



EVIDENCE SYNTHESIS REPORT

The Role of Critical Natural Infrastructure in Supporting National Security

Environment and National Security: Exploring the Risk Pathways

October 2026



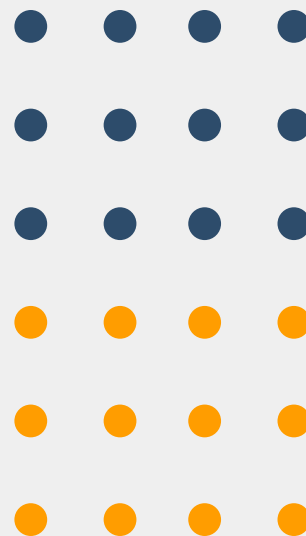
About

This document is one of a series of reports from the Agile Initiative's Environment and National Security: Exploring the Risk Pathways project. The Evidence Synthesis Reports provide the detailed evidence underpinning the shorter Priority Policy Questions: Summary of Key Findings reports.

The project also produced a [Forward-looking Research Agenda](#) containing an overview of the whole project, a conceptual framework illustrating the links between environment and security, a summary of the current UK government policy position, a research agenda listing almost 200 evidence gaps, analysis of potential interventions, and guidance on how to communicate the key issues effectively based on insights from behavioural science.

The Evidence Synthesis Report Series

- The role of critical natural infrastructure in supporting national security
- Managing demand: energy security, food security and UK national security
- Climate risks and opportunities for shipping and UK Maritime trade
- Weaponisation of nature
- Societal resilience and mental capital



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Summary

This rapid evidence synthesis shows how UK national security depends on natural assets and systems that sustain our daily lives ('Critical Natural Infrastructure'). We illustrate this for three focus areas at global, national and local levels.

1. Global climate security

Degradation of tropical forests and ocean ecosystems puts critical earth systems at risk. Release of stored carbon and loss of future carbon sequestration capacity brings the earth closer to climate tipping points. Some plausible scenarios involving a slow-down in ocean circulation could lead to much drier, colder and stormier conditions in northern Europe, making much of the UK unsuitable for arable crops. Amazon rainforest degradation will also reduce rainfall supply to the La Plata basin, which supplies over half of the UK's soybean imports, exposing UK livestock production to supply chain shocks and economic losses. A cascade of climate tipping points could cut global crop production by 50%, with severe impacts on food prices and supply chains, leading to humanitarian crises and geopolitical conflict.

2. National food security

Declining populations of wild pollinators and natural pest predators are putting crop yield, stability, quality and profitability at risk both in the UK and globally. This particularly affects fruit, vegetables and oilseeds that contain micronutrients essential for human health, as well as high-value coffee, cocoa and spices that underpin the economies of several low-income countries. Loss of wild pollinators and fruit-eating mammals that disperse seeds also creates cascading impacts for entire ecosystems and their services, especially tropical forests where over 94% of plants require animal pollinators. Risks to UK food security are compounded by the growing impact of floods and droughts, which affect most of the UK's high-grade farmland. The Fens are a priority: they contain 48% of England's Grade 1 farmland but their peat soils are degrading, sinking and emitting carbon, sea level is rising, and flood defences are not future-proof.

3. Local climate resilience

Climate threats to urban areas are growing, with risks to national security. Heatwaves put hospitals and emergency services under extreme pressure, and a third of homes could be at risk of flooding by 2050, with many becoming uninsurable. Public trust in the government's ability to handle extreme weather is low. Urban green infrastructure can help to mitigate those risks while delivering multiple benefits for health, wellbeing and societal resilience, but green space is under pressure due to urban development.

Failure of critical natural assets and systems causes cascading risks for national security, through health impacts, infrastructure damage, economic shocks, competition for resources, geopolitical instability and conflict. In addition, food and water insecurity and nature loss can erode mental capital through impacts on cognition, stress, wellbeing, educational attainment and adaptive capacity, affecting societal resilience.

While this rapid evidence synthesis provides only a brief overview for three focus areas, it highlights how nature loss threatens our security and our way of life. The following policy recommendations provide immediate, actionable options to boost our resilience and protect and restore the natural systems that sustain life. UK policymakers have a critical window of opportunity to show global leadership for strengthening critical natural infrastructure both within the UK and globally, to protect our long-term security.

Policy recommendations

1. **Formally recognise the importance of Critical Natural Infrastructure** and incorporate it into the National Risk Register and resilience planning, national security assessments, infrastructure investment decisions and wider policy goals across government, breaking down policy silos.
2. **Set up a monitoring, early warning and decision-making framework** for Critical Natural Infrastructure based on existing indicators of ecosystem health, linked to mitigation options and policy escalation routes.
3. **Maintain strong global leadership on phasing out fossil fuels, halting deforestation and protecting ocean ecosystems**, including by halting new fossil fuel exploitation, ending overfishing and water pollution, and restoring development funding for ecosystem protection.
4. **Align climate and biodiversity policies:** restrict climate-related activities that undermine ecosystem resilience, such as geoengineering, seabed mining for critical minerals or harvesting forests for bioenergy.
5. **Accelerate adoption of a circular economy** approach, including recycling critical minerals, reducing waste of energy, food and water, and shifting to more sustainable plant-rich diets, to enhance resilience and security.
6. **Invest in actions to trigger positive tipping points** where policy interventions can shift society onto a self-sustaining pathway of cascading benefits
7. **Increase investment in nature-based solutions and agri-environment schemes** that pay farmers to adopt sustainable practices that tackle multiple threats, e.g. by supporting soil health, flood and drought resilience, pollinators and pest predators.
8. **Play a global leadership role in halting pollinator decline** through international development funding and knowledge exchange.
9. **Strengthen planning guidance** in England to protect high-grade farmland and urban green space, improve the adoption of multifunctional Sustainable Drainage Systems (SuDS), incorporate strategically positioned shade trees in new developments and retrofits, and keep new homes and critical assets out of high-risk floodplains and coastal-risk areas.
10. **Implement a new flood reinsurance scheme** when the existing FloodRe expires, to prevent a large proportion of UK housing stock becoming uninsurable in future.
11. **Enforce stricter standards for water abstraction and use** to protect long-term water supplies.
12. **Restrict permission for new data centres to sustainable levels.** Collectively, their high energy, water and land use is not compatible with future climate, energy, food and water security in the UK and globally.

Introduction

This evidence synthesis was produced as part of a research sprint that explored the links between the environment and UK national security. The sprint produced a series of reports addressing priority policy questions on different aspects of this topic, with this report focusing on the concept of Critical Natural Infrastructure: the natural assets and systems that underpin our way of life, our economies, and the survival of humans and other species.

In this introductory section we summarise the concept of Critical Natural Infrastructure, the main threats it faces, and the extent to which it is recognised in UK policy. The main part of the report examines three focus areas at different scales: global climate regulation; UK food security; and local climate resilience. For each focus area, we explain the role of key natural assets and systems, identify the cascading security impacts arising from nature degradation and loss, and suggest potential mitigation options. We conclude with a summary and a list of policy recommendations.

What is Critical Natural Infrastructure?

Critical Natural Infrastructure is related to the concept of Critical **National** Infrastructure. There are various definitions of Critical National Infrastructure¹ but the most succinct is:

‘Those facilities, systems, sites, information, people, networks and processes, necessary for a country to function and upon which daily life depends.’²

The UK government currently defines 13 sectors as being Critical National Infrastructure: Chemicals, Civil Nuclear, Communications, Defence, Emergency Services, Energy, Finance, Food, Government, Health, Space, Transport and Water.

This conventional definition covers only built infrastructure, but natural assets and systems are also vital to sustain our daily lives. Healthy and biodiverse ecosystems underpin food production, water supply, climate stability, flood regulation, erosion protection and human health, with emerging research suggesting wider benefits for cognitive, emotional and social wellbeing. Natural systems are infrastructure because their failure can disrupt food and water supplies, increase flood and heat risk, undermine public health, increase prices, weaken economic resilience, and contribute to instability overseas.

The concept of Critical Natural Infrastructure was therefore developed to highlight that protecting, restoring, enhancing, expanding and investing in our essential natural assets should be given the same priority as other critical infrastructure such as transport, energy, schools and hospitals.³ Designating key natural assets as Critical Natural Infrastructure should lead to named risk ownership, regular monitoring, minimum resilience standards, investment and maintenance duties, contingency planning, and inclusion in national risk assessment, helping to improve national resilience and reduce security threats.

Critical Natural Infrastructure builds on the concept of ‘natural capital’, which is ‘the elements of nature that directly or indirectly produce value to people, including ecosystems, species, freshwater, land, minerals, the air and oceans, as well as natural processes and functions’.⁴ Stocks of natural capital provide flows of ‘ecosystem services’ (such as food and water provision, climate regulation and generation of oxygen) which make human life possible, as well as cultural, social, and psychological services that support health and wellbeing. However, while the concept of natural capital emphasises the **economic** value of nature, critical natural infrastructure emphasises its value in supporting everyday life. Both of these aspects are crucial for national security.

Similarly, evidence now shows that some natural systems are so important to the stability of the global economy (due to their ‘size, interconnectedness, non-substitutability and the criticality of dependencies upon them’) that they can be identified as Global Systemically Important Natural Systems, analogous to the Global Systemically Important Banks which are considered too big (or too important) to fail.⁵ This strengthens the case for treating certain ecosystems as strategic assets, not simply environmental amenities.

Threats to Critical Natural Infrastructure

The integrity of the natural systems we depend on is being degraded to the point where major ecosystems on land and at sea are collapsing. Since humans appeared on Earth, the biomass of wild mammals has declined by 82%, the extent and condition of natural ecosystems have almost halved and one in four species are now at risk of extinction.⁶ This is due to five drivers of biodiversity loss.⁷



Habitat loss and degradation



Climate change



Over-exploitation (e.g. overgrazing; unsustainable extraction of timber, fish, and water)



Pollution



Invasive species

These pressures arise largely from human demand for resource-intensive food, cheap commodities, energy, water, minerals, timber, transport, and infrastructure. However, at a deeper level, three root causes have been suggested: disconnection from nature (i.e. the view that humans are separate from and superior to nature, and that nature exists to supply humans with resources), concentration of power and wealth, and prioritisation of short-term extraction.⁷

These factors mean that nature protection is often seen as low priority for governments, or even as a barrier to growth. As a result, weak environmental governance, lax regulations and perverse incentives (such as subsidies for fossil fuel extraction and intensive farming) allow or even encourage environmental assets to be over-exploited by businesses. Often, this also allows hostile actors, terrorists and organised crime groups to exploit environmental assets, e.g. through illegal deforestation, fishing or waste disposal, providing an income source that fuels their organisations and thus increases threats to stability and security.

The ongoing degradation of ecosystems worldwide undermines climate stability, provision of food and water and the environmental conditions that support human health and wellbeing. Half of global economic activity (about US\$58 trillion) relies directly on nature,⁸ and biodiversity decline threatens financial stability.⁹ Even more importantly, the loss of carbon-rich ecosystems could trigger climate tipping points that pose existential risks to humanity.

Safeguarding critical natural systems will require action on multiple fronts: not only protection and restoration of ecosystems, but also management of demand, low-impact production methods, shifting of cultural attitudes and social norms, and reform of unsustainable financial and economic systems.

Critical Natural Infrastructure in UK policy

Climate change is widely recognised across government as being a risk to national security, but there has been less awareness of the importance of nature for security. However, the UK Government has now released the groundbreaking Global Ecosystem Loss, Ecosystem Collapse and National Security report¹⁰ which recognises that natural systems are critical for national security and identifies six global ecosystems of particular concern. These include four major forest ecosystems that play a crucial role in regulating global climate and rainfall, plus the Himalayan glaciers that supply water to millions of people in South Asia and the coral reefs and mangroves that support fisheries and protect coastlines in South-East Asia. These ecosystems are all degrading and could collapse from 2030 onwards, triggering major global geopolitical instability and conflict.

Several government departments are closely involved in this topic. Defra is playing a leading role in exploring nature-security links and is planning a major research project on Nature Security.¹¹ Natural England has already embedded the issue into its strategy, which is based on recovering nature for health, wealth and security. They have generated key underpinning evidence on UK ecosystems including the State of Natural Capital report,¹² the Natural Capital and Ecosystems Assessment programme¹³ which studies how ecosystem health underpins environmental resilience, and the six 'Nature Returns'¹⁴ case study areas that explore the use of nature-based solutions. The Environment Agency lead on managing risks related to water security and flooding, and the Department of Energy Security and Net Zero has a key role through delivering the UK's climate change mitigation and adaptation programmes, including via land-based measures and nature-based solutions.

