
Transforming Britain's relationship with land through nature-positive innovation

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In a nutshell

Nature-positive innovation in agriculture and land use is required to address the challenges of climate and nature facing the UK, and to increase the resilience of UK food production. This report details the nature of the innovation that is required and the policy approaches and practices through which it can be achieved.

Introduction

Currently dominant land uses in the UK are environmentally unsustainable, because of their greenhouse gas emissions, their impacts on biodiversity and their local pollution of both air and water. These uses need to be transformed, but in such a way that a thriving agriculture sector is still able to grow most of the UK's food and support a vibrant rural economy. Innovation to achieve these goals, which we call 'nature-positive innovation', is the subject of this report, which recommends a policy and regulatory framework for UK landscape recovery and sustainable agriculture.

Much needs to change in the current ways we plan, use, manage and cultivate land to create more value for local communities and national economies while improving the environmental outcomes from land use. Here we focus on innovations with a potential to reduce net GHG emissions, improve terrestrial and freshwater biodiversity, enhance the quality of soil, air and water, and build resilience to floods and droughts.

The established disciplines of innovation policy making are rarely applied in agriculture and land use or to the combined challenges of food production (the foundation for a healthy rural economy), emissions reduction and enhancing and preserving our precious biodiversity. But an innovation mindset is useful in understanding this pivotal moment for the natural environment and the rural economy. Dominant agricultural and land use practices are subject to unprecedented change as governments, businesses and the public respond to the local and global environmental consequences of current conventional land use practices which have been the majority contributor to the crisis of nature, and a substantial contributor to the crisis of climate.

As a result, the UK Government, and the governments of the devolved UK nations, have adopted ambitious, time-bound commitments to transform these practices in an environmentally, socially, and economically desirable way. The context is therefore one of change and opportunity – but also one of risk. Without a strong and clearly defined policy framework, there could be the misallocation of land to sub-optimal uses, perhaps as a result of unregulated and unmonitored carbon markets; farmers and land owners and managers might not have adequate incentives to adopt the

new measures and approaches, and make the investments, required. And, if they do, they might be undercut by food imports produced to lower standards in other countries.

In order to achieve the required transformation in agriculture and land use, policy will need to unleash unprecedented nature-positive innovation in approaches to land management to foster a transition towards a sustainable and economically viable land use in the UK.

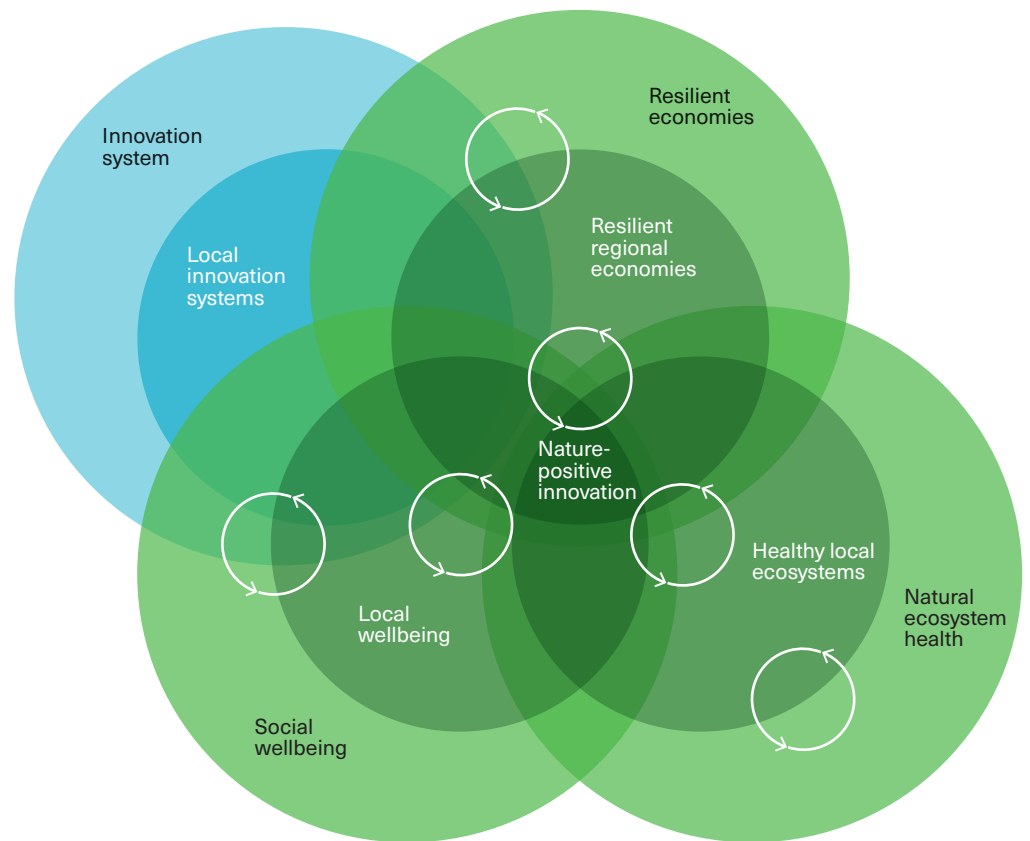
Government policy has a key role in achieving this new nature-positive land use. The formulation of the new agricultural support system provides a signal opportunity for government to put in place a broader system of incentives that promotes innovation in agriculture and wider land use that delivers much better environmental outcomes along with the food that the UK needs.

