal welfare.
- We need a renewed focus on supply chains - from field to plate - to tackle waste, improve environmental sustainability, prioritise public health, pay farmers a fair price, support local economies, build resilience, and guarantee transparency and public trust in food and farming.
- We all have a stake in the future of our countryside - from farmers to city-dwellers - and this process must be open and inclusive. We must invite the participation of as broad a group as possible in order to secure future policies that reflect the public's voice.

We could respect all these principles and still fail to meet those monumental challenges. We could make a new blanket, better but in much the same pattern. So what we really need now, beyond these principles, are some game-changing ideas – ideas that have the potential to transform the UK's farming and land use on the scale and pace required.

In this report we propose six such ideas:

- Developing agroforestry at scale
- Investing in soil
- Taking organic farming to a tipping point
- Ensuring a good life for farm animals
- Backing grassroots innovation
- Making the most of public procurement.

We explain why each is potentially game-changing. Yet they are all achievable. Every farming practice we talk about here already happens on the ground in the UK, but is currently the exception, rather than the norm.

We have described these measures as UK-wide. However, we make no assumption about which areas of policy will be devolved, and we recognise that the devolved governments are already leading the way in some of the areas where we make proposals.

Taken together, the measures we propose would set a course towards meeting the UK's climate change commitments; aligning domestic policy with the UN Sustainable Development Goal 2 that focuses on hunger, food security, nutrition, and sustainable agriculture,³² and providing the other benefits that society needs and expects from farming and the countryside.

Proposal 1

Agroforestry at scale

The familiar patchwork of the British countryside hides an extraordinary possibility – that growing our food could one day return more to nature than we take.

Farms vary greatly in their management and impact, economically, socially and on the environment. The Land Use Policy Group compared practices across numerous UK farms to consider how farmers have been able to increase yields while, as a direct outcome, reducing negative impacts on the environment.³³ Yet the contrast is even greater with woodland, which sequesters significant amounts of carbon while providing habitats for wildlife, improving water levels and making our countryside more beautiful. So what if our fields were more like our forests?

Agroforestry brings trees into fields. They can be in neat rows through crops like wheat (Box 2), dotted through pasture like parkland, or planted closer together to provide cover for plants or animals. Agroforestry is game-changing because it can boost productivity and provide big environmental benefits at the same time.

Box 2: agroforestry at Whitehall Farm

Whitehall Farm covers 120 hectares of fenland near Peterborough, Cambridgeshire, and is managed by tenant farmers Stephen and Lynn Briggs. The farm had been managed as intensive arable, but entered organic conversion in 2008/9.

In a bid to utilise space, increase productivity, safeguard against variable and extreme weather, and manage the significant soil erosion typical in the Fens, the Briggs adopted an agroforestry system.

They developed 60 hectares into an apple orchard/crops system in October 2009 with 4,500 apple trees, consisting of 16 varieties (10 commercial and 6 traditional) planted in rows 27 metres apart, with 3 metre spacing of trees within rows.

Before the tree planting, the understorey was sown with a 3 metre band of nectar flower mixtures, wild bird seed mixtures and legumes. The 24 metre alleys between the rows of trees are cropped on an organic rotation that includes cereals, field vegetables and fertility-building leys.

In addition, a controlled traffic system was developed to work alongside the alley-cropping, in order to reduce soil compaction.

The trees have helped to reduce wind velocity at ground level and soil erosion, and research is underway to quantify the impact that this has had. Biodiversity has improved, with increased species abundance and distribution.

A baseline survey of the farm was carried out before the agroforestry was implemented which included a botanical and bird survey. RSPB monitoring shows a positive impact on farmland birds especially tree sparrows, reed bunting, English partridge, barn owls and little owls.

Growing two crops from the same land - for example, rows of fruit trees in cereal crops, or productive hedges through pasture – can yield more than growing them separately and increase farm profitability.

The overall increase is measured by the Land Equivalent Ratio (LER). Studies of different agroforestry systems, in countries with similar climates to the UK, have found LERs ranging from 1 - 2.01.³⁴ The implications are dramatic. Combining commercial forestry and farming with LER of just 1.1 would release 10% of the area involved, whether for woodland, rewilding or farming less intensively, for example reverting from crops to pasture.³⁵

Such a shift would bring substantial environmental benefits. The adoption of agroforestry could dramatically help curtail soil erosion, nitrogen leaching, and biodiversity loss while increasing carbon sequestration to help mitigate agricultural carbon emissions, estimated to be 49.1 million tonnes of CO₂e per year.^{36 37} To optimise environmental benefits, larger portions of the better quality land should be converted to agroforestry.³⁸

Agroforestry can help mitigate climate change by sequestering carbon. In maritime climates such as the UK, the widespread adoption of agroforestry would result in estimated average emissions reduction of 0.51 tonnes CO₂ per hectare per year.³⁹ If agroforestry were expanded to cover just 2.3% of agricultural land by 2050, accompanied by woodland creation averaging 30,000 hectares per year, this would reduce greenhouse gas emissions by 16 million tonnes of CO₂e annually in 2050 according to the Committee on Climate Change.⁴⁰

Studies of the impact of silvoarable agroforestry systems across Europe have highlighted the substantial benefit that agroforestry can bring. One study showed an average 65% reduction in soil erosion (when combined with contouring practices) and, in areas of high nitrogen leaching, a 28% reduction could be achieved with the dense planting of trees.⁴¹ Moreover, beyond simply mitigating soil loss, agroforestry systems improve overall soil health by encouraging soil formation and aiding nutrient recycling.⁴²

Agroforestry can similarly benefit wildlife and help to increase biodiversity by an average factor of 2.6.⁴³ Increasing the habitats available to pollinators, birds and other animals can help protect them and, additionally, the trees provide shelter for livestock that might have otherwise been left exposed. This protection not only improves the standard of animal welfare, especially for pigs and poultry, but can increase productivity too.

Given these benefits, what's stopping agroforestry? The barriers include:

- Long lead times and cash flow problems for farmers before production begins.
- Costs of harvesting and labour availability.

