A Sustainable Farming model for the future

Executive Summary

The global food system faces three significant and interlinked challenges: climate change; nature recovery; and food security. The UK food system is extremely exposed to all three yet is only committed to binding targets addressing the first two - leaving food security at even greater risk. This document attempts to define how a new, more sustainable model for UK agriculture that ensures a just transition could not just help Governments reach their binding targets amid a new sense of optimism and opportunity but also address the critical issue of food security.

Recent geopolitical developments have led the UK Prime Minister to restate that 'food security is national security'. However, changes to UK agricultural Inheritance Tax relief and the unexpected scaling back, suspension or closure of various agricultural support schemes in England has significantly shaken confidence among farmers and growers. This is likely to not only affect current delivery against environmental targets, but also the production of food. As was recently observed in Farmers' Guardian: "If the country is to have guaranteed food security, then stability and certainty is needed within supply chains."

There are wider challenges too. Increasingly frequent and damaging shocks to UK food production and distribution questions the wider resilience of our food system to current and future disruptions, which goes further than simple food security. With this in mind, we have identified the following vision.

Proposed vision "A nation nourished by a transformed food system with a thriving UK agricultural economy which:

- Responsibly produces more sustainable, safe, nutritious and affordable food within equitable supply chain relationships.
- Is resilient to external trends and shocks.
- Incentivises the UK to specialise in producing what it's good at, optimising its resources while working with trusted trading partners who optimise theirs; and
- Is supported by data, insight and effective knowledge-sharing, empowering those working across the whole system to make informed decisions."

To deliver this vision, commitment to an efficient increase in UK production is needed alongside long-term, measurable environmental improvement. To deliver this, Government should review the definition of a 'public good' so that it includes food security or, better still food resilience, and completely review the values that have been determined for the delivery of the public goods currently within the Environment Land Management schemes (ELMS), and specifically the Sustainable Farming Incentive (SFI).

Innovation in data, science and technology will be critical, with co-designed solutions achieving better adoption rates from farmers. Circularity will reduce waste and optimise resource efficiency, and the elevation of agriculture and the wider food and drink sector into desirable employers will increase the inward flow of

home-grown talent. Coupled with this, incentives for both entering the industry and upskilling those already in it will not only improve exploitation of new technologies but will drive efficiency and improve reputation.

Developing capacity to respond to market opportunities domestically and abroad will be helped by removing blockers in the planning system, encouraging investment in innovation, and optimising the UK border regime and trade policy.

Above all, collaboration will be critical for the benefit of all: between Defra departments; between Government departments and especially linking food, environment, education, health and energy; and across devolved nations. It will be especially important to link the forthcoming Food Strategy, Land Use Framework, SFI review, Farm Profitability Roadmap, and other such workstreams.

Background

Climate change: Rising temperatures are leading to more severe and more frequent weather events, significantly impacting food production and availability. The UK experienced among its lowest outputs on record for oilseed rape and wheat in 2024, with both yields and area affected by extreme flooding during the winter and spring. In Spain, widespread crop failure was the result of a year's worth of rain falling in just eight hours on 29 October 2024; Spain provides ~32% of the UK's fruit and vegetable imports. Food transportation is also affected, with drought in the Panama Canal severely impacting global shipments of grain and soya at the end of 2023.

Nature and biodiversity: Loss of these is accelerating through habitat degradation and changing climate. Soil degradation and erosion alongside pollinator loss are reducing crop yields and increasing reliance on synthetic fertilisers. Wider impacts from the loss of nature and biodiversity are felt beyond the food system, with impacts on ecosystem services including clean air and water, and a reduction in human quality of life.

Food production: Our UK food system continues to provide most consumers with high-quality, safe and affordable food, with share of expenditure on food out of total disposable income among the lowest globally, at around 10%. However, while the Office for National Statistics (ONS) projects a population growth of 7.3% between 2022 and 2032, current policy on UK land use remains largely environment led. This risks domestic food production, which is already challenged by climate change and nature loss but now exacerbated by geopolitical instability, labour shortages, and crop and livestock disease. With the global population expected to continue to grow until at least 2050, the food system will need to feed many more people while dealing with more frequent shocks and disruption – but without incurring further environmental, economic, social and health costs.

Climate, nature and food are inextricably linked pillars: At this point, the UK Government has binding commitments for only two of these: progress on climate change has been secured through the Climate Change Act, committing government to reduce greenhouse gas emissions by at least 100% of 1990 levels by 2050 to reach 'Net Zero'; and nature through a global target to protect 30% of the planet for nature by 2030 ('30x30'), signed at COP15. This leaves food system resilience vulnerable as domestic food production 'yields' to nature and climate commitments. Ironically, while there is already considerable engagement from farmers on climate and nature issues, the move away from what they perceive as their primary role risks hampering further engagement and progress.