The Nature-Positive Innovation Commission was convened to set out what nature-positive innovation was required, and how it could be achieved. The Commission comprises senior figures from organisations engaged in agriculture and food system debates in the UK. Their organisations have already made important contributions to charting the route towards a more environmentally sustainable agriculture, while recognising the continuing need for the UK to have an economically vital agriculture sector to sustain and underpin rural communities, as well as provide most of the UK's food needs. Commissioners are in broad alignment on the urgent changes required to transform current land management practices to tackle the environmental challenges facing the UK.

Nature-Positive Innovation

Our perception of innovation entails much more than research and development (R&D), important though these are. Our working definition of green, or nature-positive, innovation is the **creation and adoption of new ideas, inventions, practices, processes, products, and organisational forms that create value for society and the economy while giving better environmental outcomes and helping meet environmental objectives in line with science-based targets.** The innovation we have in mind would seek to find the sweet spot at the centre of the intersections between four overlapping circles articulated at the local level: a dynamic innovation system, healthy natural ecosystems, resilient economies, and social well-being (see Figure S1).

Figure S1. Systems perspective on nature-positive innovation



The Commission considers that the nature-positive innovation required has the four broad characteristics set out in Box S1.

Box S1. Characteristics of nature-positive innovation

Designed to benefit nature

Improves diversity and resilience of natural eco-systems locally and globally

Nature-positive innovations create net benefits for nature. Their implementation should improve the health of local and global natural and semi-natural eco-systems and, when needed, strengthen their ability to evolve and adapt to changing conditions (e.g., climate change) over time. Nature-positive innovations will have both local and global benefits (e.g., carbon sequestration in soils contributes both to soil health and to climate mitigation goals).

Designed to create lasting economic and social benefits

Contributes to livelihoods of communities living off the land, helps to maintain food security, and provides health benefits to the wider public

Nature-positive innovations can provide multiple benefits for people ranging from economic benefits for farmers, businesses, landowners, and consumers to improving the quality of and access to ecosystem services for the wider public (e.g., health benefits, improved food security in the face of climate resilience and unstable supply chains).

Co-created with local stakeholders

Users and local communities are involved in all stages of the innovation process

Nature-positive innovations should be co-created and tested with local actors and stakeholders involved in land management. Their long-term success depends on engaging the local community. Place-based multi-stakeholder collaborations and hands-on demonstration and experimentation of new practices need to demonstrate the benefits and build social acceptance of new practices and social capital supporting sustainable practices. Place-based collaborative approaches to the management of agricultural lands, forests or rivers may be seen as examples of such potentially transformative approaches.