The Foreign and Commonwealth Development Office have a strong interest in ecosystem health and climate security to underpin geopolitical stability and overseas development. They administer the UK's investments in international funding programmes to help developing nations adapt to and mitigate climate change and protect natural assets, including the International Climate Finance fund and the Global Biodiversity Framework fund.

Focus areas

Policymakers interviewed for this project noted greater uncertainty, and even scepticism, about the role of ecosystem health and biodiversity in underpinning national security, compared to the well-established links for climate security. This is partly because the impact chain from nature loss to national security involves several steps; the concepts are abstract and scientifically complex; and the ecosystems are often distant from the UK. To assist with raising awareness and understanding, we aimed to build a clear chain of evidence linking ecosystem health and biodiversity (both UK and overseas) to ecosystem services and national security.

With limited time available for this research sprint, we focussed on three issues spanning a range of scales. These were selected to demonstrate the role of biodiversity in underpinning ecosystem resilience – and thus in securing vital ecosystem services that support national security – and explore policy challenges and opportunities for effective interventions.

Global climate security

Tropical forests and oceans supporting critical earth systems

Local climate resilience

Green infrastructure to tackle floods and heatwaves

National food security

Pollination, natural pest predators, floods and droughts

We aimed to provide a clear explanation and evidence chains for each of these focus areas, identifying cascading risks and potential intervention points. Evidence gaps and future research priorities were also identified and are reported separately in the Forward-Looking Research Agenda.¹⁵

1. Global climate regulation: Tropical forests and oceans

Forests and oceans play a key role in carbon storage and rainfall generation. About half of the CO₂ emissions from fossil fuels and land use are absorbed by either the ocean (29%), mainly through CO₂ dissolving into the sea, or by land-based ecosystems (21%) as carbon is taken up into vegetation and soils (Figure 1). Biodiversity underpins the resilience of these critical ecosystems but is threatened by multiple human pressures. These include climate change itself, which reduced the land 'sink' (i.e. the amount of carbon taken up by soils and vegetation) by 25% and cut the ocean sink (the carbon absorbed by the ocean) by 7% on average over the last decade (2015–2024). Here we consider how degradation of these interlinked ecosystems is destabilising large scale earth systems, and what interventions are necessary to tackle these existential risks.

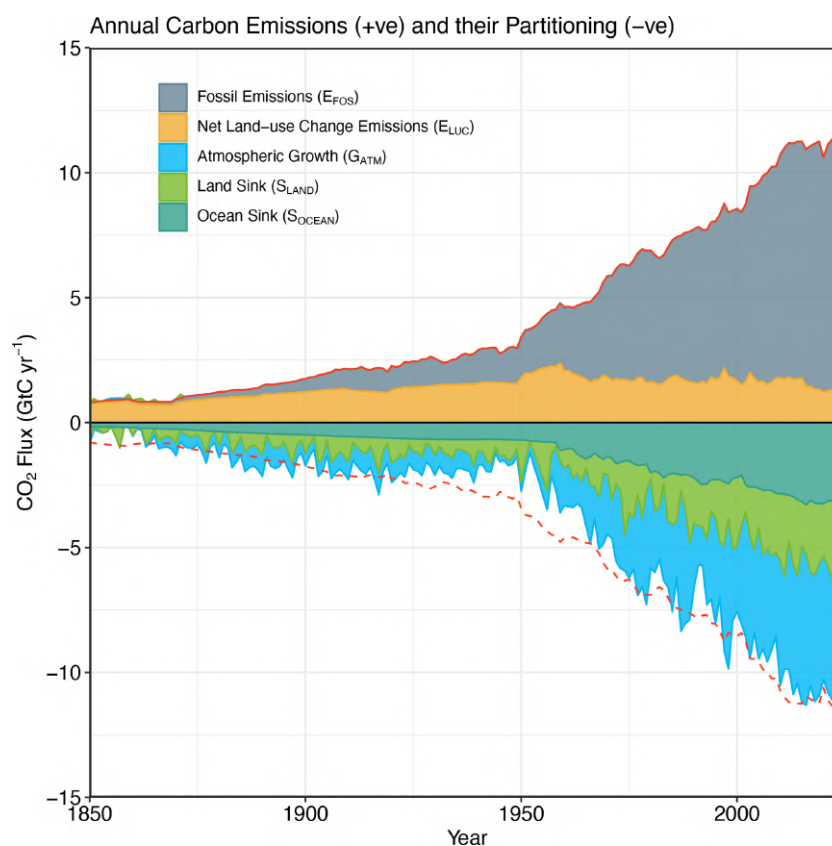


Figure 1. The global carbon budget over time from Friedlingstein et al (2026).¹⁶ Net land use change emissions (orange) are the net effect of emissions from deforestation, forest degradation, peat fires and peat drainage, partly offset by sequestration from afforestation and forest regrowth, and are derived from book-keeping models. The land sink (light green) reflects changes in vegetation growth due to higher CO₂ levels, nitrogen deposition and climate change, from process models. The ocean sink (dark green) is from an average of models and observations. The growth in atmospheric CO₂ (light blue) is from direct measurements. The dashed red line in the bottom half of the chart is simply the mirror image of the estimated total emissions in the top half. The difference between this and the estimated total sink in the bottom half is the 'budget imbalance' and reflects limitations in the modelling, possibly partly related to underestimation of forest carbon loss from fires and droughts.



Four out of the six global ecosystems identified as significant for the UK's security are forests: the tropical rainforests of the Amazon and Congo basins and the boreal forests of Canada and Russia.¹⁰ Here we focus on tropical forests, as these are some of the most biodiverse and carbon-rich ecosystems on earth but also face some of the greatest pressures.

Tropical rainforests are a major carbon store. They store over a fifth of all the carbon held in vegetation and non-permafrost soils (470 billion tonnes), with the Amazon alone storing up to 200 billion tonnes.¹⁷ However, these carbon stores are being steadily lost. Deforestation and forest degradation (from all forests) accounted for 88% of the estimated 2.6 billion tonnes of carbon released through land use emissions in 2024, with another 8% from peat fires and peat drainage,¹⁸ much of which is from clearance of peatland forests in South-east Asia. Just three countries – Brazil, Indonesia and the Democratic Republic of the Congo – produced 58% of all land use carbon emissions in the last decade, mainly due to large scale clearance of carbon-dense tropical forests for agriculture, much of which is to supply globally traded commodities.¹⁶ About two thirds of the carbon released from global forest loss is reabsorbed through reforestation and forest regrowth. However, this is highest in the northern hemisphere (China, the USA and the EU) and is often associated with non-native plantations for commercial use.¹⁹ These plantations have low biodiversity and will eventually be felled, with much of the carbon released back to the atmosphere as the wood is converted to short-lived products such as paper, or burnt for fuel.

Globally, forests were estimated to absorb around 21% of carbon emissions from fossil fuels and land use change in the last decade (Figure 1). This is thought to be due mainly to the CO₂ fertilisation effect (plants grow faster in higher CO₂ concentrations) combined with deposition of nitrogen compounds from air pollution, which acts as a fertiliser. In cooler regions, warmer temperatures can stimulate higher growth, but elsewhere the negative impacts of climate change (e.g. drought, heat and fires) have offset about a quarter of the CO₂ fertilisation effect over the last decade. In theory, CO₂ fertilisation should be stronger for tropical forests due to their high productivity and longer growing seasons, but the negative impacts of climate change are causing the carbon sink to decline in several regions including the Amazon basin.¹⁶

Tropical forests also play a key role in rainfall generation. They receive 35% of all rainfall on land and recycle much of this back into the atmosphere. This occurs through direct evaporation of rain that has been intercepted by the leaf canopy, and by evapotranspiration as water from the soil is soaked up by tree roots and flows up through the stem to evaporate from the leaves.²⁰ This recycled moisture can be transported thousands of kilometres via 'aerial rivers' of clouds and water vapour that produce rain both within the rainforest itself and in downwind areas.²¹ For example, the Amazon and Guiana Shield²¹ rainforests generate rainfall in the huge La Plata Basin to the south, responsible for much of South America's food and hydroelectricity production, and in Venezuela, Columbia, Bolivia and Peru to the north and west.^{22,23} Similarly, the Congo rainforest delivers rain to East Africa.²⁴ Forest-linked rainfall supports over US\$1 trillion of annual GDP in China, Europe and the USA; across more than 130 countries, direct economic dependence on this 'green water' exceeds US\$5 trillion, with almost another 3 trillion USD embedded in upstream supply chains.⁵

Continued tropical forest loss and degradation could push parts of the Amazon towards a tipping point, where closed-canopy rainforest shifts irreversibly towards more open, drier and fire-prone vegetation states, such as dry savanna. The resilience of the Amazon depends not only on how much forested area remains, but also on whether that forest retains the biodiversity, functional composition and ecosystem connectivity needed to resist drought, maintain ecosystem functioning and recover from disturbance.^{25,26,27}

Plant and animal biodiversity sustains forests. Evidence suggests that higher tree diversity is associated with greater stability and a lower likelihood of passing local tipping points.²⁵ Animal diversity is also critical: 90% of wild flowering plant species depend on animal pollinators (mainly insects),²⁸ and 90% of woody plant species in tropical forests and 60% of those in temperate forests depend on animal seed dispersal.²⁹ Over-hunting of fruit-eating animals such as birds, primates and elephants can also reduce seed dispersal and forest regeneration.³⁰

Animals are particularly important for dispersal of the largest and most carbon-dense trees: overhunting reduces carbon storage in tropical forests by up to 26%.³¹ Indeed, it is possible that loss of birds and mammals is leading to a global seed-dispersal crisis that has been masked so far by the long life-spans of trees, especially as seed dispersal is vital for enabling forests to regenerate following disturbances, such as fires and timber extraction, and to 'migrate' in response to climate change or pest outbreaks.²⁷

Habitat fragmentation further reduces resilience by breaking continuous forest into smaller and more isolated patches, as the edges of forest fragments are more susceptible to drying out.³² Across the Amazon, degraded forests have higher temperatures, lower humidity, greater wind exposure, more canopy gaps, higher tree mortality and lower carbon stocks than undisturbed forests. Degradation can reduce dry-season evapotranspiration (and hence rainfall recycling) by up to 34% and generate biodiversity losses comparable to deforestation.²⁶ Fragmentation also amplifies fire risk, as conditions become drier, hotter and windier, contributing to more carbon release to the atmosphere.

These local pressures scale up into basin-wide resilience loss.²⁷ Observational analyses show that more than three-quarters of the Amazon has been losing resilience (i.e. vegetation regrowth after disturbances has been slowing down) since the early 2000s, especially in drier regions and in areas closer to human activity.³³ New evidence also shows that longer and more frequent droughts are undermining the ecohydrological strategies that currently buffer some Amazon forests against collapse, while a recent synthesis estimates that 10–47% of Amazon forests could face compounding disturbances capable of triggering transitions to dry savanna by 2050,³⁴ with severe consequences for global carbon and water cycles. Similar changes are occurring in the Congo rainforest, which is also at risk of drying and could release large amounts of carbon from its thick peat soils.³⁵

Maintaining healthy and intact forests is critical to provide resilience to tipping points. For example, about 17% of the Amazon has already been converted to agriculture³⁶, and if deforestation reaches 22–28% the forest could tip into savanna at just 1.5–1.9°C of warming. Without further deforestation, this might not occur until warming reaches 3.7–4.0°C.³⁷ Protected areas and Indigenous territories are associated with lower risks of degradation.³⁸

Deforestation has already caused political instability in some regions and these impacts could grow. Because rainforests recycle a large part of the rain that falls on them, deforestation is already reducing rainfall^{39,40} and increasing temperatures⁴¹ in the Amazon, threatening to undermine regional food production.⁴² For example, droughts linked to a combination of climate change and deforestation in Brazil, Venezuela, Colombia, and Peru led to protests when governments introduced water rationing.⁴³ Further deforestation in the southern Amazon could delay the rainy season, threatening the economically important system of producing a double crop of soy followed by maize each year.⁴⁴

Great Britain is exposed to tropical deforestation impacts through its substantial dependence on imported South American soy for livestock feed. In 2025, 68.9% of UK soymeal imports and 57.5% of soybean imports by mass came directly from South America, mainly from Argentina, Brazil and Uruguay.⁴⁵ This creates a structural food security vulnerability, as Amazonian deforestation

reduces rainfall in key agricultural regions and climate change intensifies heat and drought stress,^{40,46,47} threatening the stability of soy production in the regions on which the UK feed system relies. Lower or more volatile South American soy output would result in higher feed costs and supply risk in the UK, with likely knock-on effects on the price and resilience of meat, dairy and egg production.