- Lack of UK processing capacity for some agroforestry products with significant growth potential such as nuts.
- Short farm tenancies.
- Insufficient information and knowledge about agroforestry among farmers and in rural communities.
- Lack of coordination between government departments and bodies.⁴⁴

While agroforestry is increasingly supported by the UK's devolved administrations and in other European countries (Box 3), English farmers face obstacles in accessing support.⁴⁵ A review by the Department for Environment Food and Rural Affairs (Defra) is underway.⁴⁶

Box 3: agroforestry in France

In 2016, the French government unveiled a bold new national strategy for the development of agroforestry to 2020.⁴⁷ The plan consists of 23 actions, split among five separate themes addressing:

Knowledge and information sharing

This will include actions to improve data collection and monitoring, evaluation, knowledge-sharing and establishing strong farmer networks.

Regulation and finance

To include proposals for grant schemes, consideration of tax incentives to encourage investment, encouraging agroforestry development for support payments, and strengthening relationships between landowners and farmers.

Advice and training

Including the provision and strengthening of specialist training, advice and knowledge sharing services, and dedicated promotion of agroforestry systems.

Increasing economic value of agroforestry products

To include the development of supply chains that add value to agroforestry products, developing synergies with quality assurance labels, developing recognition of sustainably managed agroforestry wood and a national scheme for the production of locally sourced tree and bush plants.

Promoting agroforestry internationally

This will involve concerted efforts to engage in advocacy, research and knowledge-sharing at an EU and international level, and to highlight the value of this French national strategy.

In addition, the plan establishes a steering committee for ongoing monitoring and evaluation.

Recommendation: a national agroforestry strategy

A national agroforestry strategy should be at the heart of a new sustainable land use policy for the UK.

This strategy should draw on UK and international experience. It should be led by Defra, working closely with the devolved administrations and the Forestry Commission. It should be drawn up with input from farmers, foresters, civil society organisations and the public. Public engagement is crucial because agroforestry will affect what our countryside looks like.

The strategy should include the following elements.

Ambitious targets

A bold target would raise awareness, signal priority, encourage behaviour change and provide a basis for measuring progress.

While the benefits will ultimately depend on how many hectares are in agroforestry, the first step is to start making it a normal farming practice, so it makes sense have a target for the number of farms with agroforestry. France aims to have agroforestry on 50% of farms by 2025.⁴⁸

We propose that the UK should adopt an initial high-level aim similar to France, but aligned with the UK's 2030 targets for climate change and soil health: to have agroforestry on 50% of UK farms by 2030.

Clear ownership within government

Agroforestry has been neither fish nor fowl, with officials and industry bodies associated with farming and forestry in England struggling to recognise or support its benefits.

A national agroforestry strategy should clearly assign ownership within government, establish links across the agricultural, forestry and land use sectors, and ensure ministers are accountable for delivering on its objectives.

Financial support for the uptake and maintenance of agroforestry

Agroforestry needs to be encouraged by our environmental stewardship schemes post-CAP. A promising model is the Scottish Rural Development Programme, which provides capital grants of up to £3,600 per hectare and five-year maintenance payments of up to £84 per hectare, per year, depending on tree stocking density.⁴⁹

Interim financial support should also be made available under the current England Rural Development Programme. Defra has reviewed the evidence base for agroforestry and how the agroforestry measure could operate within the Rural Development Programme.⁵⁰ Government should publish and act on this review.

Encourage private investment and market development

Private investment in agroforestry is low, due in part to the delayed return on investment before trees become profitable.⁵¹

The national agroforestry strategy should contain measures to encourage investment in agroforestry systems and products, such as favourable tax incentives, and grow the domestic market for forestry products, including through public procurement (see Proposal 6).

Provide incentives for longer farm tenancies

Short farm tenancies have an impact on many land management practices, and particularly on decisions about long-term investments such as agroforestry. Increasing farmers' confidence over future tenure would encourage more long-term strategies and planning.

Implementing the measures proposed by the Tenant Farmers Association for longer and more sustainable farm tenancies -such as restricting 100% inheritance tax relief to landlords prepared to let for more than 10 years – would incentivise such a shift.⁵²

Support for farmer networks, knowledge transfer, advice and research

In order for agroforestry to become and remain a viable mainstream farming system in the UK, investment must be made in research, knowledge exchange and advice. This should recognise that, while agroforestry is relatively easy to establish in livestock systems, it requires more management and planning on arable farms.

Proposal 2

Investing in soil

The fundamental importance of soil health to farm productivity, food security, climate change and public health has been neglected by government for far too long. Recent statements from UK ministers on soil health are welcome, but have not yet been matched by policies to deliver the government's stated ambition to manage all soils sustainably by 2030.⁵³

A key measure of soil health is levels of soil organic matter (SOM). Good levels of SOM are crucial to everything from long-term yields and the quality of food grown, to resilience to extreme weather and soil erosion, and as a vital store of soil carbon.

Increasing soil organic matter in arable and horticultural soils would be game-changing (Box 4). For example, in degraded soils with currently just 1-2% organic matter, a 20% increase in SOM over the next 20 years would increase the water holding capacity by 40,000 - 100,000 litres per hectare.⁵⁴ Increasing SOM also increases soil carbon. A global meta-analysis found that organic farms store, on average, between 0.27 and 0.45 tonnes more carbon in topsoil per hectare, per year thanks to higher SOM.⁵⁵ Taking the lower estimate, an increase of 0.27 tonnes per hectare across the UK's arable and horticultural soils and temporary grassland could see an additional 1.65 million tonnes more carbon stored each year.⁵⁶ This is roughly equivalent to taking 1.3 million cars off the road.⁵⁷

We know that increasing SOM by 20% is a realistic target because, on average, it is the difference that organic farmers in North-west Europe already achieve.⁵⁸

Box 4: rebuilding organic matter at Lower Smite Farm

Lower Smite farm has been owned by the Worcestershire Wildlife Trust since 2001. Caroline Corsie took over the farm in 2008 and quickly started improving the farm's soil health and enhancing the wildlife value of the farm, two factors she believes are closely linked.