Knowledge-based and measurable

Based on interdisciplinary scientific evidence and local knowledge

Nature-positive innovation should benefit from interdisciplinary scientific knowledge, local knowledge and expertise, and an ongoing process of peer-to-peer learning, reflection, and adaptation. This approach allows strategic decisions to be based on robust evidence, and land use practices to be adapted, or stopped, in the light of new evidence. Measurement and evaluation of progress towards sustainability goals is key for making informed decisions and avoiding potentially harmful choices and to place local initiatives in a global process of sustainability transition. One promising approach already developed is the Global Farm Metric framework for measuring sustainability in all farming systems and landscapes.

The Commission has identified many nature-positive practices and land uses, which are set out in Box S2. Their practical applications around the country are illustrated in many examples in the main report.

Box S2. Examples of nature-positive innovations for farming and land use

Process and organisational innovation

- Sustainable farming techniques (e.g., maximising biological processes in soil and ecosystems, minimal or no till, crop rotation, cover crops, polycultures, integrated grazing, agroforestry)
- Pollution control and pollution treatment technologies (e.g., eliminating or reducing the use of fertilizers, pesticides, or herbicides to limit air, water, and soil pollution; cleaning technologies for treating pollution released into the environment; environmental monitoring technologies)
- Waste prevention and waste management processes (e.g., circular economy approaches such as cascades, waste management processes and equipment)
- Production processes that are efficient in their use of materials, energy, and water
- Adoption of renewable energy in farming and other land-based activities (e.g., farms, water companies)
- Quality control processes and new metrics (e.g., environmental management and auditing systems)

Product and service innovation

– Products

- Water-efficient, climate-resilient and soil-improving crops for human or animal consumption
- Sustainable perennial energy crops and innovative novel plant-based fuels (e.g. algae)
- Sustainable fertilizers, pesticides, herbicides
- Innovative feed alternatives (e.g. insects, algae, seaweed) to reduce methane emissions from livestock
- Innovative tools for sustainable farming and land management (e.g., mechanical, or technologically advanced tools for minimal soil disturbance, robots, and automated tools for harvesting or weeding)

– Innovative services

- Services for farms and land managers aimed at improving the sustainability of land use (e.g., facilitation of good practice exchanges, environmental consulting)
- Services to customers (e.g., eco-tourism, educational farm stays)

Marketing innovation

- Informing customer choices (e.g., independently verified eco-labels)
- Awareness raising on sustainable food production and consumption, including local engagement

Business model innovation (single-actor models)

- Radical changes in product-service systems of farms and companies engaged in land use (e.g., direct sales to local customers, tools and infrastructure sharing)

System innovation (multi-actor models)

- Social innovations (e.g., new forms of farming cooperatives, product-sharing platforms and infrastructures focused on sustainable goals, new relationships between nature conservation areas and the tourism sector)
- Multi-stakeholder collaborations to implement nature-based solutions (e.g., ecological corridors, catchment management)
- Multi-actor circular product-service systems (e.g., industrial ecology approaches on farms or forests)

Institutional and policy innovations

- Novel policy instruments and new designs of policy instruments (e.g., performance-based payments for delivering public goods, circular and nature-positive public procurement)
- New planning and territorial governance of ecological areas (e.g., catchments, or ecological corridors)

Policy principles for land use transformation

The Commission believes the UK Government, and the governments of the devolved nations, have a key role in making the practices in Box S2 dominant in UK farming and land, and suggests the following key features of policy for nature-positive landscape change.

First and foremost, **Britain needs a strategic policy framework and policy roadmap for a long-term landscape-wide transformation.** The framework should cover all types of urban and rural land, though the focus of this report is on the latter. Land and landscape changes are key to sustainability because of the need to grow food in ways that are consistent with both the net-zero target and the wider regeneration of nature.

The policy framework should be underpinned by a clear set of targets and milestones, and an evaluation and monitoring system to measure progress towards desired goals in different regions and allow for the fair sharing of costs and rewards of policy interventions.