Amazon deforestation increases the risk of crossing multiple climate tipping points. Degradation of tropical forests will release large quantities of carbon stored in soils and vegetation, and also reduce future absorption of CO₂. This will accelerate global warming and increase the risk of triggering climate tipping points such as melting of ice sheets and permafrost,⁴⁸ and slowdown of the large-scale ocean currents, such as the AMOC, that control global climate and rainfall patterns¹⁷ (Box 1). Regional changes in temperature and rainfall from Amazon degradation could also have direct effects on the AMOC, though this is highly uncertain.⁴⁹

Box 1: What is the AMOC and why does it matter?

The Atlantic Meridional Overturning Circulation (AMOC) is a major component of the global ocean circulation and plays a crucial role in regulating the Earth's climate. Wind patterns drive warm, nutrient-rich surface water north from the tropics, providing the Gulf Stream that keeps winters in north-western Europe much milder than similar latitudes. When this surface current reaches Arctic waters, it cools and forms sea-ice, making the remaining water saltier. This cold, salty water is denser than the surrounding water, so it sinks and then flows back at depth towards the equator, keeping the circulation going. The current eventually returns to the surface in coastal 'upwelling zones', bringing nutrient-rich water up from the deep ocean to sustain the marine ecosystem, and the cycle starts again.

Global warming slows the current down. The poles are warming faster than the rest of the Earth, and this melts Arctic ice (or stops ice from forming), which dilutes the saltiness of the water. Warmer, less salty water is less dense and so it sinks more slowly, slowing down the current. In 2023 the IPCC assessed that the AMOC will very likely weaken by 24% to 39% this century,⁵⁰ with some recent studies warning that it could collapse by mid-century under current emissions,⁵¹ and observations showing warning signs of approaching a critical transition.⁵² A smaller circular current south-east of Greenland (the North Atlantic Subpolar Gyre) which helps to drive AMOC could collapse much sooner.¹⁷

Major disruptions to AMOC would very likely have large-scale effects on weather patterns and rainfall. Lower northward heat transport is likely to cause widespread cooling in the North Atlantic, and changes in atmospheric circulation would shift storm tracks and reduce rainfall across many Northern Hemisphere mid-latitudes, with studies projecting colder winters, stronger storms and severe droughts in northern Europe.⁵³ By intensifying climate stress across multiple regions (including droughts in parts of Africa and changing monsoon patterns), a weaker AMOC would increase the risk of synchronised crop failures, potentially halving the global area suitable for wheat and maize production.¹⁷ For the UK, an AMOC-tipping scenario projects colder winters and substantial water deficits across most of the current cropland area, potentially causing near-total cessation of arable farming and agricultural losses an order of magnitude larger than those from climate change alone.^{17,54}

Oceans play a key role in climate regulation. They currently absorb 80–90% of the excess heat caused by climate change and about 29% of the CO₂ emissions generated by human activities.⁵⁵ Most of this additional CO₂ dissolves directly into the sea (the ‘solubility pump’), but the ‘biological carbon pump’ also plays a role. Marine organisms absorb CO₂ from the atmosphere as they grow, and much of this then sinks to the deep ocean and is entrained by the meridional overturning circulation, eventually being released back to the atmosphere (‘degassing’) in upwelling zones after about 200 years (on average). Although the biological carbon pump is thought to be broadly at equilibrium at present, it sequesters a small amount of carbon through burial of organic matter in stable deep-sea sediments.⁵⁶ It also enhances the solubility pump by removing CO₂ from surface waters so that more can dissolve.⁵⁷

Weakening of the biological carbon pump could lead to loss of stored carbon from the ocean, as not enough CO₂ would be absorbed from the atmosphere by marine life to replace that lost by degassing. This could have serious effects on the global climate, as ocean waters store 85% of the earth’s carbon.⁵⁸

This risk arises from multiple pressures on ocean ecosystems. For example, climate change could slow down the ocean circulation (Box 1), reducing the upwelling of nutrients that supports marine life. Acidification caused by CO₂ dissolving into the ocean can dissolve the shells of plankton, and microplastic pollution can reduce their resilience to climate change.⁵⁹ Ocean acidification may be occurring at rates too fast for species to adapt; acidity (measured as pH decrease) has increased by 30% since 1700.⁶⁰ Ocean warming and nutrient pollution is also reducing the dissolved oxygen in seawater.

Further stresses arise from overfishing,⁶¹ which can undermine the integrity of marine ecosystems and result in unexpected cascading impacts, especially when keystone species are affected. For example, the functional integrity of marine ecosystems has been affected by overfishing of whales, at the top of the food chain, and krill, their main food source (Box 2).



Box 2: The unexpected impacts of whale fishing

Whales are thought to play an important role in sustaining marine ecosystems by excreting iron in a form that is highly available to plankton,⁶² especially in the Southern Ocean which receives very little iron input from erosion of rocks on land. After the huge decline in whale populations in the 20th century, when 90% of fin whales and 99% of blue whales were taken from the Southern Ocean, krill populations were expected to increase. Instead, they collapsed unexpectedly and are still only a fraction of former levels.⁶³ This could be because the whales were providing the iron needed to sustain phytoplankton populations, which are the main food source of krill.

Krill plays a vital role in marine food webs, nutrient cycling and the biological carbon pump,⁶⁴ but are currently being extracted from the ocean in vast quantities for use as Omega-3 dietary supplements, aquaculture feed, and pet food. Last year, krill fishing hit its quota of 625 million tonnes early and the industry was shut down for 3 months. Overfishing of krill requires their marine predators to travel further to find food, in an already resource-depleted landscape. This can create cascading impacts for the whole ocean ecosystem, as krill are at the base of the food chain for other species (larger invertebrates such as squid, as well as fish, whales, penguins, and many other birds and mammals).

The overall impact of ocean ecosystem degradation on the carbon cycle is poorly understood due to many complex cascading effects, interactions and feedback loops. For example, the climate-induced slowdown in ocean circulation (Box 1) could reduce the rate of degassing but could also exacerbate oxygen depletion, further affecting marine life.⁵⁷ Similarly, reduced nutrient upwelling could be offset by increased nutrient pollution from agricultural runoff.⁵⁶ These uncertainties are the focus of ongoing research.⁶⁵

There are wider impacts on food security and livelihoods from the pressures on ocean ecosystems. Climate change forces fish species to migrate to new areas and also causes coral bleaching, damaging important nursery habitats for commercial fish stocks. A slowdown in ocean circulation (Box 1) could reduce nutrient transport to upwelling zones which sustain important commercial fisheries. Combined with industrial overfishing and pollution, these pressures could drastically impact the livelihoods of the 3.3 billion people that rely on the ocean for nutrition and incomes, creating risks for food security and social stability.⁶⁶



Cascading risks to national security

The combined effects of forest and ocean degradation could lead to cascading impacts for global climate and regional rainfall. Forest degradation leads to increased carbon emissions, exacerbating global warming, and this warming will also reduce the ocean carbon sink, as less CO₂ dissolves into water at higher temperatures.⁶⁷ Similarly, if weakening of the biological carbon pump releases stored carbon from the ocean, the resulting warming could flip tropical forests from carbon sinks to carbon sources. These effects therefore amplify each other and push the earth closer to various climate tipping points.

Five tipping points are already at risk of being crossed (melting of the Greenland and West Antarctic ice sheets, loss of warm-water coral reefs, loss of the North Atlantic Subpolar Gyre, a crucial engine of the AMOC (Box 1), and melting of permafrost), with three more at risk by the 2030s.¹⁷ Each tipping point could trigger others, in a domino effect. For example, melting of permafrost releases methane, a potent greenhouse gas, and leads to additional warming that increases the risk of breaching other tipping points by up to 50%.⁴⁸ Emissions from forest and ocean degradation also increase the risk of slowdown of the AMOC Circulation, which could bring severe cold, dry, stormy conditions to the UK with catastrophic impacts on domestic and global food production⁶⁸ (Box 1).

The casual chain linking forest and ocean degradation to food security is shown in Figure 2. This shows how emissions from forest and ocean ecosystem degradation exacerbate warming, which could trigger climate and ecological tipping points such as slowdown of ocean currents, leading to more extreme weather, increased water scarcity and reduced food production globally.

Loss of other ecosystem services would compound these impacts: less rainfall downwind of the Amazon would reduce production of soy in the La Plata Basin, leading to livestock feed shortages in the UK and elsewhere; loss of coral reefs and reduction of nutrient upwelling would undermine global fisheries; and loss of forests and coastal ecosystems would also reduce protection from flooding and erosion. Forest degradation has also been implicated in the spread of zoonotic diseases, as it brings forest-dependent wildlife that can carry diseases (such as bats or mosquitos) into closer contact with humans as they search for new habitats.⁴³



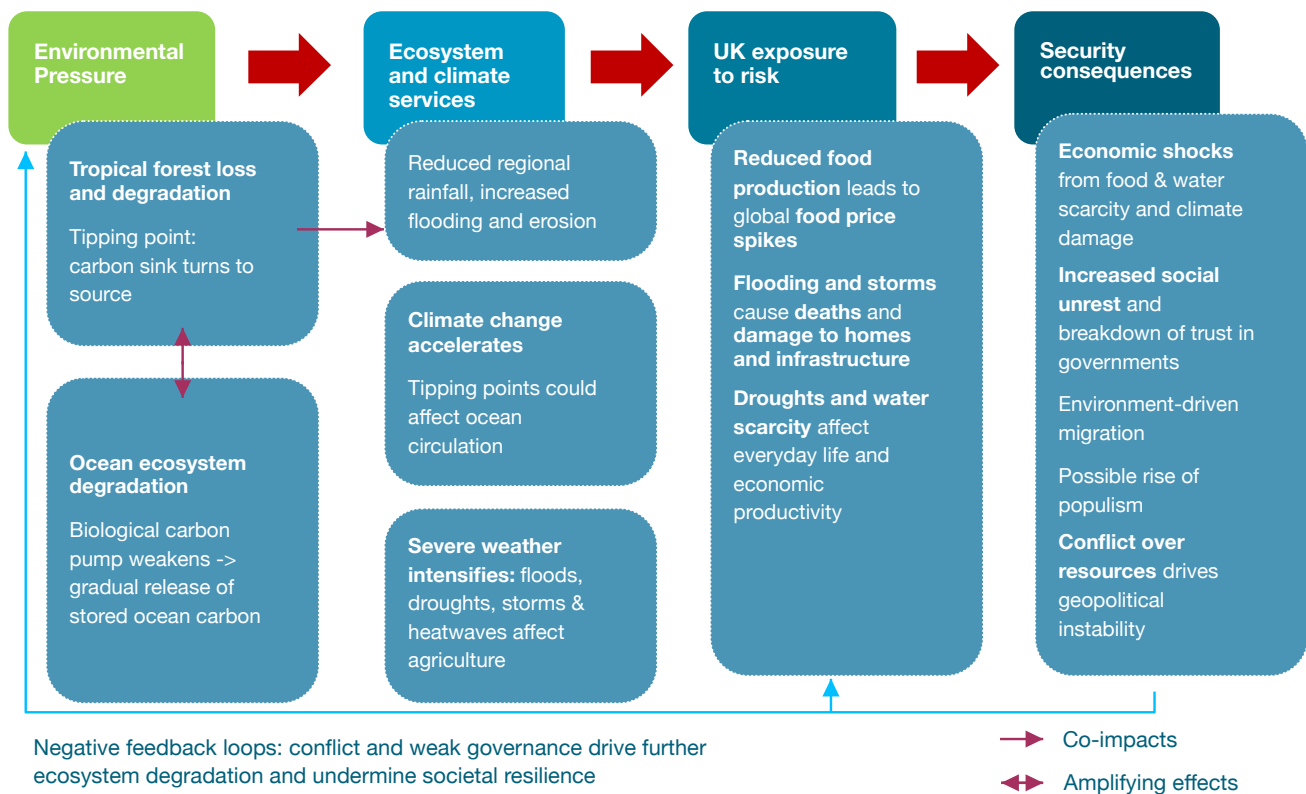


Figure 3. Causal chain with feedbacks and interactions linking forest and ocean degradation with national security via governance and societal resilience



Mitigation options

To protect critical natural systems, we need to tackle the underlying drivers of nature loss (including climate change, agriculture, over-fishing and pollution) as well as protecting and restoring tropical forest and ocean ecosystems.