Before Caroline's involvement, Lower Smite was farmed as a non-organic arable farm. At best the farm was only on the edge of profitability, but since changing to an organic and more sustainable system, Lower Smite is able to pay for itself. Caroline is currently seeking to supply local organic farmers with cereals and field beans for livestock.

Over the first five years of Caroline's work, through a combination of practices such as longer rotations, herbal leys, green manures and carefully managed grazing, she has lifted the organic matter content of her soil by 20%. Her baseline average over the farm when she started was 2.5% and it is now at 3%. In one field with an SOM content of 3.2%, Caroline's use of green waste compost raised organic matter to 7% in just one year. Two years later, with no further applications of green compost, SOM content was still at 5.2%.

The government's existing soil health commitments provide a starting point for a new UK policy framework:

- The *4 per 1000* soil carbon initiative, which the UK signed at the UN Climate Change Convention in Paris.⁵⁹ This aims to increase global levels of soil organic carbon in all soils by 0.4% each year, and commits participants to increase their soil carbon stock.
- The government's own aim for all English soils to be managed sustainably and degradation threats tackled successfully by 2030 – initially set out in 2009 and restated in 2016.^{60 61 62}

As a recent parliamentary inquiry found, these current commitments are not being met.⁶³ In response to proposals for an EU Soil Framework Directive, the UK government insisted that no action should be taken at EU level, as safeguarding soils could safely be left to national governments. Yet it has not delivered.

What is stopping progress on soils? Given that healthy soils boost productivity and resilience, don't farmers have a stake in improving SOM in spite of this policy failure?

A key factor is cheap and plentiful nitrogen fertiliser. Applying ammonium nitrate at £240 per tonne is often cheaper, at least in the short term, than building soil fertility using cover crops which fix nitrogen from the air and leave organic matter in the soil.⁶⁴ The more farmers rely on synthetic nitrogen, the less they rely on a healthy soil ecosystem to feed their crops, and the less organic matter they leave in the soil.

We use many times more nitrogen overall than the planet can sustain and also, globally, we use it less and less efficiently (Box 5). As organic farmers show, we could produce 80% as much on average, without any nitrogen fertiliser at all.⁶⁵

Box 5: nitrogen fertiliser and climate change

Nitrous oxide – a potent greenhouse gas (GHG) with a global warming potential 265–298 times that of CO₂ – accounts for around a third of the UK agricultural sector's total emissions.^{66 67}

The majority of these emissions arise from the estimated 900,000 tonnes of nitrogen fertiliser that is applied annually on British farmland, the manufacture of which is alone responsible for an estimated 6 million tonnes of CO₂, equivalent to around 1% of the UK's emissions total.^{68 69}

The Committee on Climate Change estimates that measures aimed at reducing N₂O emissions from agriculture – through increased the use of leguminous crops and the reduction of untimely or over-application of fertilisers – could deliver an annual emissions reduction of 2.7 million tonnes of CO₂e by 2030.⁷⁰

Recommendation: action on soils

Strong policies to restore and protect soil health must be included in the UK's agricultural framework, in order to deliver the UK's domestic and international commitments on soil health. These should include the following:

Soil stewardship payments

Building soil organic matter should be a prime objective of public payments to farmers. As farmers will no longer get area-based payments, the basic 'cross compliance' conditions that are currently meant to protect soil, but in practice achieve little, will no longer apply. Instead, farmers should be incentivised to monitor and increase the organic matter in the soil.

A pragmatic approach to this is to use existing farm assurance schemes such as organic and LEAF. Where a scheme includes requirements that are proven to increase organic matter sufficiently, such as cover cropping, minimising bare land and reducing compaction, farmers certified by those schemes would be automatically eligible for soil stewardship payments.

Farmers outside such schemes would also be eligible, but only if they could demonstrate improvements in SOM using an approved sampling and monitoring method. Policy design should take account of the time required to increase SOM and should encourage farmers and land managers to adopt long-term strategies for soil management.

Soil monitoring

Regular SOM reporting by farmers should form part of a well-maintained national database, which will provide an accurate picture of the state of the UK's soils and will help to direct funding and research in the future. Investment in soil health research, data collection and monitoring across the UK should fill in the gaps. An accurate picture of the health of soils is vital to ensure that soil conservation and restoration remains an ongoing, long-term project for successive governments.

Tenancy agreements

Soil health and monitoring should be encouraged by making it a requirement of tenancies that soil health is not degraded during their term. For example, it could become a standard component of all farm tenancies that a measure of SOM be taken at the start of a new agreement, and it would be incumbent on the tenant to ensure levels are the same or higher by the end of the tenancy. Longer tenancies could help too.

Nitrogen budget

Following Scotland's lead, the other nations of the UK should set a nitrogen budget.

⁷¹ This would be a first step in reducing our farming and food system's dependence on unsustainable inputs of nitrogen, which has knock-on effects on soil health.

At the same time, government should model and pilot mechanisms to lower nitrogen use in likely event that the voluntary restraint proves insufficient. These could include higher taxes on synthetic nitrogen – if taxed at comparable percentage rate to fuel duty, this would make much of its use uneconomic.⁷² A key challenge would lie in devising a practical way, compliant with our international trade agreements, of applying an equivalent duty to embedded nitrogen in imported feed and food. An alternative approach would be to tax or cap net emissions of greenhouse gases (an approach that California adopted when it enacted AB 32 California Global Warming Solutions Act⁷³) that could have the twin effect of reducing nitrogen use and incentivising farmers to build SOM.⁷⁴

Proposal 3

A tipping point for organic

Evidence for the many environmental, animal welfare, economic and social benefits of organic farming continues to grow. Recent reviews and meta-studies find that organic farms deliver:

