

Wildlife and Countryside Link response to the EAC inquiry: Food security risks of climate change and biodiversity loss

December 2022

Wildlife and Countryside Link (Link) is the largest nature coalition in England, bringing together 69 organisations to use their joint voice for the protection of the natural world.

Summary

1. Climate resilience, biodiversity health and food security are all inextricably linked. Policies must be geared towards tackling these issues together.
2. The Agricultural Transition- including but not limited to Environmental Land Management (ELM)- will be crucial for addressing these three crises. However, it has been beset by delay, a lack of coherence and an absence of measurable outcomes for climate and biodiversity, which ultimately will harm food security and the resilience of the farming sector.
3. In particular, there is currently no credible Government plan which details what contribution ELM and other land-related policies will make to Net Zero, and the Environment Act targets. This must be remedied quickly, if the Government is to meet these objectives.

Climate change and food security: projected effect, risks, and mitigation

What are the main risks posed to future UK food security from projected climate change and biodiversity loss pathways?

4. The Government's Food Security Report 2021 identified climate breakdown and nature decline as the biggest threats to domestic food security: *'Climate change and emissions pose significant risks to production and food security. As a consequence of unusual weather patterns associated with climate change, wheat yields in 2018 were 7% below the 2016 to 2020 average, and in 2020 were 17% below that average.'*ⁱ
5. Climate change and biodiversity loss affect the majority of foods produced in the UK. The long hot summer of 2018, of a type we can expect to see more of in the years ahead, saw onion yields down 40%, carrot yields down 25% and potato yields down 20%.ⁱⁱ
6. These extreme climatic conditions are not an anomaly, but are a pattern emerging as a result of human induced climate change.ⁱⁱⁱ These events are now happening more frequently, and with greater intensity. In addition to pressure on food systems, these conditions are increasingly threatening the natural systems which play a vital role in mitigating and adapting to the impacts of climate change.
7. These impacts are of understandable concern to farmers. Research in 2021 by the University of Exeter found that each and every farmer interviewed *'had experienced or witnessed issues caused by extreme weather such as heavy rain or prolonged dry spells in recent years, and expected these to intensify further'*.^{iv}

8. Until now, outdated agricultural policies have exacerbated the impact of these crises, with negative economic impacts. For example, the Food Security Report suggested that *'soil degradation, erosion, and compaction result in losses of about £1.2 billion each year and reduce the capacity of UK soils to produce food'*.^v

How do existing UK food production, import, and export practices contribute to climate change and biodiversity loss?

9. The effects of environmental threats are compounded by widespread reliance on conventional farming methods, which depend on large-scale and expensive inputs. which are reliant of fossil fuel for their production and are largely imported.
10. A continued reliance on fossil fuel-based products on farms is one of the reasons that the sector continues to be a significant emitter of carbon; farming makes up 0.52% of UK GDP but 12% of our territorial greenhouse gas emissions.^{vi,vii}
11. This is another clear reason for urgent help for farmers to transition away from an over-reliance on fossil fuel inputs (e.g. chemical fertiliser) and adopt more regenerative farming methods. If high prices persist (due in part to the conflict in Ukraine) for another 12 months, the additional fertiliser bill for British farmers could be £760 million, assuming farmers purchase and apply the same quantities of chemical fertiliser as in a normal 12-month period.^{viii}
12. The reliance on fertiliser and fuel from overseas gas is increasing UK farming costs, just as climate and ecological damages are reducing the amount of UK food produced. These are two closely linked problems, with the former exacerbating the latter.
13. Not only is fertiliser use costly for farm businesses it is also damaging rivers, air and soils. An average 40% of nitrogen fertiliser in the UK is left unused or leaks into the environment, contributing to soil erosion and exacerbating climate change by evaporating into the environment.^{ix} GHG emissions from fertiliser production are also high. For the UK arable sector, nitrogen fertiliser production and use accounts for 60%-70% of agricultural emissions. Yet a recent report suggested farmers could reduce average nitrogen use by 40% on a wheat crops without a yield penalty.^x
14. As set out in the Climate Change Committee's Sixth Carbon Budget, significant reductions to carbon emissions from UK agriculture could also be made by lessening methane produced from intensive livestock farming.^{xi} A 2022 report from the Boston Consulting Group suggests that investment in alternatives to livestock farming *"has the highest CO2e savings per dollar of invested capital of any sector"*.^{xii} Climate change and biodiversity loss affect the majority of foods produced in the UK.
15. If UK farming continues to operate to recent precedent, continued fuel and fertiliser reliance will make production yet more expensive in an increasingly uncertain world, whilst contributing to an accelerating decline in yields driven by climate and ecological breakdown. The status quo is an escalator to chronic food insecurity.