Limit climate change by continuing with strong policies to phase out fossil fuels

By continuing to show strong global leadership, including the commitment to Net Zero emissions and the ban on exploiting new oil and gas fields, the UK can help to reinforce multilateral action and counter the growing challenge of backsliding by some political actors. However, greater focus is needed on more efficient use of resources, including through shifts in consumer decisions on energy use, transport, aviation and diets.^{71,72}

Tackle the causes of deforestation and forest degradation

The biggest driver is agriculture (especially for soy, palm oil, beef, coffee, cocoa and rubber),⁷³ as well as timber extraction, mining, oil extraction and bioenergy. There are two key opportunities for the UK to show global leadership.

- ❖ **End import of commodities from deforested land.** The Glasgow leaders' declaration on forests and land use at the 2021 COP secured agreement from 145 countries to halt and reverse deforestation this decade, with traders agreeing to stop buying commodities grown on illegally deforested land (such as cattle, palm oil, and cocoa).⁷⁴ The UK and Guyana co-

chair the Forest and Climate Leaders' Partnership to provide an international accountability and finance mechanism, but the UK has not yet enacted the secondary legislation needed to make large businesses conduct due diligence to ensure commodities were not produced on illegally deforested land.⁷⁵ However, the government has recently announced a consultation,⁷⁶ signalling the intention to align with the EU's Deforestation Regulation which will start in December 2026. Given the UK's leadership role, it is important to implement strong legislation as soon as possible to strengthen global confidence in the agreement. There are also calls for the UK to go further by ending imports of commodities grown on all deforested land (because much deforestation is legal) and preventing UK financial flows from driving deforestation.⁷⁷

- ❖ **Fund the protection of remaining tropical forests.** The government recently announced plans to invest £400m in the Tropical Forests Forever Facility (TFFF), an innovative global investment fund launched at COP30 in Brazil in 2025.⁷⁸ This aims to fix the 'leakage' problem of localised schemes such as REDD+, where protecting certain areas simply means that other areas are deforested instead. It does this by acting at a much larger scale, targeting payments at national governments in 74 developing countries, covering over a billion hectares of tropical forest and subtropical moist forest. Crucially, 20% of the payments will go to indigenous peoples and local forest communities. The UK helped to co-design this fund and the recent announcement is important to build global confidence. However, the investment (which, in theory, will be returned with interest) replaces grant funding originally intended for other climate-nature overseas projects, which was diverted for other government purposes (to extend the £2 bus fare cap).⁷⁹ There is therefore a risk that benefits for tropical forests will be offset by losses in other ecosystems, unless this overseas climate-nature funding is eventually replaced.

Reduce the multiple pressures on ocean ecosystems

Ocean ecosystems must be protected and restored, to reduce the risk of uncertain but potentially severe impacts if the biological carbon pump weakens. This includes reducing pressures from fishing and pollution, and using marine spatial planning to manage trade-offs.

- ❖ **End damaging fishery practices.** Around 35% of fisheries are overfished, and this has led to armed conflict.⁴³ The UK can promote good practice by enforcing catch quotas in line with scientific advice and banning bottom trawling in Marine Protected Areas. Efforts to protect ocean mammals such as whales from ship collisions, sound pollution and fishing are also important, as these keystone species can support the wider ecosystem through nutrient cycling; and ongoing efforts are needed to end global overfishing of Krill, given their crucial role in the marine ecosystem (Box 2).⁶⁴
- ❖ **Protect oceans from pollution.** Further efforts to tackle the UK's severe water quality problem are vital, including eliminating untreated sewage discharges into waterways, reducing fertiliser runoff from farmland, and tackling microplastic pollution. Plastic fragments contain at least 4,000 chemicals of concern, including endocrine disruptors and carcinogens, that can leach into water, disrupt ocean ecosystems and pass into the human food chain, but UK progress on tackling these has stalled in recent years.⁸⁰
- ❖ **Marine spatial planning** can help to balance competing pressures on ocean and coastal ecosystems,⁸¹ especially when linked with land-based measures to minimise pollution.⁸²

Development funding for forest and ocean protection

The UK has funded several important initiatives, including Forest Governance, Markets and Climate, addressing drivers of deforestation; Investment in Forests and Sustainable Land Use, supporting climate-resilient forest economies; the Amazon Catalyst for Forest Communities, strengthening forest governance and tenure security of Indigenous People and local communities; the Congo Basin Forest Action Programme; OCEAN; and the Blue Planet Fund. However, these and other programmes are threatened by progressive cuts in aid, from 0.7% of GDP to 0.5% in 2021 and then 0.3% in 2025 (to spend more on defence). Given their importance for global and national security, there is a strong argument for continuing to invest in protecting these critical ecosystems. As part of this, it is crucial to maintain UK contributions to the Global Environment Facility (GEF) as part of our international climate funding. Investing in nature-based solutions also delivers multiple co-benefits for community resilience, livelihoods, health, wellbeing and social capital.⁸³

Align climate and biodiversity policies

While some actions have benefits for both climate and nature, others could undermine ocean and forest resilience to climate change. These include mining of the seabed or in tropical forests to provide critical minerals needed for batteries and renewable energy, as well as risky geoengineering options, such as iron fertilisation of the oceans to stimulate plankton growth⁸⁴, sinking of large amounts of seaweed,⁸⁵ and extraction of biomass from natural forests to use for bioenergy or BECCS.⁸⁶ Climate action is vital to reduce pressure on biodiversity but by itself this is not enough, and more targeted, ambitious and co-ordinated policies are needed to fully return to the planet's safe operating space for all planetary boundaries, including by addressing trade-offs between goals.⁸⁷

Accelerate uptake of circular economy approaches

A circular economy approach, sustainable supply chains and demand management are critical tools to reduce pressures on ecosystems. Greater re-use and recycling can help reduce demand for mineral and metal extraction from oceans and forests;⁸⁸ shifting to more sustainable plant-rich diets, can reduce forest loss for soy and cattle farming;⁸⁹ and sustainable energy use and transport patterns can reduce fossil fuel emissions.

All these mitigation options will lead to cascading co-benefits for security.

- ❖ **Rainforests deliver wider benefits for health and economies**, protecting communities from floods and landslides and providing rich genetic resources. For example, 25% of drugs used in modern medicine are derived from rainforest plants, and 70% of cancer drugs are natural or synthetic products inspired by nature.⁹⁰
- ❖ **Reducing pollution and overfishing will support fish stocks** and reduce pressures on coastal mangroves, seagrass, saltmarshes and coral reefs, which protect coastal communities from storm surges and provide nursery habitats that support commercially important fisheries.
- ❖ **Reducing ocean pollution also has benefits for human health**⁹¹ including by reducing the potential effects of microplastics and associated chemicals on human neurodevelopment, cognition, neurological health, and long-term mental wellbeing, which could undermine societal resilience.⁹²
- ❖ **Pro-environmental actions** (e.g. active travel, sustainable diets and environmental stewardship) can also support health, wellbeing, social cohesion, and resilience.⁹³

2. UK food security: Pollinators, pest predators, floods and droughts

The UK's food security is vulnerable to environmental and geopolitical risks. UK food prices increased by 36% from 2021–2025, due largely to energy price rises and grain shortages caused by Russia's invasion of Ukraine, and the proportion of food-insecure households increased to 10%.⁹⁴ The Iran–US conflict in the Middle East that started in spring 2026 could have even greater impacts; diesel and fertiliser prices for farmers had already doubled by June 2026.⁹⁵

Crop and livestock production are increasingly affected by climate change. For example, the hot, dry spring and summer in 2025 reduced UK wheat and oat yields by 10%, losing over £800 million in farm revenue.⁹⁶ Exceptionally wet weather reduced wheat yields by 20% in 2024, and heat stress is already reducing milk yield and causing poultry deaths.⁹⁷ Economic losses from heat stress for six key products where data is available (wheat, barley, oats, dairy cattle, free range hens, and lambs) are projected to increase by 34% by the 2050s under a central warming scenario, but could be much more severe in extreme years.⁹⁸

The modern intensive agriculture system is trapped in a 'vicious cycle' of feedback loops and cascading risks, driving climate change and environmental degradation which in turn threatens food supply. The 'invisibility of nature' in decision-making is a key problem, as it hinders the deployment of balancing feedback loops that could protect the natural environment.⁹⁹

The UK's Food Strategy aims to improve resilience of the supply chain and improve access to healthy and sustainable food, while supporting local and national food heritage and cultures.⁹⁴ As part of this, it aims to support resilient domestic production of healthy food. For context, we currently import 35% of all food, 23% of food that could be grown in the UK, 85% of fruit (mainly tropical) and 47% of vegetables.⁹⁴ While having diverse food supplies confers a certain level of resilience, it also exposes the UK to climate shocks, geopolitical disruption or supply chain risks elsewhere in the world. The UK Climate Change Committee therefore recommends maintaining the share of overall food produced in the UK at or above the current level.⁹⁸

Nature-related shocks can also transmit into UK consumer prices through international trade. Exploratory analysis suggests that a 1% increase in annual forest loss in Ghana and Côte d'Ivoire could be associated with around 9% faster quarterly growth in UK cocoa import prices. This illustrates how ecosystem degradation can operate as a structural supply shock, with implications for inflation as well as food security.⁵

In this section, we focus on two key issues related to these challenges. First, we look at the role of wild pollinators and pest predators in supporting food production, both in the UK and globally, because this illustrates the importance of biodiversity in underpinning food security and the importance of pollinator habitats as part of critical natural infrastructure. We then consider the impact of floods and droughts on the UK's high-grade farmland, especially in the Fenland region of eastern England (here referred to as the Fens) – a critical part of our natural infrastructure which is at very high risk from climate change.



Pollinators

Globally, nearly 90% of wild flowering plant species and over 75% of food crops rely fully or partly on pollination by animals, mainly insects such as bees, wasps and flies.²⁸ This includes many crops which are vital for human nutrition (fruits, vegetables, pulses, nuts and oilseeds) and cash crops that underpin local or national economies, including coffee, cocoa and almonds.

Animal pollination not only increases yield but also yield stability and crop quality, making food production more resilient and profitable. A meta-analysis of over 200 studies showed that animal pollination increased yield stability by an average of 32% in apple, oilseed rape, and faba bean compared to wind pollination or self-pollination,¹⁰⁰ while a UK study showed that excluding pollinators reduced the weight of market-quality raspberries by 64%.¹⁰¹ Similarly, wild pollinators increased the value of apples by £16k per hectare in a study of UK orchards, but some farms suffered yield deficits of up to 22% from insufficient pollination, equivalent to around £14 k/ha.¹⁰²

However, the diversity and occurrence of wild pollinators is in decline across the world due to multiple compounding threats from climate change, habitat loss, exposure to agrochemicals, competition with commercial bees, and diseases.²⁸ In Europe, 10% of wild bee species and 15% of butterflies are at risk of extinction¹⁰³ and populations are declining for 37% of bees and 31% of butterflies. These trends are mirrored in the UK, where the occurrence of wild pollinating insects (bees, hoverflies and moths) decreased by an average of 18% between 1970 and 2020.¹⁰⁴ This is concerning because there is clear evidence that pollination depends on pollinator diversity.¹⁰⁵

As wild pollinator populations have declined there has been a growing reliance on managed honeybees for pollination services, but these increase the cost of food production and are vulnerable to parasites and diseases. They also compete for pollen and nectar and can transmit pests and pathogens to wild bees and other insects, putting them at greater risk of extinction.¹⁰¹ Global cultivation of pollinator-dependent crops (especially high-value fruits and nuts) is increasing much faster than populations of managed honeybees, raising concern over a future pollination crisis.¹⁰⁶ The role of wild pollinators is undervalued: it is often not recognised that a diverse mix of wild pollinators can provide higher and more stable yields than managed honeybees alone.²⁸

The decline of UK pollinators threatens the goal of maintaining or increasing domestic fruit and vegetable production, which is a crucial part of the government's food strategy to shift to more resilient, healthy, sustainable food that celebrates local food heritage.⁹⁴ The UK grows a range of pollinator-dependent crops worth £1.7 billion per year including apples, pears, strawberries, raspberries, oilseed rape, tomatoes and beans, of which £630 million per year depends on animal pollinators (2020 prices),¹⁰⁷ with the government valuing pollination services at £500 million per year.¹⁰⁸ Fruit production is particularly vulnerable, as 70–80% relies on pollinators.¹⁰⁹