- More wildlife and biodiversity - 50% more abundant wildlife, with a third more species on average, including almost 50% more pollinator species and 75% more plant species.^{75 76}
- Healthy soils and carbon storage - organic soils sequester up to 450kg more carbon per hectare than non-organic farms, and soil organic carbon stocks are up to 3.5 tonnes higher per hectare than non-organic farms.⁷⁷
- Protection against flooding - Healthy soil reduces the risk of floods and droughts by storing as much as 3,750 tonnes of water per hectare, the equivalent of one and a half Olympic swimming pools.⁷⁸
- Clean water - 35-65% less nitrogen leached from arable fields.⁷⁹
- Significantly lower pesticide use.⁸⁰
- Significantly lower use of antibiotics.⁸¹
- More jobs, including younger people and new entrants to the farming industry.⁸²
- Food security - modelling by the UN Food and Agriculture Organisation (FAO) concluded organic farming can play a major part in increasing global food security.⁸³

There is nothing to stop other farmers using the same methods, and more and more are taking up organic techniques to improve their soils and tackle problem weeds. In practice, however, it is because organic farmers opt to limit their use of fertilisers and pesticides, and are independently checked as doing so, that they are obliged to adopt a whole system of ecological practices that reliably deliver such benefits.

Yet, at present, just 3% of farmland in the UK is managed organically.⁸⁴ British consumers are demanding more organic produce, with the UK organic food and drink market seeing four years of successive growth. With organic farmland more or less stable, much of this growth is being met by imports, particularly of raw materials for animal feed.⁸⁵

Experience from elsewhere shows that things could be different. In some other countries, organic farming has reached a tipping point, where directly accounts for

up to a fifth of production, and sets new norms for policy, business and the public. The share of land farmed organically in Austria is over 19%, Sweden 16%, Switzerland 13% and Italy 11%.⁸⁶

The success of organic farming in other countries has helped to unlock wider support for ecological approaches to farming. It has gone hand-in-hand with more support for innovation in nature-friendly methods, sometimes tighter regulation of pesticides and antibiotics in farming, and more progressive public procurement.

Why has the UK lagged? A major study comparing organic farming across the EU found that strategic government support was crucial to organic reaching a tipping point but in Whitehall, "policy makers appear to struggle in balancing the environmental and market aspects of organic farming".^{87 88}

Much of agricultural policy is devolved, with Scotland seen as the most supportive of organic farming within the UK. In 2016, the Scottish Government launched its latest Organic Action Plan, co-produced with the organic sector and with funding to support implementation. This could be considered a blueprint for a policy for the rest of the UK.⁸⁹ Organic farming is also a current Scottish Rural Development Programme National Priority.⁹⁰

Recommendation: an organic strategy for England

To reach a tipping point, the organic market needs to grow at least twice as fast as the 5% per year it has recently, and this demand needs to be met mostly by UK farmers. In 10 years' time, the UK should aim for at least 10% of UK farmland to be managed organically.

We propose that a new UK agricultural framework should include a strategy to drive organic food and farming to this tipping point. As the biggest market, and with Westminster trailing the devolved governments in supporting organic, the priority is a strategy for England, alongside closer working with devolved nations on UK-wide issues such as international trade. This strategy for England should include the following policies:

Expand organic promotion and marketing

The UK government has committed to raising the profile of high quality, British produce both domestically and globally. The UK's highly-respected organic sector must be a significant part of this wider strategy – organic farmers and businesses across the UK need to see the benefits of increased consumer demand.

Government must also commit to exploring and building strong links for export, which can play an important part in balancing supply and demand, and reducing volatility in a small sector.

We need a more ambitious approach to improving the public's access to organic

food. Better public procurement policies (see Proposal 6) should promote organic, seasonal and nutritious food and diets, and should raise awareness of the links between food and the environment. Public procurement should encourage menus that include 'less but better' meat, dairy and eggs as advocated by the Eating Better Coalition;⁹¹ sourcing organic is the simplest way to ensure it is 'better'.

Farm payments recognise the benefits of organic farming

Organic farms have a unique status in the CAP. Not only are they the only certification scheme underpinned by legal standards, but they also act as a gateway for farm payments (Box 6).

Box 6: what can we learn from organic certification?

Organic certification is different from other assurance schemes because it already functions as a gateway to farm payments. Three key factors legitimise this arrangement: longstanding, independent and robust scientific evidence demonstrating the delivery of environmental and public benefits; the requirement of a detailed auditing process; and the underpinning of the standards in legislation - currently the EU Organic Regulation.

As such, under Countryside Stewardship in England, while other parts of the scheme are competitive, the organic management and conversion payments are available to all eligible farmers (subject to there being sufficient budget available) who can prove they meet the required criteria.

The UK should maintain this approach for organic maintenance and conversion, and work with the range of certification bodies to develop new schemes

Organic conversion and maintenance payments, as currently operating under Countryside Stewardship for England, should be maintained, improved and expanded as part of post-CAP agricultural policy.

Government should pay specific attention to increasing organic production where we currently rely heavily on imports, such as animal feed, and organic fruit and vegetables, in order to meet the growing UK demand for home-grown produce. It is important to maintain the right balance between conversion and maintenance payments in order to avoid oversupply.

As the focus of farm payments shifts entirely towards delivering public goods, this approach to incentivising organic production could evolve. Government could assess the effectiveness of organic and other certification systems in delivering a panel of environmental and social objectives, taking into account scientific evidence, scheme monitoring data and the rigour of the assurance process. Farmers certified to those schemes would be automatically eligible for payments to

incentivise those benefits.

Farm advice, research and innovation

Government recognition and support for organic agriculture should also inform priorities and budget allocation for research, innovation and farming advisory services.

There are many ways in which organic methods can benefit farming practices across the industry, and opportunities for knowledge sharing among farmer networks should be actively promoted and encouraged. One example is the Innovative Farmers network, established by a partnership including the Soil Association. This programme brings together organic and non-organic farmers with researchers, and provides funding and support to test new ideas in practical 'field labs'. It provides a model that could be expanded more widely (see Proposal 5).

In order to future-proof the sector and to encourage new entrants to organic farming, research institutions and universities – particularly agricultural colleges – should be encouraged to offer courses in organic and agroecological farming practices. Support should be made available for organic apprenticeships.