Food security: The Labour Government manifesto stated that 'food security is national security', and the Prime Minister has repeated this frequently since election. While new public procurement ambitions have been announced, no ambition for food production or food security exists. A Food Security Index published by the previous Government in May 2024 was a welcome step. However, the index in its current guise is backward-looking and contradicts IGD's analysis of risk across the food system. It is also not binding, and overlooks a number of complexities including: the role of the whole system in delivering food to consumers (note recent cyberattacks against retailers), the importance of climate-smart production methods, the role of food in enabling good health (as referenced in the National Food Strategy), the UK's competitive advantage in growing some foods the world needs versus our reliance on imports of others, and inherent weaknesses in processing and transportation capacity and infrastructure. It is also inescapable that for farm businesses to invest in and grow their food production capability as well as future-proof it, they need confidence and stability.

The review of ELMS and SFI gives the Government the opportunity to examine whether the desired outcomes are being delivered, and if the incentives are too rich in some areas and too poor in others. More widely, with ELMS based on the premise of 'public support for public goods', the review offers the opportunity to consider whether the time is right for food security or even food resilience, as a more holistic and proactive concept, to be redefined as a 'public good'.

Food Production and Transition Challenges

A number of specific challenges (some detailed in IGD's 2024 report and others emerging since then) underlie these issues and hamper transition to a more sustainable model that include food resilience.

Land use: Competing demands for renewable energy production, biofuels, forestry, housing, recreation and nature recovery have already created pressure, only to be exacerbated by the impact of climate change on UK growing conditions. Recent boosts to compulsory purchase powers to support development and nature only add to concerns. Proposals for a new land use framework for England indicates up to 9% of land will need to be taken out of food production to meet national Net Zero targets. Concerns also remain over who will hold Government agencies, businesses and local authorities to account once any framework is in place.

Government support: Given the prioritisation of Net Zero and 30x30, Government support regimes are likely to have a major impact on food production. This was certainly the case with England's SFI, abruptly suspended in March 2025 with no plans to announce a successor scheme until well after the Spring Statement. Before SFI ran out of money, some of its measures took land entirely out of production in return for supporting carbon sequestration or nature, albeit eventually capped at 25% of land per applicant; analysis indicates this took 2% of land out of production in 2024, translating to a likely 3% reduction in crop output. Whatever the form of a replacement scheme, it is likely to prioritise travel towards the binding Net Zero and 30x30 commitments at the expense of food production – unless a more balanced approach can be part of the design. Meanwhile, Government support in other forms includes a planned loosening in planning restrictions for farm infrastructure in England, and new capital grants for investment in technology.

Disease: Climate change will affect disease, pest and parasite prevalence within UK crops and livestock with potentially significant effects on food system resilience. Improved monitoring and technologies such as gene editing will become a likely focus of the new AgriTech Centre. Defra has recently announced additional funding for APHA to improve resilience against disease, but depleted border control resources have also raised concerns that the UK is 'walking into a major food safety storm'.

Water: Climate change is shifting weather patterns around the world. In the UK, summers are projected to become drier (we are experiencing the driest spring in over a century in 2025), and winters, wetter. Overall, summer rainfall is expected to decrease by around 15% by the 2050s in England; and between 2010 and 2019, UK winters were on average 12% wetter than the period between 1961 and 1990. UK water quality is poor: only 14% of rivers are thought to be in good ecological health, in part due to agriculture. It is likely that the focus on water quality will increasingly include farming's impact.

Input pressures: Current agricultural practices are supported by a network of inputs, including energy, fertiliser and labour. These are subject to volatile price and long-term demographic changes. Food resilience is inherently linked to energy security. Currently, the UK has only one operational fertiliser plant, producing ammonium nitrate from imported ammonia rather than UK gas. Agricultural producers are therefore reliant on global imports, often from outside the EU, and are exposed to geopolitical instability and regulatory change such as the Carbon Border Adjustment Mechanism.

Labour: While agriculture is increasingly focused on automation, it still relies on 462,000 workers across the UK, and thousands of seasonal workers each year. The seasonal workers' visa scheme has been extended for certain parts of the food system, although this does not address a chronic shortage of semi-skilled and skilled permanent labour, as reported in the independent review into labour shortages in the food supply chain.

Finance: To successfully upgrade technology or automate, farm businesses are reliant on access to capital and finance. Tenant farmers often have insufficient assets against which to borrow, and high interest rates and increasingly unreliable crop yields may deter banks from lending. On a more positive note, some banks are exploring how funding can be linked to environmental improvement. For example, Lloyds Bank has

partnered with the Soil Association Exchange, and Oxbury offers a transition facility with attractive rates linked to improving soil health using Downforce technology.