Global pollinator decline also affects UK food security, as we import pollinator-dependent crops from a range of countries including Spain, the Netherlands, Brazil, France, South Africa, Italy, New Zealand and the USA.²⁹

Declining global pollinator abundance and diversity risks worsening poverty and inequality through severe impacts on livelihoods and economies in low-income countries that export coffee, cocoa, fruits, nuts and spices.¹¹⁰ For example, 41% of the agricultural production value of Côte d'Ivoire is dependent on pollinators – mainly for cocoa.²⁹

Pollinator decline can also result in cultural and social impacts, undermining distinctive practices, traditions and cultural identities in both producing and importing countries. For example, major increases in the price of coffee and chocolate could undermine trust in government in many countries where consumption of these products is part of the way of life. This was illustrated when coffee was exempted from US import tariffs following voter dissatisfaction.¹¹¹

Loss of wild pollinators also creates cascading risks for entire ecosystems and their services. It is often forgotten that wild pollinators are essential for the reproduction of many wildflowers, shrubs and trees that underpin wider ecosystems and the services they provide, including their ability to store and sequester carbon, protect from flooding and erosion, cool our towns and cities and provide food and habitat for other species.¹¹² Without pollinators, half of all flowering plants would decline in fertility by 80%, while a third would not produce seeds at all.¹¹³

Pollinator diversity underpins ecosystem resilience by preserving overall plant diversity and productivity, because different pollinators are adapted to pollinate specific flower shapes and plant species. A greater diversity of pollinators increases the chances of specific plant species being pollinated and reduces the chance that the loss of one species could lead to ecosystem collapse.¹¹⁴ Wild pollinator diversity also enhances pollination during environmental and climatic perturbations, thus alleviating pollen limitation.¹¹⁵ The increase in managed honeybees exacerbates these risks because they take the pollen from wild plants but are inefficient at pollinating them.¹⁰⁶

Tropical forests, which are crucial for climate stability, are particularly dependent on pollinators. Over 94% of higher tropical plant species require animal-mediated pollination.¹¹⁶ Mammals also play a key role in seed dispersal and germination. For example, elephants play a key role in the reproduction of many fruit trees, as they eat the seeds then excrete them in fertile dung, aiding germination and dispersing the trees over long distances. In Cameroon, there are 68% fewer ebony saplings in forests with high hunting pressure where elephants are absent,¹¹⁷ with impacts on carbon storage.



Pest predators

Natural pest predators are an important, and often undervalued, component of food security. Predators such as birds, bats, ground beetles, spiders, hoverflies and lacewings, and parasitoids, such as parasitic wasps, prey on herbivorous insect pests, improving crop yield and quality while reducing dependence on expensive and environmentally damaging insecticides.¹¹⁸ For example, in sub-Saharan Africa, a meta-analysis of 99 studies on 31 crops found that biological-control interventions reduced pest abundance by 63% and increased yield by over 60% on average, comparable to using synthetic pesticides but without the associated health and environmental risks.¹¹⁹

More diverse communities of natural predators provide a higher pest predation service.¹⁰⁵ For example, bats and birds were found to play complementary predation roles in apple and blueberry orchards in northern Spain.¹²⁰ Natural predators therefore form part of the ecological infrastructure of farming systems, helping to keep pest populations below economically damaging thresholds and making biodiversity a productive asset.

Biological control of pests is worth an estimated US\$50–196 billion per year globally but many of the insects that provide pest control services are in decline, with some countries reporting >80% population decay over recent decades.⁴³ In the UK, predators of crop pests, including ants, carabid, rove and ladybird beetles, hoverflies, dragonflies and wasps, have shown an average 34% decrease in distribution since 1970, indicating substantial erosion of the ecological infrastructure that supports farming.¹⁰⁴

Pest predators depend heavily on semi-natural habitat within farmed landscapes. Hedgerows, flower-rich field margins, grassy strips, scrubby corners and weedy field edges can provide nectar, pollen, alternative prey (when no crop pests are available, e.g. after harvest), shelter and overwintering sites for pest predators, allowing them to persist in agricultural landscapes and recolonise nearby crops. A recent global synthesis showed that floral field margins increase pest predator abundance and diversity, reducing pest abundance and crop damage relative to non-floral grass margins.¹²¹

Including a diversity of semi-natural habitats in farmed landscapes can strengthen pest control and other ecosystem services.¹²² For example, a study in southern England found that hedgerows with many different woody species provided better habitat for bumblebees and Linyphiid spiders, while including trees in the hedgerow supported Lycosid spiders, and maintaining a rich understory of wildflowers below and beyond the hedgerow supported hoverflies.¹²³ Similarly, a study of cereal field margins in northern Spain found that the abundance of some pest predators was higher in margins with annual wildflowers while others preferred margins with perennial or woody vegetation.¹²⁴ However, while many studies demonstrate the benefits of semi-natural habitats on the abundance of pest predators, there is an evidence gap on the outcomes for crop productivity and associated economic benefits.¹²⁵

Overall, the evidence shows that semi-natural habitats form part of the critical natural infrastructure that supports resilient agricultural production. Investing in hedgerows, flower-rich field margins, scrubby edges and similar habitats supports pest regulation, pollination and soil conservation, decreases reliance on chemical inputs and helps safeguard long-term food security.¹²⁶



Flood and drought risks to high grade farmland

Increased flooding and drought pose high risks to crops and livestock in the UK,⁹⁸ with projections of hotter, drier summers and more intense rainfall.¹²⁷ The exceptionally wet winter of 2023/24 led to the lowest arable harvest on record in the UK.⁹⁸ Water supply for agriculture could face further pressure from a potential public water supply shortfall of 5 billion litres per day by 2050.¹²⁸

Most of the UK's high-grade farmland is at risk from both floods and droughts. High-grade land is concentrated in England, where 13% of all agricultural land and about 59% of Grade 1 farmland is at risk of flooding from rivers and the sea (Figure 4),¹²⁹ with much of the rest being at risk of drought.⁹⁸

The Fens are a priority area: they contain 48% of England's Grade 1 land and are vulnerable to both floods and drought. The Fens contribute over 7% of UK agricultural production, growing over a quarter of England's sugar beet, 20% of potatoes and over 30% of vegetables. They support over 80,000 jobs and contribute about £3 billion a year for the regional economy.¹³⁰

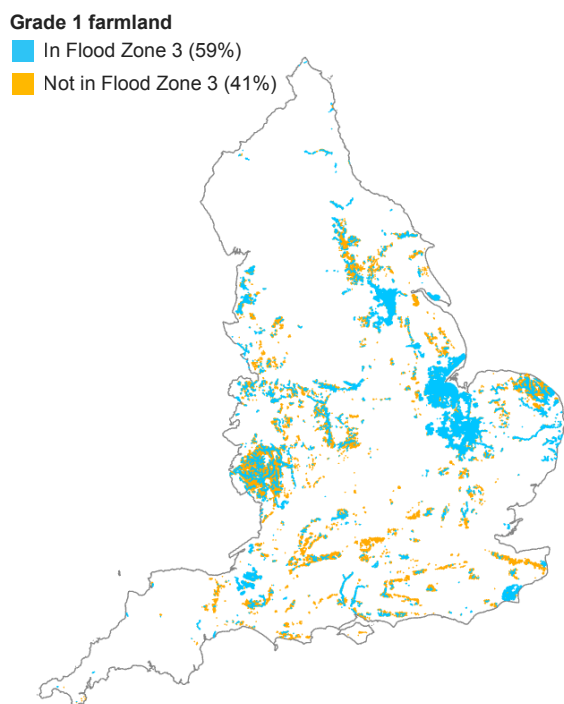


Figure 4. Flood risks to Grade 1 farmland in England

However, the peat soils in the Fens are degrading and sinking. Intensive cultivation and drainage dries out the peat soils, oxidising the organic matter and producing high CO₂ emissions. 84% of fertile peat topsoil has been lost from East Anglia over the last 200 years, and the Fens could lose much of the remainder in 30 to 60 years under current management and climate change. Subsidence has caused up to five meters of elevation loss in places.¹³⁰

Sea-level rise is accelerating in the Fens, in line with the UK trend where two-thirds of the observed rise since 1900 has occurred in the last 30 years.¹³¹ In East Anglia, sea-level has risen from an average of 0.5 mm/year from 1956–1986 to 4.0 mm/year in the last 30 years, and could increase by 1.1 to 1.6 metres in the next 100 years. Flood risk could double by the 2080s under 4°C warming and high population growth, or could rise 16-fold under a low-adaptation future.¹³⁰

Protecting the Fens is extremely challenging. As most of the area is below sea level, it requires continual protection by a system of pumps, drainage channels, sluices, embankments, sea walls and barriers, which remove water during flood events or retain it for irrigation during dry periods. However, continual pumping dries out the peat, causing further subsidence, so that water has to be pumped uphill – using more energy which adds to costs – into many of the drainage channels which are now elevated above the land surface, constrained between embankments.

As sea-level rises, more pumping will be required, but this is costly and carbon-intensive. Diesel and electric pumps caused 80% of emissions in the Great Ouse catchment in 2021,¹³⁰ creating a negative feedback loop by exacerbating climate change. Simply maintaining current defences is expected to cost between £6 and £9.4 billion, but the whole system also needs upgrading to deal with the sinking land surface and rising sea levels. There are plans to decarbonise the pumping system by replacing the remaining diesel pumps with electric pumps powered by renewable energy, providing security from high energy costs, but this creates additional vulnerability if there are power cuts during flood events.¹³⁰

Similar flood risks apply in the Norfolk Broads, East Yorkshire and Somerset. Over 82% of the Broads, including around 25,000 of farmland, is at risk of flooding,¹³² mainly from the sea, as much of the land is below sea level.

In addition, salinisation from coastal flooding and saltwater intrusion into groundwater can cause long-lived damage to soils and crop production, inhibiting plant nutrient uptake and degrading soil structure.¹³³ Saltwater intrusion is also a risk in Suffolk, where it threatens both agricultural soils and freshwater aquifers. Agriculture there depends on irrigation from boreholes, but these are being lost to coastal erosion.¹³⁴

Drought risks to farmland are increasing with climate change. The Fens are in a dry part of the UK; some areas receive less than 600 mm of rain a year. There could be over 34 months of severe drought in a 30-year period at 2°C warming, rising to 110 months at 4°C. River flows are projected to decrease in all three of the Fenland catchments under warming, with the Ely Ouse approaching a 25% reduction at 4°C.



Cascading risks to national security

Combined threats to pollinators, pest predators and high-grade farmland pose severe risks to UK food security (Figure 5). Further loss of semi-natural habitats in the UK would reduce wild pollinator abundance and diversity, reducing the yield quantity, stability and quality of fruit, vegetable and oilseed crops that are important for health and nutrition. Habitat loss would also reduce populations of natural pest predators, which is likely to reduce crop yields and increase dependence on expensive pesticides, which in turn would cause further adverse impacts on both pollinators and pest predators.

Loss of wild pollinators would also undermine regeneration of wider UK ecosystems and the services they provide, including carbon storage and flood regulation. Together with increased reliance on managed honeybees, which take pollen and nectar resources but are inefficient at pollinating wild plants, this would have further knock-on effects on pollinators and pest predators by reducing the quality of their habitat.

Compounding impacts could reduce UK food production and increase prices. The increased costs of extra use of pesticides and managed honeybees combined with lower yield and quality could make crop production uneconomic in some cases, putting farmers out of business. At the same time, continued loss of high-grade UK farmland due to sea-level rise and droughts would further reduce UK crop production, causing food shortages and price rises.

This would cause greater reliance on food imports, but these are highly vulnerable to global pollinator and ecosystem decline. Modelling showed that loss of pollination services for commodities such as coffee and cocoa due to pesticide use, natural disasters and economic debts would cause the greatest economic losses in importing countries such as the UK, rather than the producer countries.¹¹⁰ Economic modelling indicates that **if pollinators go extinct globally, the average global crop price will almost triple** (increasing by about 187%).¹³⁵ This would be associated with severe risks for nutrition, food affordability, and the economies of low-income countries reliant on exports of coffee and cocoa, which could cause widespread economic shocks, geopolitical instability and conflicts.