Continue the legal basis for organic standards

The high levels of public trust and confidence in organic food are underpinned by its legally defined standards and robust system of certification. It is imperative that these standards – particularly continued alignment with the EU Organic Regulation – are maintained in order to preserve this trust. This continuity is vital to developing the market for British organic produce at home and abroad.

Proposal 4

A good life for all farm animals

The vast majority of pigs and chickens, and more and more dairy cows, spend all of their lives indoors, often in cramped, industrial environments. Even if they avoid pain and distress, their lives are often agonisingly dull. Pigs, for instance, are most likely to have their tails cut off, and chickens their beaks trimmed, to stop them cannibalising each other – a sign of frustration. Many have no chance to fulfil innate instincts and pleasures, like caring for their young, rooting and scratching the ground, or feeling the sun on their backs.

Even in the UK, a nation of animal lovers where we have often improved welfare standards ahead of other countries, this is still the norm. In the name of lower cost production, the scale of these indoor, intensive farms is increasing, pushing out smaller family farms to make way for industrial systems that affect local communities and the environment as well as the animals themselves.

The Farm Animal Welfare Council, the government's welfare advisors, define three levels of welfare: a life not worth living, a life worth living, and a good life. A 'good life' involves more than simply being free from pain or disease. It means ensuring animals can exercise natural instincts and follow their urges to care, graze, root and play.

Insisting on a good life for all farm animals would be game-changing. It would mean switching to better farming systems, not just making tweaks. Overall, the UK would consume and produce less meat, dairy and eggs under such a system, but the quality of such products would be much higher.⁹² For example, a wholly domestic organic dairy sector could produce around 70% of current total milk volumes.⁹³

An indication of the scale of change is provided by a Reading University study examining the implications of wholly organic agriculture, which requires animals to be raised to the very highest welfare standards. This found that chicken, egg and pork production would fall to roughly a quarter of 2008 levels, resulting in massive reductions in energy use for food production, and a reduction in the quantity of grain used to feed animals rather than people. On the other hand, it found an overall increase in largely pasture-fed beef and lamb, with production rising to around 168% and 155% of 2008 levels respectively.⁹⁴

What's holding this back? One factor is the overuse of antibiotics, which also presents human health risks (Box 7).

The routine, preventative use of antibiotics limits the incidence of farm animal diseases in cramped conditions where they could otherwise spread quickly. While industrial farming systems can significantly reduce antibiotic use through tight biosecurity, well-managed extensive systems, where animals can enjoy a good life,

achieve even greater reductions (Box 8).

Box 7: the overuse of antibiotics

We are facing a global health catastrophe from antibiotic resistance, brought about by decades of misuse and over prescription of antibiotics in human medicine and livestock farming. Last year, the UK government's Review of Antimicrobial Resistance (AMR) – the O'Neill report – predicted that, if no action is taken, AMR could cause the death of one person every three seconds by 2050.⁹⁵

The rise of antibiotic resistance is widely seen by organisations like the European Food Safety Authority, the World Health Organisation and the Lancet Infectious Diseases Commission as a consequence of the use and overuse of antibiotics in both human and veterinary medicine. However, attention on this issue has so far tended to focus on the overuse of antibiotics in human medicine. While antibiotic use in animals may not be the main driver of resistance in humans, use in farm animals (and to a lesser extent use in companion animals) is a very important contributor. For some human diseases - such as Salmonella and Campylobacter - it is the main cause of resistance.⁹⁶

Antibiotic use in British and European farming has begun to fall, but there remains widespread overuse. Farm animals account for almost two thirds of all antibiotics used across 26 European countries, and around 40% of all antibiotics used in the UK.⁹⁷ In the UK and in most of Europe, it is still legal and common practice to routinely medicate whole groups of animals as a preventative measure to compensate for poor welfare, as cramped conditions and inadequate ventilation make disease outbreaks more likely and more difficult to control.

Box 8: antibiotic use on organic farms

Experience from other countries shows that tighter regulation, including a ban on routine preventative use can quickly cut rates of antibiotic use. However, unless management changes are also made, use tends to stabilise at levels which are still too high. In contrast, in countries and farming systems which use less intensive, more health-orientated husbandry, even greater reductions in antibiotic use are achieved. Intensively farmed Danish pigs receive five times less antibiotics per pig than British pigs, but ten times more than organically farmed Danish pigs.^{98 99}

A small study by UK government scientists compared 12 organic farms (5 pig farms and 7 poultry) with 13 non organic (7 pig farms and 6 poultry farms). Per kilogramme of meat produced, the non-organic pig farms used between 13 times and 330 times more antibiotics than the highest-consuming organic pig farm. Six of the seven organic poultry farms and two of the five organic pig farms did not use antibiotics at all during the 2 year study.¹⁰⁰

Practices employed by organic farmers which reduce the need for antibiotics include using slower growing breeds, lower stocking densities and smaller herd or flock sizes, increasing access to the outdoors, later weaning of piglets and other

measures aimed at optimising animal health and welfare.

Another factor is investment and the structure of the market. Once a business makes a 25-year investment in a particular type of building for hens, pigs or cows, they are locked into using that system. Significant changes to legal requirements, stocking densities, costs or market prices can threaten their business, making it difficult to adapt.

Recommendation: ten years to high welfare

There is growing consensus among policy makers and industry that, post-Brexit, the UK should be a 'high-standards economy'. It certainly what the public expect.¹⁰¹ In reality, on animal welfare, our standards are not yet high enough.

We propose that the UK sets the ambition that all farm animals should have a 'good life' within ten years. Hand-in-hand with stronger regulation, this will require public investment to help farmers adjust their infrastructure and businesses.

Defining a good life

While the Farm Animal Welfare Council (FAWC) proposed that a 'good life' should be the benchmark for animal welfare, it did not set out how this should be measured or achieved.¹⁰² Defining a good life provides a practical way to raise the bar in the marketplace and speed the move to eating less but better meat, dairy and eggs.