How self-sufficient is the UK in producing food? What practices could the UK adopt to become more self-sufficient while reducing the emissions associated with agriculture?

16. The UK produces around 75% of its own food.^{xiii} There are many things that influence domestic food supply. For instance climate adaptation and mitigation play a large role in shoring up improved self-sufficiency. (Other factors include fairness in the supply chain, trade deals and trading standards).
17. Biodiversity, climate resilience and food security should not be competing priorities – they are completely interdependent. Farming in a way that supports biodiversity, whilst adapting to and mitigating climate change, will underpin and secure resilient and profitable farm businesses well into the future.
18. Investment in nature-friendly farming is proven to help maintain and even improve yields. One study showed that organic systems have the potential to produce yields up to 40% higher than conventional systems in times of drought.^{xiv} One study demonstrated that managing 8% of a farm for nature helped to maintain and even enhance yields of some crops and led to no loss in economic or nutrient value. Conversely, one UK study showed that a 30% decline in pollinator numbers over 10 years would cost more than £188m per year in lost crop yield.^{xv} If supported by public goods payments, nature-friendly farming practices would provide the foundation for more resilient farm businesses.
19. Agroecological/regenerative practices are being adopted more widely across the board, which demonstrates the good business sense that many of these methods provide. For example, many farmers are already managing soils to improve their health and reduce the need for chemical inputs. One survey found that 92% of farmers are already using some form of sustainable soil management^{xvi}, with others going further and cutting out chemical fertilisers altogether to replace them with plants that restore soil richness naturally.^{xvii}
20. Agroecological practices can also increase profitability. For example, the cost saving for a tonne of no-till wheat (a sustainable arable farming practice) is an estimated £23 per hectare compared to the average UK farm.^{xviii} A case study from East Yorkshire also showed that a low/no-till system led to a 25% reduction in nitrogen applications and a 33% reduction in fuel and labour costs.^{xix} Avoiding tillage also reduces the amount of carbon loss from the soil from oxidation.
21. In the marine environment, well-protected marine sites can improve food security in the medium/long term. For example, proposed HPMAs (if delivered in the right manner) will conserve wildlife and habitats on a large scale, so the number, diversity and size of fish will increase. Neighbouring fisheries will benefit as commercially and recreationally fished species spill over into surrounding waters, helping restock our overfished seas.^{xx}
22. For this reason, strong marine protections such as HPMAs should not be seen as standing in opposition to a flourishing fisheries sector which bolsters domestic supply, but rather as complementary, helping ensure the health of our seas for generations to come. The benefits of no-take zones have been seen in Scotland in Lamlash Bay where studies have shown that

marine life has flourished since the establishment of Scotland's first no-take zone. Some species are reported to have increased by nearly 400% since protection measures were introduced, with benefits for exploited fish stocks. The designation of Lyme Bay in southwest England as an MPA added £2 million to the total value of tourism and recreation in the area and the restriction of bottom-towed fishing gear has seen an increase in the number of fish by 430% and total abundance by 370%, inside the MPA over 11 years.^{xxi, xxii}

UK preparedness: Government and market

How has the prolonged heat wave and drought in 2022 affected food growing in the UK?