The overall impacts on UK national security depend strongly on governance. Food insecurity has negative impacts on health, wellbeing, livelihoods, and adaptive capacity and could undermine societal resilience and confidence in the government's competence and legitimacy, leading to social unrest. Combined with geopolitical conflict over resources, there could be severe impacts on UK national security and way of life.

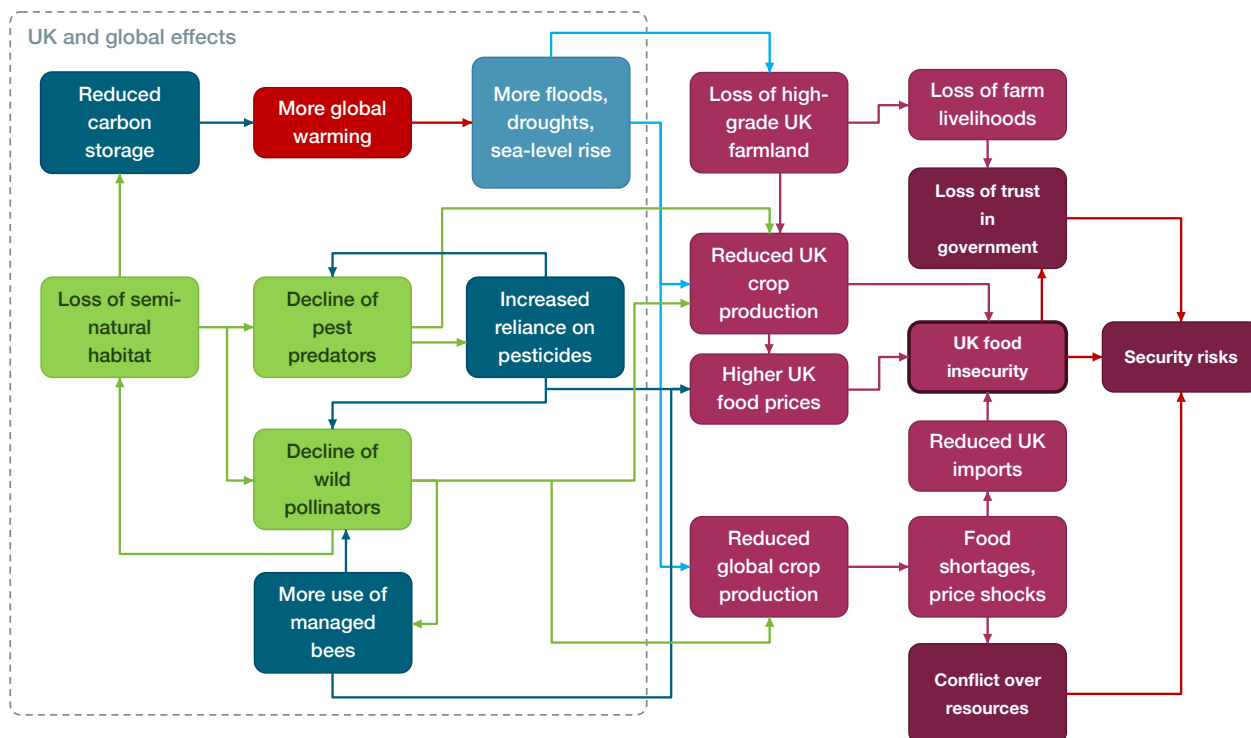


Figure 5. Systems diagram showing the main links between decline of pollinators and pest predators, loss of high-grade farmland, UK food security and national security. Effects shown inside the dashed box occur both in UK and globally. Outside the dashed box, UK and global effects are separated.



Mitigation options

A comprehensive policy framework is needed to tackle these interlinked and cascading risks to UK food security, integrating a range of approaches. These include increased funding for agri-environment schemes and nature-based solutions; reducing pressures on pollinators and pest predators; protecting semi-natural habitats and high-grade farmland; using circular economy and demand management approaches to improve food system resilience; and showing global leadership to support pollinators and pest predators in other countries.

Increased funding for agri-environment schemes and nature-based solutions

Agri-environment schemes, which pay farmers to implement environmentally friendly practices, can address multiple risks to food security. Following Brexit, different schemes are emerging across the four UK nations, including the Sustainable Farming Scheme in Wales¹³⁶ and Environmental Land Management Scheme (ELMS) in England. For example, the lowest tier of ELMS (the Sustainable Farming Incentive, SFI) includes many nature-based options that support pollinators, pest predators and soil health, including habitat strips, beetle banks, pollinator plots, flower-rich herbal leys, hedgerows, scrub mosaics, agroforestry, Integrated Pest Management and organic farming.¹³⁷ Adding organic matter to soils improves infiltration and water storage, addressing both floods and droughts. Agroforestry is particularly useful: trees in pasture provide shade and shelter for livestock, and rows of trees in arable fields have been used to stop fine peat soils in the Fens from blowing away in strong winds.¹³⁸ The middle tier of ELMS (Countryside Stewardship) supports habitat creation on individual farms, and the top tier (Landscape Recovery) supports farmers who

come together to plan habitat creation at landscape level.¹³⁹ Agri-environment schemes, including those that operated before Brexit, may have had some success in increasing the occurrence of butterflies¹⁴⁰ and bees that pollinate crops.¹⁴¹

Consistent, adequate and predictable support for these schemes is essential to maintain uptake by farmers. The sudden termination of funding for the SFI in England in March 2025 caused consternation, and the new scheme that opened in September 2026 ended just six hours later as the £253 million funding pot ran out with many farmers failing to secure any funding, showing that more funds are needed.¹⁴²

Other nature-based options can also play a role in farmland resilience.¹⁴³ Where maintenance of farmland is no longer viable, restoring some parts of the Fens to wetlands can help to stop subsidence and promote new peat formation, raising the land level and reducing carbon emissions or even restoring carbon sequestration.¹⁴⁴ For example, Wicken Fen helps to protect 2,000 ha of farmland and 10 houses in a 1-in-20 year flood event.¹⁴⁵ More widely, natural flood management actions such as tree-planting, leaky dams and wetland restoration are estimated to have a cost-benefit ratio of between 3 and 5.⁹⁸

Changes in farming practices can play a role. Farm and catchment resilience can be improved with better irrigation efficiency, seasonal forecasting and on-farm water storage. Options for the Fens include uptake of paludiculture (wetland-based agriculture on rewetted peat), producing crops such as cranberries, wild rice, club-rush, and bur reed, or use of saline-tolerant crops in areas with high salinisation risk. Multifunctional land use options such as agrivoltaics (solar farms that allow use of the area between and beneath the solar panels for crops or livestock) can help to ease pressure on land use.

Reducing pressures on pollinators and pest predators

Reducing pesticide use is vital to support pollinators and pest predators. Three neonicotinoid pesticides that are lethal to bees and butterflies are banned in England,¹⁴⁶ but this ban has been lifted to allow treatment of a sugar beet virus in five out of the last six years,¹⁴⁷ and other pesticides are still widely used.

The government's 2025 UK Pesticides National Action Plan aims to reduce 'environmental risk' from pesticide use (rather than quantities used) by 10% over the next five years on a voluntary basis.¹⁴⁸ It encourages the uptake of Integrated Pest Management (IPM), which can reduce pesticide use through a mix of methods such as crop rotation, planting habitat for natural predators, growing pest and disease-resistant crop varieties, using precision application of pesticides to reduce the quantity applied, regularly cleaning equipment to reduce pest and disease transmission, and using trap crops to draw away pests.²⁸ It would be useful to consider whether this target could be strengthened, and backed by extra support for IPM through agri-environment schemes.

Reducing overstocking of managed honeybees (*Apis mellifera*) used for commercial pollination services is also important, as they compete with wild pollinators for pollen and nectar, exacerbating their decline and putting the regeneration of ecosystems at risk.¹⁰¹

Recognising the importance of semi-natural habitats

Habitats that support pollinators and pest predators should be recognised and protected as Critical Natural Infrastructure. Pollinators and pest predators need habitats with structural diversity, to provide shelter, nesting and hibernation sites, and pollinators also need wildflower-rich habitats to provide nectar and pollen when crops are not in bloom. For example, wildflower patches and semi-natural habitat close to orchards led to more visits by wild bees and hoverflies, producing more and bigger apples.¹⁰¹

However, while the value of flower-rich field margins, hedgerows, native woodlands and ancient trees is recognised and supported, we need to recognise the importance of ‘messy’ habitats such as scrub, brambles, dead wood, ivy, tall grass and ‘weeds’, which are often targeted for ‘tidying up’. These habitats are rich in pollen and nectar resources: eight out of the ten most valuable wild plants for pollinators (ranked by insect visitor richness) are considered to be weeds, including thistles, brambles and ragwort, implying that awareness of their benefits needs to be improved.¹⁴⁹ These overlooked and undervalued habitats can also support nature-connectedness for people, helping to strengthen societal resilience.¹⁵⁰

Smarter planning decisions to protect high-grade farmland

Protecting the high-grade farmland in The Fens and other low-lying regions from sea-level rise is very difficult and expensive, as described above. However, decisions on flood and drought management need to integrate consideration of future long-term impacts on food security, carbon emissions, environmental integrity and other issues.

Given these challenges, it is essential to avoid loss of Grade 1 and 2 farmland elsewhere to development, or conversion to other uses such as woodland. The National Planning Policy Framework for England expects developers to use lower grade farmland ‘if available’, but this requirement could be strengthened to avoid developing Grade 1 or 2 land for housing or infrastructure.¹⁵¹

Circular economy and demand management

Demand-side measures are central to resolving land-use trade-offs. If some high-grade farmland in the Fens is converted to wetland or paludiculture, the rest of the UK farming system will need to replace the lost crop production capacity (to avoid increasing reliance on imports). As the majority of UK farmland is used either for grazing livestock or to produce livestock feed crops, shifting to a more plant-rich diet and reducing food waste could help to free up land previously used for feed crop production.¹⁵² This could be used for horticulture, nature recovery, flood management, and climate adaptation, including to produce crops previously grown in The Fens, although production of fruit and vegetables can be more challenging on less fertile soils.

A circular economy approach is essential to reduce the pressure on water resources. England faces a public water supply deficit of 5 billion litres per day by 2055, more than a third of current daily usage, due to population growth, irrigation due to climate change, and the need to stop streams and rivers from drying up.¹⁵³ Planned investment of £8 billion in new reservoirs, water transfer and desalination systems will only meet 34% of the deficit and will take decades to build; the rest must be met through efficiency and behaviour change in households and businesses (49%) and fixing water leaks (17%).¹⁵³ This requires water efficiency standards for new homes and appliances, investment by water companies to fix leaks (which waste 19% of water), and fully considering the impact of water-intensive infrastructure such as data centres when making

planning decisions⁹⁸ (84% of proposed data centres in England are in water-stressed areas).¹⁵⁴ Together with water recycling, these measures could reduce the size and extent of new water supply infrastructure needed, and the associated financial, environmental and carbon cost.

Global leadership and funding to support pollinators and pest predators

The UK has an opportunity to show leadership in addressing global pollinator decline. This could include funding global action to support pollinators in low-income countries that depend heavily on export of vulnerable crops¹¹⁰ through international development activities. In addition, there are opportunities for knowledge exchange based on the outcomes of England's agri-environment schemes and their role in supporting bees,¹⁴¹ as well as the citizen science pollinator monitoring scheme,¹⁰⁷ neo-nicotinoid pesticide ban and pollinator action plan.¹⁵⁵

3. Local climate resilience: urban green infrastructure

In this section we consider how climate change impacts in urban areas pose risks to national security, how urban green infrastructure can help to mitigate those risks while delivering multiple benefits for people and nature, and how to tackle the loss of green space to urban development.