Government should urgently support the development of a rigorous framework that can score farms, supply chains and assurance schemes against the tiers set out by FAWC. Unlike basic welfare measures, which are designed to help improve welfare in any situation, this would recognise that animals are happier in some systems than others. Even the best-managed indoor farms do not offer animals essential choices to graze, root and play.

Such a framework has already been piloted for laying hens.¹⁰³ We need the same for broilers, pigs, sheep, dairy and beef cattle. These frameworks should then be used to underpin other policies: they can benchmark labelling and assurance schemes, ensure public sector caterers procure high-welfare meat, dairy and eggs, and target investment at the highest welfare systems.

Label by method of production

In the meantime, before such frameworks are in place, consumers and caterers rely on the higher welfare assurance schemes for farm animals. These assurance schemes include RSPCA Assured and organic certification, such as the Soil Association's standard, which covers "living conditions, food quality, the use of antibiotics, as well as transport and slaughter, making them the very highest welfare standards of farmed animals".¹⁰⁴

Method of production labelling has proved to be an important tool for driving

standards and an excellent opportunity for farmers to add value to their products. When these labels are underpinned by independent assurance schemes, they also help enforce animal health and welfare rules, improving biosecurity.

However, these voluntary schemes only have limited reach - with less than 4% of food produced in the UK coming from farms meeting the RSPCA's higher welfare standards.^{105 106}

Mandatory method of production labelling of all meat and dairy would be a step towards providing consumers with the information they want.¹⁰⁷ In turn, this would level the playing field for higher welfare products and help this important market to grow, allowing more farmers to shift from volume to quality production and helping to safeguard the future of British farming.

A market based primarily on volume production presents challenges for the farming industry. Competing on price alone is forcing many farm businesses to close. Instead, Britain should expand the welfare quality market domestically, and help build a robust brand based on these values.

Mandatory method of production labelling has been in place for shell eggs since 2004, and the UK pig industry adopted voluntary method of production labels in 2010. Despite being popular with farmers and consumers, it has not been extended to other farm species.

Now is the moment for the government to demonstrate its commitment to improving farm animal welfare, expanding market opportunities for farmers, and meeting the demands of consumers by introducing mandatory method of production labelling for all meat and dairy.

Stop the overuse of antibiotics

The UK should ban the routine, preventative use of antibiotics in livestock farming. Around 90% of antibiotic use in veterinary medicine is for the mass medication of groups of animals, and routine prophylactic use has been labelled 'excessive and inappropriate' by the government's own review.^{108 109} This practice cannot be allowed to continue.

The UK should also set target to reduce farm antibiotic use by 50% by 2020, and 80% by 2050. This is the target proposed by the Alliance to Save Our Antibiotics, of which the Soil Association is a founding member. Part of this target must be a reduction in the use of critically important antibiotics by 80% by 2020 and 95% by 2025. These targets are not only achievable – they could easily be met. In the Netherlands, for example, the use of critically important modern cephalosporins in the four main farm-animal species has been reduced by over 99% in just two years.¹¹⁰

Antibiotic resistant bacteria are not constrained by national borders. It is therefore imperative that there is international cooperation and a joined-up strategy to

reduce antibiotic use in livestock farming. The UK government should impose import restrictions on animal products from countries with less rigorous requirements on antibiotics.

High standards of animal welfare – including allowing maternal behaviours in pigs, optimum herd and flock sizes, adequate enrichment, and access to range and pasture – should be incorporated into farm antibiotic reduction strategies.

Incentives and funding for investment in farm infrastructure

Many livestock farmers – often struggling with ever-tighter margins– are effectively locked into intensive, indoor livestock farming. Significant investment will be required in order to allow a transition to extensive, high-welfare farming systems which rely minimally on antibiotics.

Policies should make investment in extensive, low-input systems a more attractive option for farmers and for investors. This could include tax relief or capital grants to help farms move to more extensive systems and repurpose intensive animal housing.

As political pressure and public awareness of the problems caused by intensive agricultural farming rises, so the economic and reputational risks to investors and business owners increases, along with the incentive to divest and to change systems.¹¹¹

Proposal 5

Grassroots innovation

However the policy landscape unfolds, farming is set to enter a period of transformation, driven by changes in trade, markets, labour and support payments. To weather this change, and make the best of it, farmers will need to innovate.

Practical innovation by farmers has always played a vital part in improving farming practices. Farmers everywhere experiment - choosing, developing and adapting practices and tools to suit their land.¹¹² They have been called 'innovators by tradition'.¹¹³ This is as important now, in the development of modern techniques such as reduced tillage, as it has been historically.

Yet this grassroots innovation can be a lonely business. Instead of developing ways to farm better, most agricultural research focuses 'upstream', to develop new chemicals, drugs, breeds or equipment to sell to farmers. That may not be the best place to find sustainable solutions, but it is where governments and investors can make a visible return on their investment.

The UK spends around £450 million a year on agricultural research and innovation.¹¹⁴ Only a fraction of this money, perhaps as little as 1%, goes to practical projects led by farmers.

Focusing more of the UK's agricultural research investment on farmer innovation could be game-changing. Putting just 10% of the current total budget towards such projects could see upwards of 1,000 projects a year led by groups of farmers. This would support many of the most active innovators in UK farming to team up and develop ideas that they have identified as priorities for the sustainability and resilience of their businesses, creating a powerful engine driving improvements across the sector.

This estimate is based on a new initiative called the European Innovation Partnership for Agriculture (EIP-Agri), which Brexit could stop almost as soon as it has begun.¹¹⁵ In England, this is offering groups of farmers or foresters up to £150,000 over three years.¹¹⁶ While its birth has not been easy, with concerns that the application process is bureaucratic, it has been welcomed as one of the first significant efforts by government to provide such support.

Alongside the EIP-Agri, an independent initiative called Innovative Farmers has been supporting farmer-led 'field labs' since 2012 (Box 9). Led by the Soil Association, LEAF, Innovation for Agriculture and the Organic Research Centre, with support from the Prince of Wales's Charitable Foundation and Waitrose, it has supported around 50 such projects.