Operational infrastructure: Carbon and nature markets offer opportunities to farmers. The Green Finance Institute provides comprehensive support to those wanting to access these markets, but also highlights areas requiring Government intervention, such as concerns over data safeguarding, standardised accounting, alignment of tax regimes, and confirmation of how Government and private income from these markets can be 'stacked'. Soil Association Exchange has also launched Exchange Market, offering insetting opportunities for farmers within some supply chains.

Ensuring a just transition: The Government has recently announced more action on contracts and supply chain fairness. However, it is inevitable that farms will continue to consolidate, increasingly so with changes to Inheritance Tax (IHT), average size will grow in an ever-more risky landscape. IHT aside, many large lowland farm businesses can respond quickly to incentives and invest appropriately but there remains an important socio-economic and cultural role for both upland farms and small to medium sized mixed farms in lowland areas already farming in a more nature-friendly way. Both these farming models receive more attention and opportunity in Wales and Scotland, but fall through 'cracks' in terms of current Government policy in England, having little or no opportunity to draw down funding. If these sectors are to be supported ensuring their communities continue to thrive, what 'public goods' can they deliver in return?

A vision for the food system in 2050?

In late 2023, the AFN Network+ (UKRI Agri-food for Net Zero Network+) published its report outlining four plausible futures for a Net Zero UK agri-food system in 2050, dependant on geopolitical stability, markets and social change - they are listed overleaf.

The scenarios were built over several months of workshops and events with agri-food specialists and stake-holders from within the AFN Network+, as well as about 40 other individuals from: UK universities and research institutes; central Government departments and agencies involved in food, health and environment; international development agencies such as the UN; national and local farming groups covering both conventional and environmentally-progressive agriculture; environmental organisations; international commodity trading organisations; the security and diplomatic services; commercial organisations; and international financial services including national banks. These scenarios provide an understanding of challenges and opportunities ahead:

- Scenario A is clearly undesirable; it is widely acknowledged that food system change is required.
- Scenario B is highly desirable, but the shifts required are great, and it seems unlikely in an increasingly volatile world with the move away from global free trade. However, the principles of a more circular economy should feature in any food strategy.
- Scenario C could be considered 'worst case' but features are evident already: the food system faces significant risks and building resilience is critical, although self-sufficiency is unrealistic.
- There are elements of Scenario D that resonate and would be more likely to garner support from farmers and businesses, provided they are supported and incentivised to deliver it. Building on Scenario D being the most likely, there is also additional opportunity for farming, to produce climatically relevant food for export to a high standard, which will need focus on an alignment and elevation of Brand Britain.

Hence a vision balancing ambition with feasibility would be…

"To have a nation nourished by a transformed food system with a thriving UK agricultural economy, which: responsibly produces more sustainable, safe, nutritious and affordable food within equitable supply chain relationships; is resilient to external shocks; incentivises the UK to produce what it's good at while working with trusted partners who optimise theirs; and is supported by data, insight and knowledge-sharing, to empower informed decision-making."

SCENARIO A – BUILD BACK FAST AGAIN

An unstable and globalised world, where economic growth is key (essentially business as usual). Permanent economic crises increase inequality and reduce financial support for farming and trade. Market volatility makes resilience building difficult for households, supply chains, and agriculture. Issues of food security are exacerbated by weak governance. Technology is seen as the main driver of change, but benefits are unevenly distributed. Rural-urban migration increases as people lose productive farmland, which is given over to other uses (e.g., biofuels) or converted to urban centres with small arms of high-tech farms.

SCENARIO B – CIRCULAR WORLDS

Geopolitically stable and globalised, underpinned by circular sustainable systems and values. Sustainability and wellbeing are a stronger focus than economic growth. There is a shift away from industrial agriculture towards more localised food production systems that use agroecological approaches. Technology is used to reduce waste through better inputs, outputs, and upcycling. Agricultural landscapes are reimagined for multiple functions including biodiversity protection. There is greater investment in rural areas which reduces rural-urban migration. However, inequality remains high due to lack of access to land or capital for some farmers.

SCENARIO C – SELF-SUFFICIENCY

An unstable, regionalised world, where a circular economy is driven by necessity rather than choice. Frequent geopolitical crises disrupt trade flows, making self-sufficiency key for many nations. This 'isolation' leads to an 'island-for-island' approach with little cooperation between countries on issues such as climate change or biodiversity loss. Technology focuses on efficiency gains within existing systems rather than innovation. There is significant investment in local infrastructure, but limited resources mean that progress can be slow, leading some farmers to struggle against poverty traps while others thrive depending on their starting position.

