

# Creating a Nature-rich UK

UNLEASHING THE POTENTIAL OF NATURE-BASED SOLUTIONS



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Published in print 13th September 2023

Online version [zerohour.uk/reports](http://zerohour.uk/reports) | Updated 14th September 2023

Layout: Laura Hutchinson



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# INTRODUCTION

The greatest risk we face today is the climate and ecological emergency. To the economy. To people's jobs and livelihoods. To our national, food, and energy security. To our health, housing, and transport systems. And of course, to our shared natural world which is under threat like never before.

Action (or inaction) by politicians in the months ahead to tackle this dual crisis will be the most consequential in all of human history. The UK Government, devolved administrations, mayors, local governments, and all UK political parties, must therefore seize this last, best chance to align policy with what the best available science tells us is urgently required to secure a liveable future.

Having agreed, at international levels, to "keep 1.5°C alive" and to reverse nature's destruction by 2030, it is essential to lock these complementary apex targets into law with a joined-up climate and nature strategy to achieve them.

This is what the Climate & Ecology Bill will deliver. A science-led, people-powered and—most importantly—joined-up strategy to set the UK on track. A roadmap to a nature positive, zero carbon future. A blueprint for the just transition to build a fairer, greener, more prosperous UK.

The challenges are great, but so are the opportunities; many of which are 'win, win, win'. The UK must rapidly reduce its greenhouse gas emissions but—as set out in this report—we must simultaneously reform our food system and protect and enhance our much-depleted natural world.

Freeing up land and restoring habitats including woodlands, peatlands, wetlands and seas, to enable the implementation of nature-based solutions will:

- Remove carbon dioxide from the atmosphere much more cheaply than the (unproven and eye-wateringly expensive) engineered options;
- Help us better adapt to climate change
- Bring back wildlife, and all the free services (pollination, water and air purification, pest and disease control) that nature gifts us with
- Create an abundance of new, green jobs and skills
- Safeguard the UK's food security; and in so doing ...
- Give a much needed boost to local communities and the economy

It's time for the UK Government and the devolved administrations to unleash the potential of nature-based solutions, now—for people, for climate, and for nature.

# SUMMARY

Nature has become humanity's blind spot. We have lost our connection to the environment on which we depend for life, polluting it with our waste, with little regard to its sensitivity and extraordinary complexity. We haven't recognised, until almost too late, that Earth's natural systems are deeply intertwined, and that as we cross 'safe' boundaries, we unleash mutually reinforcing impacts which are shifting our biosphere outside of the stable zone that enabled modern civilisation to develop.

This report demonstrates how:

1. A nature-rich UK will create a thriving and resilient economy, unlocking green prosperity for communities across the UK;
2. Nature-based solutions (NBS) remove carbon at a far lower cost than expensive, unproven and unworkable technologies, whilst protecting against climate impacts; and
3. Transforming the food system is essential in order to free up land for NBS, as well as safeguarding the UK's food security, and creating green jobs.

We highlight that many NBS reports downplay carbon sequestration potential by assuming business-as-usual. We demonstrate that with the transformative change necessary to tackle the climate and nature crisis, the potential for NBS becomes many times greater.

## Role of nature-based solutions (NBS)

We need the large-scale restoration, protection and sensitive management of nature to help us mitigate and adapt to climate change. A coordinated nationwide plan to implement NBS can help the UK to address the biggest societal challenges of our times, simultaneously benefiting people and biodiversity, as well as being critical to sustainable economic development and job creation. However, in order to unlock the immense potential of NBS, we must reform our unsustainable food system, the principal cause of damage

to land and marine ecosystems, and responsible for 35% of UK emissions (including imports).

## System upgrade needed

Addressing the climate-nature crisis requires a whole-system approach, and the sort of transformative action called for by the IPCC. This means shifting from a model that drives demand for livestock, commodity crops and heavily processed foods, which fuel the cost of living crisis, to one that delivers a more home-grown, plant-rich diet. This will free up enough land to allow NBS to sequester more CO<sub>2</sub> than currently projected to be removed by false engineered solutions. These changes will also address our dependence on other nations for so much of our food, a situation which will grow increasingly risky as climate impacts accelerate.