Box 9: Innovative Farmers - a model for supporting farmer-led innovation

Innovative Farmers is a not-for-profit network that gives farmers and growers research support and funding on their own terms. At the heart of the initiative are farmer groups running 'field labs'. These are designed to support innovative farmers who are influencing others in their sectors and communities.

Close to 1,000 farmers have now taken part in field labs. The field labs boost the rate, rigour and relevance of their innovation.

The field labs are getting results. The findings range from how to minimise antibiotic use in dairy to ways farmers can improve soil health and reduce pesticides.

This is already changing farming practices. Independent evaluation found that half of the farmers surveyed have already made or planned changes to their business.

Through farm walks, webinars and conferences, Innovative Farmers reaches beyond this core of innovators to share their learning with others. A total of 5,750 farmers and farm advisors have attended events.

The network's third tier of engagement is through the farming press, a key source of technical and business information for farmers throughout the industry. Innovative Farmers' reach last year of 1.9M meant that, on average, every UK farmer heard about the field labs 7 times.

The network unites farmers of all stripes. While the focus on agroecological solutions means that many organic farmers are involved, approximately 50% of participants and 70% of new joiners are from outside the organic sector.

Innovative Farmers has also made progress in inspiring the main funders of agricultural research to recognise and back farmer-led innovation. This is essential to achieving a long-term impact at scale. Defra and the European Commission have cited Innovative Farmers as an exemplar for the European Innovation Partnership – a new initiative due to spend €2.8 billion on farmer-led innovation.

Innovative Farmers is part of the Duchy Future Farming Programme, funded by the Prince of Wales's Charitable Foundation. The network is backed by a team from LEAF (Linking Environment and Farming), Innovation for Agriculture, the Organic Research Centre and the Soil Association, and supported by Waitrose. It is sponsored by Anglia Farmers, the BBSRC, Buccleuch, Produce World Group and Robin Appel.

Recommendation: back farmer-led innovation

The success of the UK's agriculture post Brexit will depend on innovation by farmers. We propose that policies should recognise and support this.

The starting point is that thousands of UK farmers already investigate, experiment, design and develop new approaches. Helping them share the risk and increase the rigour of this would benefit all of agriculture, at relatively low cost.

Budget for grassroots innovation

At least 10% of the UK's public agricultural research and development budget should be dedicated to supporting sustainable innovation by farmers. On current figures, that would amount to a minimum of £45 million per year.

This investment could come from the budget allocated to the research councils, which accounts for the largest share of the current spend. As much of it would ultimately go to researchers to take part in projects developed by farmers, there would be little net effect on public investment in research institutions. They would simply be rewarded for a different type of research.

The funding could be allocated to a dedicated farmer innovation fund. It would give out grants that are much smaller than is currently normal for the research councils. Funding would be capped at £30,000 per year, with smaller projects encouraged.

It would aim to be easy-access funding, with minimal bureaucracy and barriers to entry for projects that meet the funding criteria. These would include substantial evidence of leadership and involvement by a group of farmers, foresters or other land managers, potential to benefit the sustainability and resilience of their businesses, and professional support to make the most of the funds and their effort.

Innovation support services

Experience shows that farmer-led innovation projects benefit from professional support.¹¹⁷ This includes:

- Facilitation and project management, to make sure a group makes the most of the skills, knowledge and capacity it has convened.
- Research advice, to design and analyse trials or other types of research.
- Communication, to ensure the learning is shared widely, for example through the farming press, social media and knowledge exchange events.

In practice, these needs can often best be met by a small team, rather than an individual. In particular, it is helpful if facilitation and research are separate roles, so the facilitator can help the group challenge the researcher to ensure their advice will be relevant and practical.

The EIP-Agri has a facility to develop 'innovation support services' to provide such support, though Defra has not taken the opportunity to do so. The UK should develop innovation support services to help farmers apply and make the most of the new funds that would be available. We should build on the experience from other countries of doing this through the EIP-Agri, and of home-grown initiatives

such as Innovative Farmers.

Reward practical research

Public research funding should foster a culture in agricultural research institutions that recognises, celebrates and rewards scientists who support farmers effectively.

Researchers currently depend primarily on their publication record for career advancement. While increasing attention is paid to 'research impact', this is yet to become a big factor in how researchers progress in their institutions or grant applications. For example, the proposed impact of a project is rarely subjected to same quality of scrutiny as its research design.

We should change this culture by incentivising individual researchers and their institutions to get their hands dirty. This could include:

- An awards scheme with prize funding for researchers working on farmer-led projects, similar to wider innovation awards that have been run by the research councils. This should have prizes for methodological advancement, highlighting researchers who have developed research designs and approaches to analysis that address the real-world variability and uncertainty faced by farmers.
- Training to help researchers work effectively with farmer groups, with researchers who are experienced in this sharing their knowledge with others.
- Involving farmers and other practitioners more in reviewing research grant applications, not only for the new farmer innovation fund, but also assessing the impact statements in standard funding proposals that promise practical benefits.

Proposal 6

Making the most of public procurement

The UK public sector serves some 3.5 million meals each weekday across settings as varied as schools, nurseries, care homes, hospitals and prisons.¹¹⁸ In total, it spends £2.4 billion each year procuring food and catering services.¹¹⁹ While this accounts for little over 1% of the total food retail and catering market, its influence is significant.¹²⁰ Food in schools and public institutions sets norms for the public and consumers, signals values, and gives integrity to government priorities and policies.

Making the most of public procurement could be game-changing. The UK could benefit the health and food habits of the next generation by further upping ambitions for school food. It could also help drive demand for food that meets the highest standards, helping to achieve economies of scale in processing and lowering consumer prices. To illustrate the potential scale of this impact, the current UK organic market is worth over £2 billion, so if the public sector went organic, it would approximately double that market.¹²¹

The past decade has already seen progress. After a succession of public procurement initiatives, Defra has recently introduced a Balanced Scorecard. This allows caterers to balance straightforward criteria, such as cost, against more complex criteria, such as health and wellbeing, resource efficiency and quality of service.