23. The full economic and social impact of the extreme weather in July 2022 on the farming sector is yet to be seen, however it is clear that the extreme heat has had a negative impact on the livestock sector, as grasslands became arid, and it had negative impacts on arable crop yields for which are likely to lead to as much as 50% loss on some crops.^{xxiii}
24. The damage done by extreme weather is also long-term. As reservoirs are currently, on average at around 68% capacity- with some falling to as low as 24%- this will impact farming for at-least another year if not longer, if rainfall over the winter does not replenish reservoirs in 2022-2023. A Defra press release from November warned:

'If rainfall levels through winter are 80% or less of the long-term average, National Drought Group projections show that currently depleted reservoirs and groundwater aquifers are unlikely to fully recover and farmers would be concerned their water supply storage reservoirs may not fully refill. Large parts of the country would be at risk of drought continuing into next summer – most notably in parts of the South West, South East, East Anglia, Yorkshire and East Midlands. In more severe rainfall scenarios, the projections suggest drought conditions would be widespread, covering most of the country.'^{xxiv, xxv}
25. Additionally, many livestock farmers had use their winter feed early to feed the livestock due to drought impacts on grass growth in the summer This can drive up costs and create volatility.
26. Extreme weather is also causing a 'boom and bust' pattern in yields. In autumn 2022, unusually mild weather forced farmers to harvest potato and green vegetable crops early, leading to an autumn glut. This is likely to lead to shortages of these foodstuffs from domestic farms in 2023.
27. Crops under pressure from extremes in environmental conditions, such as drought, also become more vulnerable to other threats such as pests, pathogens, and diseases. This is further perpetuated in circumstances where poor soil health exacerbates these issues further. Addressing these complex and interlinked issues requires a systems-based change in conventional UK farming systems.
28. Climate change not only undermines the predictability and consistency of UK domestic food supplies, but it also undermines farm businesses, as increasingly unpredictable weather patterns make it increasingly difficult to plan ahead and know where investment is needed in advance.

How can the UK ensure that enough water is available for crop growing while preventing unsustainable levels of abstraction that can impact the ecology and resilience of our rivers, wetlands and aquifers?

29. The needs of agriculture, the environment and water cannot be separated. The 2022 drought led to far greater impacts on agriculture and the environment than it did on the public water supply. Droughts are expected to continue to impact agriculture as climate change will lead to more frequent, successive extreme weather.
30. The solutions must be holistic. The UK must "build back wetter", driving water consumption down and efficiency up, and leaving more water in the environment. The agricultural sector needs to be part of this. For example, payments through the Environmental Land Management Scheme should support wetland creation, farm water storage and water efficiency. This will build resilience to drought and prevent farms from running out of water, both for the benefit of wildlife, and for agricultural production.
31. However the burden of water resilience must not fall on the farming sector alone; there are a range of steps that the UK can and should be taking in addition to the above, including:
 - a. Driving greater investment in water industry infrastructure - more reservoirs, and fixing leaks - through the Price Review 24 process. No new reservoirs have been built in southern England since 1976, and we currently lose nearly 20% of our water supply to leaks, which is equivalent to 2.4 billion litres per day across England's nine major water companies.^{xxvi}
 - b. Ofwat and Defra must unlock and incentivise the use of nature and catchment-based solutions by the water industry outside of/in addition to ELM.
 - c. Removing Government blockages on a meter rollout, particularly smart meters. Fitting 1 million smart water meters in the UK each year for the next 15 years could save at least 1 billion litres of water a day by the mid-2030s.^{xxvii}
 - d. The regional and water resources management plans must all address environmental need first, and focus on reducing abstraction around sensitive sites such as chalk streams. Strategic management of water resources at catchment scale is also needed. Currently, nearly a fifth of surface waters, and over a quarter of groundwaters, do not have enough water to protect the environment and to meet the needs of fish and other aquatic life.^{xxviii}

What is the Government doing to prepare for disruption to the UK's food supply resulting from climate change impacts or biodiversity loss?