The Commission expresses its strong support for fostering multifunctional land use: an integrated approach that promote multiple land uses while considering the economic, environmental, and social aspects of land use change. This is consistent with the approaches proposed earlier by the FFCC (2019) and more recently by the National Food Strategy (NFS, 2021). To this end, land use policy must have a strong place-based delivery, evaluation and monitoring to ensure that multifunctional approaches are aligned with the overall environmental goals.

In addition, **the policy framework should inspire and support a wide variety of land use innovations and local pathways of change.** With no one size to fit all situations, the framework must empower local partnerships to create and experiment with alternative approaches to sustainable farming and land management adapted to local contexts, including conservation agriculture, regenerative agriculture, agroforestry, and agroecology (NFS, 2021).

There is a danger that policy changes are fragmented and uncoordinated. In contrast, **these changes should be based on a systemic understanding of sustainability transitions and resilience.** The policy framework should account for challenges of climate change alongside other environmental priorities, including biodiversity and ecosystem health, to harness potential synergies and avoid unnecessary trade-offs (CCC, 2021). The framework must also consider co-evolution and co-existence of ecological, social, and economic systems. In other words, the vision must include at its heart both ecosystems and local communities who live on and live from the land, today and in the future. Sustainable land use depends on local conditions and needs to engage local communities and farmers.

Policy makers should explicitly recognise other values delivered by landscapes in policy making and investment decisions, beyond an exclusive consideration of “value for money”. Decisions based on these wider values may favour farming practices which have lower yields but create better quality local jobs, offer recreational value for local communities, produce healthier and more nutritious food and are less environmentally damaging.

The policy framework needs to include demand-side considerations, alongside the supply-side. A singular focus on changing agricultural practices without considering the need for social and behavioural changes in established food habits and dietary patterns is likely to prove ineffective and fail

to address the set of interconnected environmental challenges facing the UK. For instance, there is growing understanding of the need to transition to less and better animal farming and reduce meat and dairy consumption to reduce environmental pressures on climate and land. A shift towards more plant-based dietary patterns is already underway in the UK (Alae-Carew, 2021) and may create more space for a nature-positive and socially desirable use of land.

Government should increase its investments in agricultural innovation that supports experimentation, demonstration, and scaling of nature-positive change fostering landscape-wide systemic transformation towards sustainable food production.

Recommendations

Innovation policy with an ambition to transform landscapes and land use practices across the UK requires a comprehensive portfolio of instruments. It needs to go beyond a narrow focus on financing R&D and technology deployment and employ a wider variety of economic, regulatory and innovation schemes to create markets and learning environments enabling nature-positive innovation.

The Commission recommends that the Government:

Boosts public investments in nature-positive innovation to foster multi-functional land use

Recommendation 1.

Payments for farmers and land managers under the ELMs need to reward farmers and land managers for creating multiple benefits for nature and the local community. When designing the schemes, Government should strive for public investments in nature-positive innovation to leverage private finance to generate greater returns to farmers and landowners than less environmentally positive alternatives.

Recommendation 2.

Investments in research, innovation, and the wide adoption of innovative land management practices need to be significantly increased. The investments should foster nature-positive transformation of the UK landscape and food system and include technological and non-technological innovation, notably business model innovation and land management models, such as agroecology or regenerative agriculture, and foster experimentation and demonstration of place-based landscape-wide transformations. Investment in nature-positive innovation should consider the importance of supporting local innovation capacity and peer-to-peer learning for developing and scaling up innovations.

Creates markets and a regulatory framework that incentivise, reward, and protect nature-positive innovation for land

Recommendation 3.

Economic policy instruments must ensure that farmers and land managers are rewarded for delivering multiple environmental and social benefits. Such instruments, including carbon pricing and markets, subsidies and public procurement, need to create and shape markets by embedding sufficiently high valuations of carbon and nature benefits to incentivise landowners and land managers to choose nature-positive alternatives over business-as-usual activities. Public procurement, such as dynamic purchasing systems (DPS), can be used to promote nature-positive innovation to deliver healthy and sustainable products and services to public-sector institutions.

Recommendation 4.

R&D and innovation schemes should be designed to nurture local innovation ecosystems and peer-to-peer learning to foster nature-positive innovation. Policy support and investments for R&D and nature-positive innovation need to be co-designed and delivered with regional and local stakeholders to better respond to specific local challenges and contribute to levelling up.