Meanwhile, 1.7 million meals a day already meet the Soil Association's Food for Life Served Here standards. This is a well-established scheme for caterers, which covers similar issues to the Balanced Scorecard. Membership of the scheme provides caterers with independently verified evidence of their achievements. It incorporates a wide range of product assurance schemes including Red Tractor and other farm assurance schemes – Fairtrade, LEAF Marque, Marine Stewardship Council, Freedom Food and Organic – and will generally guarantee good or excellent performance by caterers against the award criteria in the Balanced Scorecard. One million of the meals are at the scheme's Silver and Gold level, with significant spend on food produced to higher environmental and welfare standards (Box 10).¹²²

Box 10: Brighton & Hove, Better Food Standards

Brighton & Hove City Council was the first in the country to introduce more stringent rules on food buying standards for all catering contracts over £75,000.¹²³ The standards set are equivalent to the Soil Association's Bronze Food for Life Catering Mark.

The introduction of buying standards follows the adoption in 2012 of a city-wide food strategy, in association with the Sustainable Food Cities network, which is co-

led by Soil Association, Sustain and Food Matters. The strategy sets out how the city works towards a healthier more sustainable food system, which reduces food poverty, supports local food businesses and reduces the environmental impact of the way in which food is produced, consumed and disposed.

Brighton & Hove City Council is a key partner in helping to deliver the strategy and has signed up to a number of commitments that seek to improve the food it serves every day to thousands of school children, clients, visitors and employees. Through the development and adoption of Minimum Buying Standards, the Council can use its significant buying power and influence to encourage healthy and sustainable food production and consumption and drive local economic development.

The Minimum Buying Standards are based on the Bronze Food for Life Catering Mark Standards, developed by the Soil Association. The Council has determined that meeting them should be seen as the initial stage of a progressive journey to improve the food served, therefore working through from Bronze, to Silver and Gold, is encouraged.

What's holding back further improvements? One factor is the higher cost of sourcing higher quality ingredients. However, this can be counterbalanced by reformulating the menu. 71% of public sector institutions meeting Food for Life Served Here criteria report that implementing the scheme's sustainability criteria was cost neutral and 29% report overall cost savings. Research by the New Economics Foundation demonstrated £3 in social return for every £1 invested in Food for Life, with most of the benefit experienced by local businesses and local employers.¹²⁴

Recommendation: roll out the balanced scorecard

The UK should implement an ambitious procurement policy that builds on the progress already achieved by Defra's Balanced Scorecard tool and Food for Life Served Here.

Implement the Balanced Scorecard approach across the whole public sector

From 2017 all of central government will use Defra's Balanced Scorecard when procuring food and catering services. Based on annual spend of £1.2 billion on food and drink in the English public sector, use of the Scorecard across the public sector would channel up to £200 million more into British produce.¹²⁵

Put quality before price

All public procurement decisions should place a weighting of at least 60% on quality, with price not to exceed a 40% weighting.

The relative weightings given to price and quality in public sector catering tenders have a big impact on the quality of food provision and the benefits to British farmers. In recent years, as local authorities seek to make challenging budget cuts, there has been a worrying shift towards tenders giving 60-80% weighting to price,

effectively ensuring that the cheapest bid wins. Safeguarding a 60% minimum quality weighting will incentivise a 'race to the top', with benefits for consumers, farmers and food business (Box 11).¹²⁶

Government should support this by comparing the cost-effectiveness of delivering public benefits through direct agri-environment payments to farmers, with stimulating demand for assured products such as organic through public procurement. If it is found to offer good value for money, agri-environment funding could be used to top up public catering budgets where cost is a genuine barrier to improvement.

Independent verification

Caterers' use of the Balanced Scorecard should be independently verified via schemes such as the Soil Association's Food for Life Served Here. This would increase uptake of assurance schemes such as Red Tractor, LEAF, Marine Stewardship Council and organic, thereby delivering more sustainable food and farming. Over 1.6 million Silver and Gold Food For Life Served Here meals are already served every day across the UK.¹²⁷ 15% of ingredients at the Gold level must be organic.

A revitalised procurement policy of this type would complement an increased role for assurance and certification schemes recognising farmers who deliver public benefits.

Box 11: feeding the future: the experience in Brazil

The Brazilian government has developed a procurement policy – the Food Acquisition Programme (PAA)¹²⁸ – simultaneously to tackle rural poverty, hunger and malnutrition and support local smallholders. The programme is part of the country's wider food security policy framework known as Zero Hunger, which aims to reduce food insecurity across the country.¹²⁹

The produce of smallholder or family farmers is purchased by federal and local governments for public institutions, such as schools and hospitals. There is no bidding process, providing the farmer with greater access to buyers in an otherwise highly competitive market.

In addition to the PAA, the Brazilian government has in place a National School Feeding Programme (PNAE), which requires at least 30% of school food to be purchased from local farmers, with priority given to organic produce.¹³⁰ Meals are produced according to strict national nutritional guidelines.

These programmes have contributed to Brazil's extraordinary success in reducing hunger and malnutrition. In 1990, almost 15% of the population suffered from hunger; that figure is now just 1.7%.¹³¹ Approximately 47 million school pupils are served by the programme every day, in almost 250,000 schools across the country.¹³² Moreover, with at least 30% of the food sourced from family farms, the programme is also delivering significant benefits to over 120,000 rural families.¹³³

Conclusion

No individual proposal set out in this report will be a panacea, and there are no quick-fixes to tackle the many significant and urgent challenges we face. To meet the demands of the future, we must adopt a holistic landscape approach to food and farming in the UK and transition to a more sustainable vision of agriculture. If implemented effectively and at scale – with the full support and conviction of government – each proposal in this report has the potential to have a genuinely transformative impact on the future of food, farming and the British countryside. While significant, we know that the scale of change required is both achievable and necessary. By integrating these policy recommendations into a holistic vision of food, farming and land use in the UK, we can create a system that better addresses the needs of UK farmers, consumers and citizens today and into the future.

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