Climate risks from flooding and overheating in urban areas

By 2050, a third of homes in the UK could be at risk of flooding. Annual flood damage of £3.3 billion per year today could increase to £4.5 billion by 2050 under 2°C of warming, or £7.5 billion under 4°C.⁹⁸ Critical infrastructure – including roads, railways, energy networks, and water systems – is also at risk. By 2050, 46% of roads and 54% of railways will be at risk of flooding in England alone.¹⁵⁶

Over half of homes in the UK are at risk of overheating today, and this could increase to 92% by 2050 under 2°C of warming, or 100% under 4°C. Record peak temperatures of 40°C, which caused 3,000 premature deaths in England and Wales in 2022 and a further 2,800 in May–June 2026,¹⁵⁷ could become an annual occurrence, with peak temperatures climbing to 45°C by 2050.⁹⁸

Heatwaves and flooding will have particularly severe impacts in urban areas, due to the high populations and high coverage of impermeable surfaces. Surface-water and flash flooding can be unpredictable, leading to fatalities and major long-term impacts.¹⁵⁸



Cascading risks to national security

Flooding leads to economic losses, long-term impacts on personal wellbeing and mental health, and cascading disruption to business and essential services including transport, telecoms, power, food production, and business continuity. For example, it has been estimated that workers are unable to reach their workplace for ten days on average after a flood event, losing economic output worth at least £290m annually, and a year of flood events causes a decade-long downward pressure on the economy worth £6.1bn, cutting employment by around 46,000 jobs.¹⁵⁹ Flooding can disrupt access to schools, damage educational infrastructure, and contribute to prolonged absences, with downstream effects on learning, wellbeing, educational attainment, and future productivity.¹⁶⁰ Extreme weather has also been linked to violent and aggressive behaviour, depression and suicide,¹⁶¹ and puts a high strain on emergency and health services, with military support sometimes also needed.

Public trust in the government's ability to handle extreme weather is low, with 66% believing the UK is unprepared for events like flooding, storms, and heatwaves.¹⁵⁶ Loss of confidence in the government can undermine social stability, and also affects people's willingness and ability to engage with adaptation measures, affecting societal resilience.¹⁵⁰



Urban green infrastructure

Green infrastructure can play a key role in climate resilience. Parks, urban trees, green roofs and walls, sustainable drainage systems and other green spaces can cost-effectively reduce flooding and provide shade and cooling.¹⁶² For example, one study estimated that 39% of the lives lost in European cities due to the urban heat island effect could be saved by increasing tree cover in all cities to 30%,¹⁶³ and another found that tree cover could be increased by an average of 8% in major global cities by making more use of street trees, car parks and parks.¹⁶⁴

Cooling by green infrastructure can reduce the need for air conditioning, which is placing a growing strain on electricity demand and associated carbon emissions.¹⁶⁵ Sustainable Drainage Systems (SuDS) which incorporate a network of ponds, channels and wetlands can be cheaper than conventional drainage schemes, e.g. saving almost £12,000 (2025 prices) in capital costs per new home in Wales.⁹⁸ Figure 6 shows how green space in London is associated with lower surface runoff during intense rainfall events and greater urban cooling.



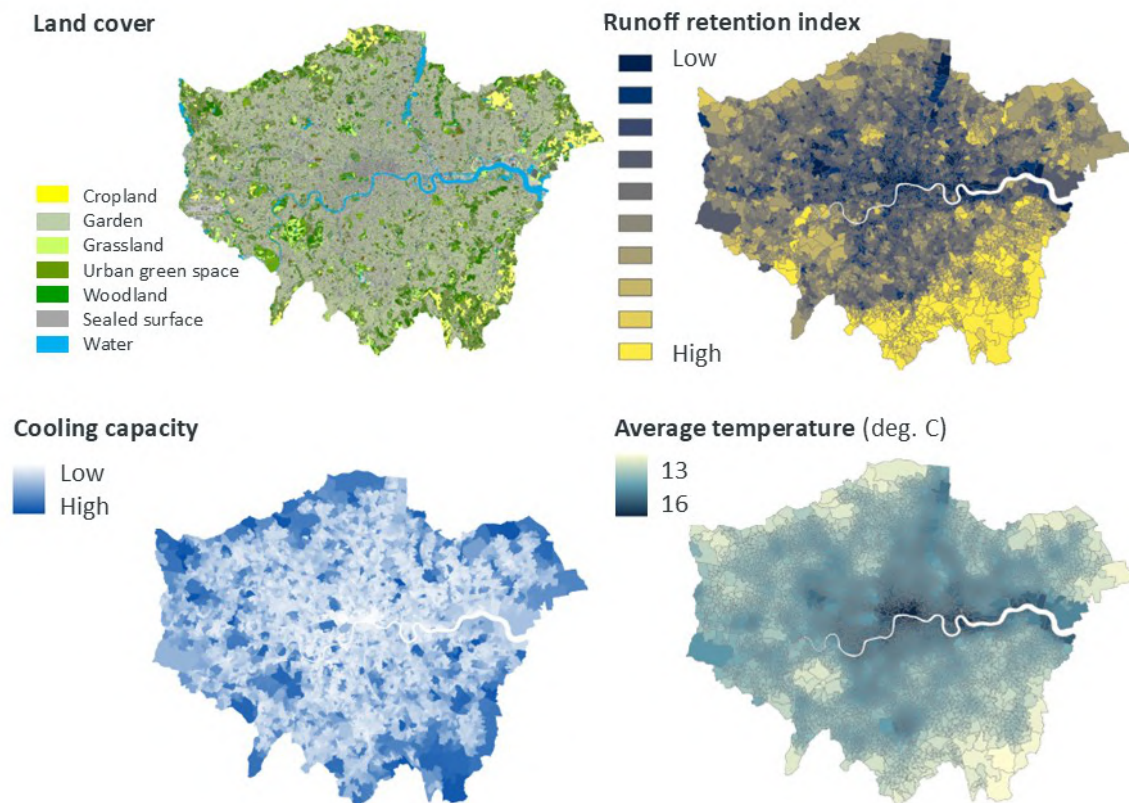


Figure 6. Green space in London (top left; green and yellow areas) is associated with runoff reduction (top right) and cooling (bottom). The runoff retention index is the amount of water retained during a high rainfall event. Cooling capacity is modelled based on albedo, shade and evapotranspiration for each land cover type from a literature review, and this determines the average temperature. The difference between green and paved areas is over 3°C, even in an average summer with no heatwave.¹⁶⁶

Green infrastructure also supports human health and well-being through providing opportunities for recreation, social interaction, and nature connection (Figure 7), helping to build societal resilience.¹⁶⁷ There is emerging evidence of the impacts of nature on human health and wellbeing through a range of pathways, including stress reduction, opportunities for physical exercise and social connection, and exposure to the soil microbiome.¹⁶⁸ Access to nature is associated with improvements in over 20 different health indicators, including depression, insomnia, ADHD, obesity, high blood pressure, diabetes, poor eyesight, immune function, pain control and child development, with disadvantaged communities typically receiving higher benefits.¹⁶⁹ In addition, a recent poll showed that people take pride in their local parks and green spaces, and high-quality green space can build public confidence that the Government can fix the bigger issues.¹⁷⁰

Wildlife-friendly management of green infrastructure can also provide a refuge for pollinators, supporting crops in nearby areas and thus boosting UK food security. For example, long grass and ivy in urban gardens increases butterfly abundance and species richness.¹⁷¹

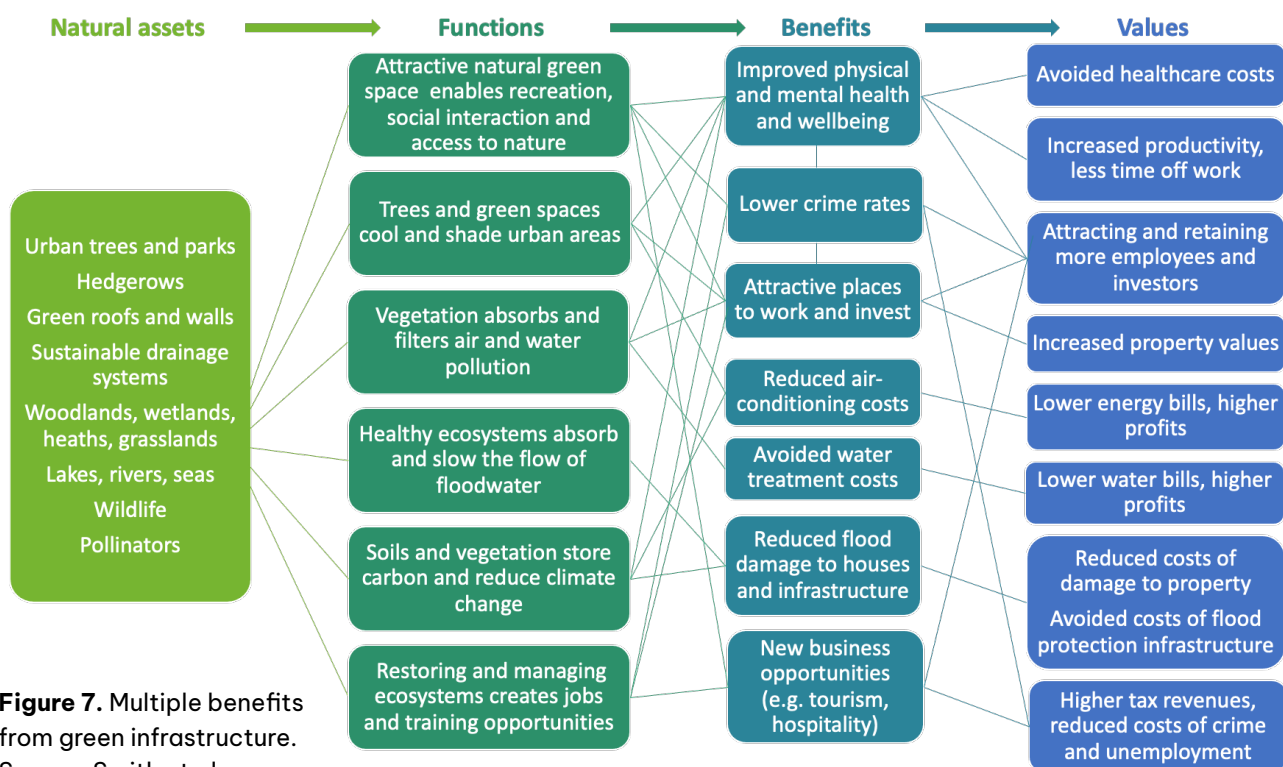


Figure 7. Multiple benefits from green infrastructure.
Source: Smith et al (2023)¹⁷⁰

Green infrastructure is under threat from development pressures.¹⁵¹ Despite wide recognition of the benefits of green infrastructure, including development of guidelines and standards to support deployment in England,¹⁷² pressure to meet housing targets means that many green spaces are being allocated for housing development. Recent changes to planning regulations have exempted over 90% of all developments from the requirement to deliver biodiversity net gain, disproportionately affecting deprived communities living in ‘nature poverty’.¹⁷³

This loss of urban nature contributes to decreasing permeable surfaces, stronger urban heat island effects, and increasing risk of floods. To address these challenges, smarter planning laws are required in line with the Nature Positive Cities concept, which calls for a holistic policy approach to create more liveable, resilient and sustainable urban areas by restoring and enhancing nature and biodiversity.¹⁷⁴



Mitigation options

A range of approaches are needed to reduce the risks to green infrastructure and maximise its contribution to climate resilience and national security. These include protecting existing green space, improving the use of sustainable drainage systems

Strengthen protection for existing green space in the planning system

The current National Planning Policy Framework in England sets the expectation that new green infrastructure will be included in new developments in line with Natural England's Green Infrastructure Standards or a local equivalent. However, protection for existing green space, including designated Local Green Space, green belt land, recreational space and even nature reserves, has been weakened. There is now a long list of exemptions where development on green spaces is allowed, including around rail stations, for mineral extraction, engineering operations, transport, electricity and water infrastructure, 'material changes to the use of land' and buildings for sports facilities and recreation,¹⁵¹ as well as 'nationally significant infrastructure' (which now includes data centres). Even where compensation is required (which only applies to certain protected sites, with even National Nature Reserves excluded) it will take many decades to replace established trees and habitats in a new site, and it is unlikely that the species lost on the old site will ever fully recover.¹⁵¹

Improve the adoption of multifunctional Sustainable Drainage Systems (SuDS) in England

Following severe floods in 2007, Schedule 3 of the 2010 Flood and Water Management Act made multifunctional SuDS mandatory in all new housing developments, but this was only fully implemented in Wales. In England, SuDS has been delivered through the non-statutory planning system since 2018, with the current requirement being that developments should incorporate SuDS 'proportionate to the nature and scale of the proposal' and 'should provide multifunctional benefits where possible, facilitating improvements in water quality, biodiversity and amenity.'¹⁷⁵ However, loopholes in this wording such as 'proportionate' and 'where possible' are leading to inconsistent quality of SuDS depending on power relations between developers and local authorities.¹⁷⁶ Mandatory implementation would ensure that high-quality SuDS are delivered and maintained in new developments.¹⁷⁷

Include strategically placed shade trees in all new developments

Small deciduous trees or shrubs on the south side of buildings provide shade during hot summers but allow sunlight through in winter when leaves fall. Including a requirement for shade trees on new housing developments in the NPPF could reduce the need for costly and carbon-intensive air-conditioning as well as providing multiple benefits for biodiversity, mental health, carbon storage and flood regulation.