32. There are a suite of measures needed from the Government to tackle the current and future disruption that climate change and biodiversity loss will create. They include:
 - a. A Net Zero Strategy and adaptation plan for agriculture: this must incentivise greater deployment of nature-based solutions, and the reduction of climate-damaging practices within the whole food supply chain.
 - b. Core environment and welfare standards in trade to drive up standards globally: WWF and others support minimum environmental standards in domestic law for all food sold in the UK. This will drive up the standard of food production with trading partner

countries, as well as maintaining and improving standards domestically.^{xxix}

- c. A **coherent plan to meet the Environment Act targets on land and sea**. Currently, land-related policies aren't underpinned by measurable and viable sub-targets and strategies to contribute meaningfully to targets, for example the halting of species decline by 2030. It should be a priority to produce these to ensure that targets are met.
- d. An **updated Agricultural Transition Plan** to drive a transformation in farming practice to maintain stream regenerative and agroecological systems: ELM has been beset by delays and changes in approach, which ultimately delays progress on climate change mitigation and adaptation. We also have concerns that the ability of ELM to contribute meaningfully to Net Zero and Environment Act targets may be undermined by Defra's new approach announced in December 2022.^{xxx}
 - i. Sustainable Farming Incentive: While the SFI 2022 offer is now live, it is unclear what the next steps for the scheme will be, and how the scheme will contribute to overall targets. Defra is focused on uptake, however the content of the SFI will be crucial for meeting targets.
 - ii. Countryside Stewardship+ (previous Local Nature recovery): Defra plans to replace the Local Nature recovery scheme with "an enhanced version of the Countryside Stewardship scheme" dubbed 'Countryside Stewardship+'. The risk is that without significant improvement, the new version of Countryside Stewardship will deliver little for climate and biodiversity, and therefore won't enhance food security. For example, 'Environmental Targets Evidence Pack' shows maintaining the status quo would lead to a 13% decline in the farmland bird indicator by 2030.
 - iii. Landscape Recovery: it is likely that at-least another round of Landscape Recovery will be launched before the end of this parliament. However, there has been no public commitment to successive rounds of this scheme, despite the high demand for the first round. It is important that there is a firm commitment to the future of this scheme and the availability of public funding.

Does the Government's Food Strategy address the risks of climate change and biodiversity loss adequately? Does it prepare the UK to adapt to a world affected by ecological crises?

- 33. While the Government's Food Strategy is progressive in rhetoric, it failed to outline the goals, metrics and mechanisms through which the Government will tackle the impact of biodiversity loss and climate change on the UK food system. Clear recommendations from Henry Dimbleby's National Food Strategy Independent Review on how food systems could contribute to climate and nature objectives were not taken up.
- 34. The strategy fails to cover demand side drivers and how it will support the societal shift to sustainable and healthy diets which is required if we are to tackle the climate and biodiversity

crises and produce enough food to feed ourselves well.

35. The Strategy largely reaffirmed commitments that the Government have already made. While there are clearly several ambitious commitments on nature and climate such as Net Zero and the halting species decline by 2030, the Government Food Strategy was a missed opportunity to crystallise how the food and farming sectors (including retailers) can contribute to those overarching goals.
36. It also failed to tackle trade deals and agricultural imports in a way that would prevent UK food supply from driving ecological damage abroad.

What role should the Government take in ensuring that land is available to secure the UK's food supply in the context of a changing climate?

37. There are a number of pressures on land use which can and should be addressed. Intensive livestock production is addressed on paras 46-49 of this response, however other steps that the Government should be taking include:
 - a. **A Land Use Framework**
 - b. **A Food Waste Reduction Strategy**
 - c. **Avoid the incentivising of biofuel production**

38. A national Land Use Framework should direct local/regional strategies, which are built upon community consultation and which identify opportunity areas and scenarios, which better inform about trade-offs and help guide decision-making on land use at the local level. The Framework should comprise of the following:

- a. **Purpose:** to provide national strategic planning for all land uses, with the primary aim of achieving sustainable land use, the cornerstone of which is a healthy natural environment.