SCENARIO D – THE RIGHT TO FOOD

A geopolitically stable world with a strong focus on sustainability built on 'green growth'. A high-tech post-fossil fuel future sees diverse, inclusive economies based around renewable energy sources. These drive new forms of employment opportunities across sectors, including agriculture, where precision farming techniques help maximise productivity while minimising environmental impacts. Greenhouse gas emissions from livestock production systems are replaced by lab-grown meat substitutes made from plant protein extraction. Inequality is lower than in Scenarios A & C.

Building blocks to deliver the vision

- Recognition by Government of the food system's critical role in feeding the nation, contributing to domestic and rural economies, achieving Net Zero while supporting nature recovery, and reducing diet-related disease – and the UK's current level of exposure to risk across all these areas.
- Recognition of food security - or better, food resilience as a public good, unleashing funding for a more 'just' transition recognising a wider definition of the value food and farming can deliver.
- A Government ambition to increase UK production to feed a growing population and improve risk resilience – aspirations of 70% self-sufficiency would be in keeping with other European nations. Specificity of desired growth areas are needed; these could reduce the need for importation and access valuable internal markets. Reviewing the goals of ELMS and SFI would enable funding for public goods to deliver growth in the right areas of sustainable food production.
- Reinforced commitment from all industry stakeholders to:
    - long-term, measurable environmental improvement, especially on soils and biodiversity.
    - structural adjustment and improvement of data collection across the sector (farms, environment, food processing), starting with support for farm baselining on emissions, carbon storage and biodiversity.
    - management and smart use of the data arising to measure progress and better inform decision-making from farm upwards and across the supply chain.
- An engaged farming sector which feels valued, consulted and involved in co-designed solutions.
- An improved framework for research, innovation, digital technology and automation, co-ordinated through the AgriTech Centre, with greater collaboration with AHDB on farm-scale pilots to understand what works, and what doesn't, and where adoption barriers exist.
- Support from Government at all levels for greater connectivity across economies and geographies to create meaningful circularity.
- A home-grown talent pipeline brought about through The Institute for Agriculture and Horticulture (TIAH), raising the appeal and value of recognised ongoing CPD as part of a professionalised industry—for example through incentives for young farmers to gain training such as tax breaks—to aid the adoption of best practice and innovation, including improved connectivity with the careers system.
- Engagement from education services to ensure both understanding of food systems and future skills needs are met by school curricula.
- Support from Government, farm assurance and industry for high quality standards alongside fair-trade deals and border policies that provide a level playing field, protect from inferior or unsafe production, and enhance domestic and export opportunities.
- Government action in unlocking growth opportunities, including removing blockers in the planning system and encouraging investment in innovation.

Combining workstreams

The key to delivering the above elements is a vibrant professionalised agrifood sector, with all actors in the supply chain from farm to fork engaged and collaborating to deliver a market-focused end goal.

A large number of independent initiatives are already underway to progress the challenges articulated earlier in this paper, including AHDB's environmental baselining, the Allerton Project from the Game & Wildlife Trust examining nature recovery, Rothamsted's review of regenerative farming techniques, Queen's University's Carbon Net Zero study, the Food, Farming and Countryside Commission's (FFCC's) response to the proposed Land Use Framework, and the Countryside & Community Research Institute's (CCRI's) behaviour change studies - to name but a few.

In conclusion, the industry must find a way to bring these initiatives together in alignment with the forthcoming Government food strategy, farm profitability roadmap, and land use framework, which are all key enablers of change:

...to build a clear and aligned long term vision for food that Government agencies and Regulator initiatives align and support a policy of sustainable growth ensuring a just transition that can drive investment for the future.

This is an opportunity to work together, with experts across the whole food system including – importantly - farmers and growers, to consolidate fragmented research and small-scale pilots, to drive innovation at scale, and deliver a thriving food system.

Summary of Recommendations

- Commitment to increase UK production - growth areas identified and incentivised to increase food security / resilience.
- Food security / resilience to be recognised as a public good.
- Aligned measurement of environmental impact - use of data to measure progress and better inform decision-making from farm upwards and across the supply chain.
- Improved framework for research, innovation, digital technology and automation, involving co-ordination and support.
- A home-grown talent pipeline raising the appeal of working in a professionalised sector, with incentives for training.
- Government support for farm assurance and high industry standards alongside fair-trade deals and border policies that provide a level playing field, enhance domestic competitiveness and open export opportunities.
- Government action in unlocking growth opportunities, including removing blockers in the planning system and encouraging investment in innovation.
- **Long term vision for food which Government agencies and Regulator initiatives align with and support, with policies that ensure a just transition.**

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