Recommendation 5.

Regulations and support for agriculture from Government must be consistent with its environmental objectives and targets. Regulations need to foster market redesign towards a shared direction of transformation by enforcing consistent binding targets, norms and standards across Britain while ensuring that the regulatory framework is agile and adaptable to the changing context and new evidence. The Department of Business, Energy and Industrial Strategy (BEIS) should bring forward an ambitious domestic agriculture and land use decarbonisation strategy, setting out a nature-positive vision and actions to reduce emissions and create thriving net zero-aligned landscapes and communities.

Recommendation 6.

Trade deals need to be aligned with the net-zero target, and environmental and farming standards and priorities. The government should adopt the Trade and Agriculture Commission recommendations on core standards to ensure that environmental standards are not compromised by current and future trade deals and have similar mandatory regulation mechanisms as now exist for food standards and food safety.

Establishes a long-term policy and governance framework to ensure coherence between and the benefits from the Government's instruments and schemes transforming the land

Recommendation 7.

A long-term land use policy framework to create sustainable and resilient landscapes needs to be established. The framework should set out a shared spatial vision and process of how the UK, its nations, and urban and rural areas can work together for landscape transformation. Government needs to use the current policy momentum to generate, through democratic deliberation, a shared vision that sets out a strategic direction for land use change and a common strategic framework for land use policies and initiatives across the UK's nations.

Recommendation 8.

A Landscape Transformation Committee (LTC) should be established to oversee and inform policy for landscape transformation. This public body would bring together relevant stakeholders responsible for supporting sustainable land management to advise on the design and implementation of instruments and legislation that foster innovation. The LTC should establish regional platforms to ensure wider inclusion and active participation in landscape governance and foster policy learning and exchange of experience in implementing nature-positive innovations across the UK. It should work closely with the National Infrastructure Commission.

Recommendation 9.

A policy roadmap should be developed to inform land use planning decisions. The roadmap should be based on a common overall vision and strategic framework for policy integration, evaluation and learning to ensure policy coherence and synergies between various policy schemes. The roadmap must consider different perspectives on the policy portfolio from different places and stakeholders, to ensure that the design and delivery of policy schemes respond to specific local challenges and opportunities.

Recommendation 10.

The roadmap needs to be accompanied by a cross-cutting evaluation and monitoring system. This should be focused on landscape and land use and be developed to evaluate the impacts of the policy portfolio and to ensure that lessons are drawn and exchanged between various instruments and schemes. The capacity to draw lessons from past initiatives, such as Nature Improvement Areas (NIAs), as well as to draw lessons from pilot schemes and policy experimentation needs to be strengthened. The LTC could play a major role in such evaluation.

We believe that our recommendations are coming at a crucial time for the policy reorientation around agriculture and land use that is currently taking place. We very much hope that they will be received favourably by the UK and devolved Governments as a contribution that helps them achieve the climate, nature and environment targets to which they are committed. Commission members remain ready, as a Commission, as representatives of their organisations, and as individuals, to give such further advice and support as policy makers feel they would like.

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The Nature-Positive Innovation Commission

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The Nature-Positive Innovation Commission (NPIC)

The Nature-Positive Innovation Commission (NPIC) was formed following the work of the Green Innovation Policy Commission (GIPC) (see <https://www.ucl.ac.uk/bartlett/sustainable/green-innovation-policy-commission/about-green-innovation-policy-commission-gipc>). Its objective was to take a deeper look at the innovation that was required in UK agriculture and land use more widely, in order to regenerate nature, reduce greenhouse gas emissions and remove carbon dioxide from the atmosphere. NPIC brought together many of the leaders in UK thinking and practice related to regenerative farming and nature-positive land management. Implementation of its proposals would reverse the decades-long depletion of nature brought about by trends in land management since the 1960s.

For further information on the Commission please visit <https://www.ucl.ac.uk/bartlett/sustainable/research-projects/2022/nov/nature-positive-innovation-commission-npic>



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