With limited land in England, a national spatial strategy should consider all land uses (nature, carbon, agriculture, development, recreation, and other critical natural and built infrastructure), maximizing co-benefits and, when necessary, managing trade-offs, to ensure sustainable land use.

A healthy natural environment is the foundation of all successful and sustainable land use of people's health and wellbeing. Restoring and conserving a healthy natural environment for future generations must be the primary aim of a land use strategy.

- b. **Content:** to identify national land use objectives, strategically and spatially map their requirements, overlaps and opportunities, and connect these objectives to local and regional policies and decision-making.
- c. **Use:** to guide national policy decisions about land use and inform specific plans or decisions. In particular, a Land Use Framework should be guided and used by Local Nature Recovery Strategies.

39. Balancing trade-offs and smarter land use requires a better understanding of different land uses that have multiple benefits. For example, agroforestry provides multiple benefits both

to farm businesses and to the wider public including carbon sequestration, food production, soil health, livestock shelter and biodiversity benefits. Instead of looking at singular land uses with singular benefits, farmers and land managers must be equipped with the tools needed to assess which types of land use have multiple benefits, so that they can make the best use of their land.

40. A Land Use Framework should also address the trade-offs between land for food and nature, and land for development. Building development on prime agricultural land is putting a strain on the UK's food system. Over the past 12 years, more than 14,000ha of prime agricultural land have been lost to development. This is equivalent to the loss of around 250,000 tonnes of vegetables which is enough to provide almost 2 million people with their '5-a-day' for an entire year. ^{xxxix}
41. Much of the UK's land is used for non-food crops. Biofuels for example present a challenge for food production in the UK. In 2021, an estimated 121,000ha were used to grow biofuel crops^{xxxix}. This land could instead be used to grow food to feed 3.5 million people per year.^{xxxix} A focus on increasing biofuel production in future as a way to meet climate objectives and meet higher energy demands also poses risks for food security. An area twice the size of Wales would be needed, in addition to increased imports of biofuels if a pathway to net zero incorporates more BECCS. This would have negative consequences for nature, climate and people.
42. A Food Waste reduction strategy should address the drivers of waste. These include extreme weather, pest infestations, overproduction and market saturation, fluctuating market prices and more^{xxxix}.

Securing a sustainable food supply

What are the most environmentally friendly ways of producing a secure supply of nutritious food?

43. Some of the most effective measures to secure a supply of nutritious and nature/climate-positive food are:
 - a. **Managing at least 10% on farms for nature**,. This is critical to boost on farm biodiversity, including pollinators and pest predators. Studies from across the UK and Europe show that managing around 10% of a farm for wildlife enables species to recover locally.^{xxxix} Further modelling suggests that if around c30–50% of all farmers undertook this level of provision it would be possible to drive landscape scale species recovery.^{xxxix}
 - b. **Deploying regenerative techniques** to improve soil management, such as reduced tillage, cover cropping and the use of leys.
 - c. **Adopting a cyclical approach to nutrient management**.
 - d. **Using integrated pest management** to reduce reliance on pesticides.
44. Mechanisms to drive the above measures include:
 - a. **Ambitious ELM schemes**: This would incentivise a 10% target for nature on farms, and would underpin regenerative practices such as integrated pest management and

reduce tillage.

Speeding up the transition towards a new farming system that works with the grain of nature is vital for ensuring future food security, establishing a new and more certain contract between farmers, government and society, and therefore creating the right environment for farm businesses to prosper. In contrast, a two-year delay to the transition would halve the contribution of the new ELM schemes to the fifth carbon budget (2028-32), leaving a substantial gap in the UK's Net Zero plans. In other words, if unsustainable methods of food production are not addressed through policy and support for farmers now, the very ability to produce food will be undermined by nature decline and climate change in future.