Keep new homes and critical assets out of high-risk floodplains and coastal-risk areas and tighten flood-resilience planning rules

In England, 30% of new homes built in 2024 will be at risk of flooding by 2050.¹⁷⁸ This is partly due to loose planning guidance and partly because Environment Agency advice is not always followed; 102 decisions went against this advice in 2024–25, and 300 homes were built in contravention of this advice.¹⁷⁹ There could be a severe social and economic shock when the FloodRe reinsurance programme expires in 2039, when homes in flood zones may become uninsurable.

Reduce emissions as well as adapting

It is critical to continue strong efforts to reduce fossil fuel and land use emissions, because the Met Office is clear that future flood and drought extremes worsen in higher-warming scenarios.

Summary and recommendations

The examples above illustrate how **national security in the UK depends on Critical Natural Infrastructure** at three interacting scales. At the global scale, we depend on tropical forests and oceans to underpin climate stability, water cycles, food supply and geopolitical stability. At the national level, UK food production depends on the resilience of our farmland to climate change; but those climate impacts are linked to global ecosystem stability, and our food imports also depend on pollinators and pest predators in other countries. Locally, we depend on networks of semi-natural habitats and green space throughout our countryside, towns and cities, which support pollinators and pest predators, provide resilience to floods and heatwaves, and boost social capital and mental resilience.

Recognising, protecting and expanding a network of critical natural infrastructure in the UK could help to shift from a system of cascading risks to one of cascading benefits, where components of the system reinforce and multiply benefits for climate resilience and security. For example, investing in a series of nature-based solutions from upland peat restoration down to urban and coastal ecosystems can deliver a cascading chain of benefits for water supply, water quality, flood reduction and carbon sequestration, with net economic benefits (Figure 8).

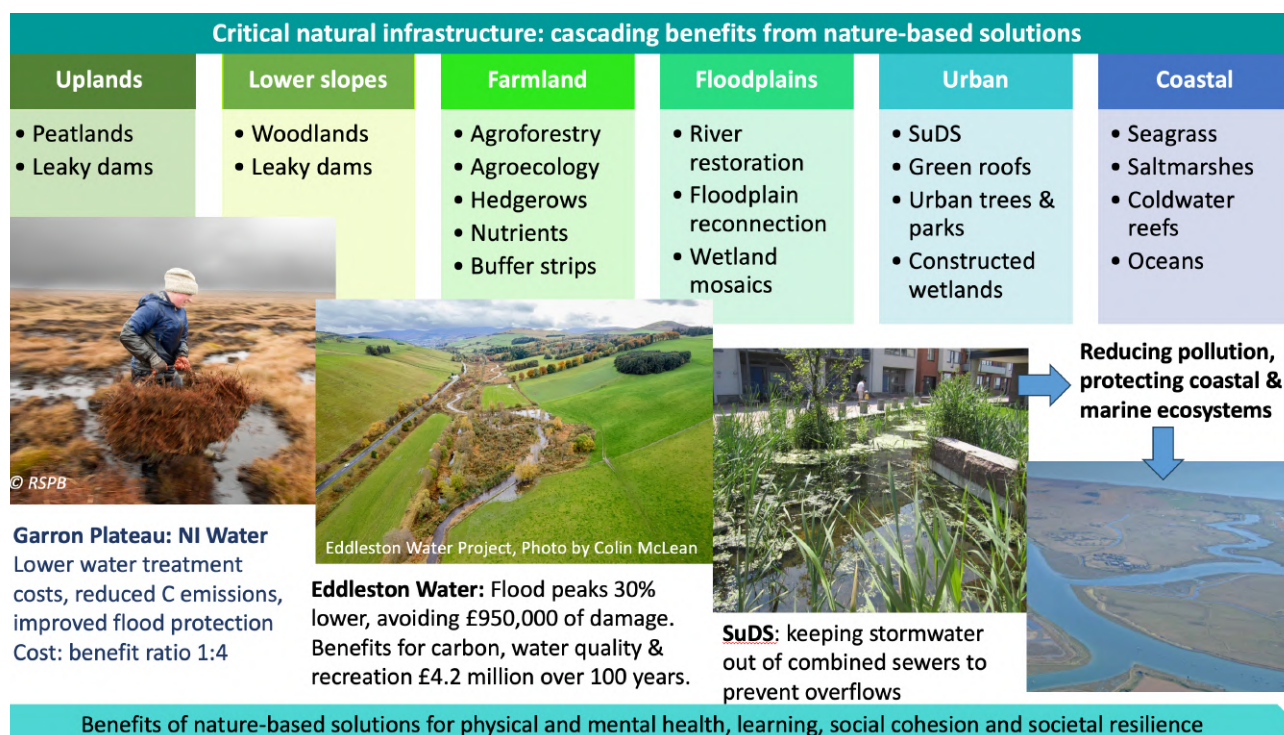


Figure 8. Example of a chain of cascading benefits from natural infrastructure for water management in the UK

However, these critical natural systems are under threat from multiple pressures and competing demands for space and resources. Key threats to nature in the UK include pollution (including excess nutrients), over-consumption of resources, and habitat loss for development, which is exacerbated by perceived conflicts between nature protection and the growth agenda, and sometimes conflicts between climate and nature policy.

Protecting remaining intact ecosystems both at home and abroad is the most urgent priority. Ecosystems take decades to centuries to recover from disturbance, and any further losses to stored carbon cannot be restored in the short window of time available to avoid tipping points.¹⁸⁰

To tackle these threats, transformative change is needed⁷ to:

- ❖ Conserve and regenerate nature
- ❖ Deliver systemic change in sectors causing loss
- ❖ Transform economic systems for nature and equity
- ❖ Transform governance systems to be integrative, inclusive, accountable and adaptive
- ❖ Shift societal views and values to recognise human connections to nature and act accordingly

UK policymakers have opportunities to strengthen Critical Natural Infrastructure both within the UK and globally, via our international engagement on Multilateral Environmental Agreements and nature finance activities, political forums such as G7 and G20, Official Development Assistance funding for overseas initiatives, and action on sustainable commodity supply chains.

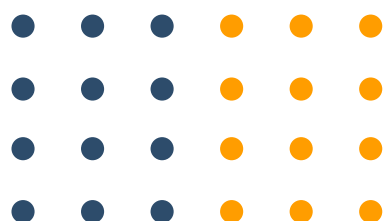
Policy recommendations

Below, we summarise key mitigation options from the sections above and add some cross-cutting recommendations. These aim to improve resilience through three approaches: robustness, by recognising and protecting the ecosystems that keep our planet habitable; recovery, by restoring degraded natural assets; and reorientation, to reduce the pressures that make current systems fragile.

Cross-cutting recommendations

- ❖ **Formally recognise the importance of Critical Natural Infrastructure.** Building on recent statements,¹⁸¹ the UK government can help to raise awareness that natural systems both in the UK and globally are not peripheral environmental assets – they are part of the critical core systems and infrastructure on which food security, water security, public health, economic stability, social resilience and geopolitical stability depend.
- ❖ **Incorporate Critical Natural Infrastructure into national resilience planning, national security assessment, and infrastructure investment decisions.** Clarify cross-government ownership and the responsibilities of each department for monitoring, funding and regulating the protection, restoration and maintenance of critical natural assets, including who is responsible if natural infrastructure fails.
- ❖ **Embed Critical Natural Infrastructure systemically across wider government policy** using a systems approach to show how nature is linked to policy goals in multiple areas including climate, farming, food, water, energy, health, education, culture and defence. Breaking down policy silos through a systems approach can help to drive transformative change.
- ❖ **Set up a monitoring, early warning and decision-making framework for Critical Natural Infrastructure.** This could draw together existing indicators that are highly relevant for national security, such as pollinator and pest-predator trends, soil condition, loss of farmland, water availability, floodplain development, urban canopy cover, and changes in critical global ecosystems. Each indicator should be linked to a decision or escalation route.
- ❖ **Continue to demonstrate strong UK leadership on reducing fossil fuel emissions,** including by resisting calls to allow development of new oil and gas fields. This is a key priority for all the security threats discussed in this report: it is crucial in order to limit climate damage to global land and ocean ecosystems and their ability to continue to store and sequester carbon; to limit the loss of high-grade UK farmland; and to reduce overheating and flooding in urban areas.
- ❖ **Align climate and biodiversity policies,** to avoid damage to ecosystem integrity from geoengineering, critical minerals extraction and harvesting forests for bioenergy.
- ❖ **Accelerate demand-side policies that reduce pressure on Critical Natural Infrastructure,** including circular economy measures to reduce virgin material demand; stronger due diligence for forest-risk commodities; food waste reduction; healthier and more plant-rich diets; water efficiency and reuse; energy efficiency and demand flexibility. Without reducing underlying demand, efficiency gains can lead to more consumption and ecosystem protection in one location may shift impacts elsewhere. Policy should therefore aim firstly to avoid unnecessary demand, then to improve efficiency, recycling and reuse, and only expand supply if needed. This will require:

- **Strong action to reduce consumption of energy, water, land and materials by high-impact sectors** such as data centres, which otherwise could wipe out any savings made by the general public. The 140 proposed data centres in the queue for a grid connection in March 2026 require a total 50 GW of electricity generation capacity, more than the current peak demand of 45 GW in the UK.¹⁸²
 - **Redesign of energy, transport, food, water and material systems** to improve access to affordable, healthy, low-impact choices and encourage pro-environmental behaviours (including a shift to more plant-based diets), while protecting low-income households from additional costs.
- ❖ **Invest in actions to trigger positive tipping points** where policy interventions can shift society onto a self-sustaining pathway of cascading benefits.¹⁸⁴ A new initiative, the Positive Tipping Point Alliance, is seeking to build a global governmental alliance to drive this forward.¹⁸⁵
 - ❖ **Increase investment in nature-based solutions** including natural flood management, agroforestry, wetland restoration and urban green infrastructure, as a cost-effective route for tackling the growing flood risk to UK houses, infrastructure and farmland.
 - ❖ **Further research is needed** to improve understanding of impacts in some areas (especially for ocean carbon cycles) and design effective interventions, supported by behavioural science insights (see the project's Forward-looking Research Agenda¹⁵).



Specific recommendations

- ❖ **Continue to show UK leadership on reducing global tropical forest loss** by rapidly implementing strong legislation on forest-risk commodities and investing in the Tropical Forests Forever Facility.
- ❖ **Strengthen development funding for forest and ocean protection.** Although funding information is limited, there have been recent reports of large cuts in many crucial programmes.¹⁸⁶
- ❖ **Strengthen ocean ecosystem resilience** by enforcing catch quotas in line with scientific advice, banning bottom trawling in Marine Protected Areas, enforcing regulations on sewage pollution and agricultural runoff more effectively, and strengthening regulations on microplastic pollution.
- ❖ **Increase support for agri-environment schemes** to support more resilient UK food production, by improving soil health and supporting habitat for pollinators and pest predators. Current funding is inadequate and inconsistent, undermining farmer confidence and destabilising the sector.
- ❖ **Investigate how to reduce overstocking of managed honeybees** to protect wild bees that are crucial both for crop pollination and wider ecosystem maintenance.
- ❖ **Strengthen UK leadership in addressing global pollinator decline** through ODA funding and knowledge exchange based on England's agri-environment schemes, citizen science pollinator monitoring scheme, neo-nicotinoid pesticide ban and pollinator action plan.
- ❖ **Reform the planning system to strengthen protection for critical natural assets.** Revise the National Planning Policy Framework (NPPF) in England to prevent development of Grade 1 and 2 farmland, remove the new exemptions that allow loss of local green spaces and nature reserves, and empower local authorities to set more ambitious Biodiversity Net Gain requirements.¹⁵¹
- ❖ **Increase uptake of high-quality multifunctional Sustainable Drainage Systems to reduce urban flooding** by implementing legislation equivalent to Schedule 3 of the 2010 Flood and Water Management Act, rather than relying on the planning system.¹⁷⁸
- ❖ **Tighten planning rules to prevent building of houses and infrastructure on floodplains** and tackle the risk of homes becoming uninsurable when FloodRe expires.

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