- b. **A robust and properly enforced regulatory baseline:** To protect the natural assets upon which food production relies will also require a stronger regulatory baseline, which disincentivises environmental harms. For example, hedgerows must be better protected in law to ensure that fertilisers and pesticides are not used on or near them; waterbodies must have statutory buffer strips, and soil health must be protected through regulation. This must all be backed by fair but firm enforcement. However, at present Defra has yet to come forward to the transformative new approach to regulation that was promised after Brexit, and has yet to respond to and implement any recommendations from the Dame Glenys Stacey review on better regulation from 2018.^{xxxvii xxxviii}
- c. **Improved transparency and shortening of supply chains:** Improving transparency can help citizens make informed choices about their food choices. Shorter supply chains provide benefits by helping producers to retain a greater share of the profits within the value chain, improving fairness in the supply chain and making their businesses more profitable whilst at the same time providing a greater connection with their customers^{xxxix}.
- d. **Core environmental and animal welfare standards in trade.** [see para 32b].

What role could a reduction in meat and dairy consumption play in improving food security and what measures could the Government take to capitalise on the trend to plant-based diets?

- 45. The important role of changing diets towards improving domestic and global food security and reducing environmental harms must be tackled..^{xi, xli} Globally, intensive livestock farming alone is already estimated to be responsible for 30% of anthropogenic-caused biodiversity loss, in addition to damage caused to the climate by methane emissions.^{xlii, xliii} To reduce mounting land pressures from intensive livestock farming, fair incentives must be available to help farmers transition toward lower-intensity livestock systems and consideration given to how consumption patterns can be brought into line with what can be sustainably produced.
- 46. Excessive animal waste produced through intensive farming systems is also responsible for the pollution of soils and waters, thereby further undermining the UK's ability to grow food. These patterns can be observed globally, in the words of Food and Agriculture Organization of the United Nations *'The livestock sector...is probably the largest sectoral source of water pollution,*

contributing to eutrophication, 'dead' zones in coastal areas, degradation of coral reefs, human health problems, emergence of antibiotic resistance and many others.^{xliv}

47. These environmental impacts, undermining the foundations of food production, can be addressed by support for less but better meat from lower intensity livestock farming, and by encouraging, where geographically appropriate (such as on high quality arable land), a switch from intensive livestock farming to vegetables, pulses and grains. The commitment in the National Food Strategy for investment in alternative proteins marks a good start, which should be swiftly delivered.^{xlv}
48. Animal feed demand is also putting pressure on both UK and overseas land. In the UK, wheat and barley grown to feed farmed animals uses 2 million hectares of land or 40% of the UK's arable land area.^{xlvi} And in 2017, 6.1m tonnes (44%) of the 13.9m tonnes of compound feed manufactured that year came from imported stocks, the majority from outside the EU.^{xlvii} This creates demand for land domestically and abroad which is used to feed animals, rather than for human consumption. It can also, in many cases, lead to indirect land-use change and environmental damage, offshoring our environmental footprint.

What role do food technologies have in mitigating the risks that environmental changes poses to UK food security?

49. New technologies could be part of the solution, but only when incorporated within a wider, integrated approach to food production and land management alongside regenerating soil health, sustainable water management, reduction in chemical use (including fertilisers, pesticides, and veterinary medicines), appropriate livestock selection and integration, and greater habitat provision. If they are utilised to further increase intensification of the farmed environment, or mitigate its harmful impacts, it will only serve to exacerbate existing problems in our food systems.
50. Food technologies such as precision fermentation may play a role in facilitating the transition to sustainable and healthy diets however attention must be paid to the feedstocks which will underpin such techniques and how these will be sourced and the health impacts of the products they produce.
51. There are a number of upcoming and developing food farming technologies that are not yet mainstream, but could play a role in shaping the food system of tomorrow. For example robotics and artificial intelligence could help us to better understand the health of soils.
52. With further research and an evidence-based approach these technologies may provide useful tools, but must not be considered "silver bullets" to solving the complex issues currently faced by our food and farming systems. Any new technologies must be transparent, comprehensively peer-reviewed, publicly consulted on, developed with farmers and subject to robust regulation following a hazard-based approach to decision-making founded on the Precautionary Principle.

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The Rivers Trust	National Trust
Bumblebee Conservation Society	ZSL (Zoological Society London)
	Angling Trust

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Feedback

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