## Is this affordable?

Bold action to harness the power of nature of course requires investment, but the funding is available if the UK acts now to avoid wasting vast sums on speculative technologies such as BECCS, DACCS<sup>1</sup> and blue hydrogen

<sup>1</sup> BECCS: Bioenergy with Carbon Capture & Storage. DACCS: Direct Air Capture with Carbon Storage

with their discredited promises to capture CO<sub>2</sub>. Scientists are clear that these engineered solutions will not help us reach net zero, and are likely to make matters worse—as set out in Zero Hour's report [Net Zero: The Ambition Gap](#).

## The way forward

The public and businesses need a solid Government commitment to a sustainable economy, with effective incentives, before they will be convinced of the climate/nature-positive opportunities and be willing to invest. And this must be a just transition, where no-one is left behind. By adopting the Climate and Ecology Bill the Government would demonstrate a firm commitment to a positive, science-led, joined-up strategy to rapidly and fairly reduce emissions, and reverse nature loss by 2030.

**"Transforming the food system is the most powerful action we can take to solve our biggest problems"**

**Antonio Guterres, UN Secretary General at the 2023 UN Food Systems Summit**

# 1. A NATURE-RICH NATION TO BUILD RESILIENCE

This section explains how the UK is at high risk from dangerous impacts of climate change such as flooding, drought and heat stress.

A [Grantham Institute](#) report says that damages are costing the UK 1.1% of GDP and warns of a rise to 3.3% by 2050, under current policies with minimal adaptation. Insurance brokers [Marsh Commercial](#) says that around a third of businesses properties are at risk from flooding and 40% of small businesses do not survive after catastrophic flooding.

As one of the most nature-depleted nations in the world, the UK is not in a good position when it comes to capacity to mitigate the most damaging climate impacts. The annual cost of flooding is already around [1.3 billion](#). The full toll of climate impacts on people's lives is immeasurable.

**"The UK's net-zero target will not be met without changes in how we use our land. Those changes must start now."**

**Climate Change Committee, January 2020**

Creating a nature-rich UK and becoming more self-sufficient in food production are by far the most viable and cost-effective solutions to this grave issue—making us more resilient to climate shocks, **alleviating the cost of living crisis and saving the country money.**

The Climate Change Committee's (CCC) report [CCRA3 2021](#), sets out the UK's top priority climate risks that threaten people and the economy. All eight risks are related to our natural world and have solutions that can be found through nature's protection. The CCC's recent adaptation [progress report](#) states that "The pace of climate change is outstripping the action taken to adapt to it."

	Top Priority Risks From CCRA3	Economic & Social Consequences	Key Nature-Related Policy Areas/Solutions
<b>1</b>	<p><b>Viability and diversity of nature (habitats &amp; species). Essential to prevent ecosystems from collapsing into a depleted state</b></p>	<p>Listed as top priority because nature ultimately underpins all economic activity and human wellbeing. Residual emissions that cannot be abated will have to be removed from the atmosphere. Restoring ecosystems such as saltmarshes, peatlands and woodland—therefore increasing their capacity to absorb and store CO<sub>2</sub>—will be vital for meeting our 1.5°C commitment. Creating healthier ecosystems is also a cost-effective way to protect against severe climate impacts such as catastrophic flooding, drought and overheating.</p>	<ul style="list-style-type: none"> <li>– Halt the destruction of habitat by transitioning to sustainable farming and fishing.</li> <li>– Reduce pressure from livestock production to free up land for large-scale restoration and nature-based solutions.</li> <li>– Expand protected areas for habitats on land and at sea, particularly carbon stores, and enforce protection.</li> <li>– Implement 'polluter pays' policy and strengthen laws to protect people and nature from further degradation</li> <li>– Prevent unsustainable development that exacerbates the risk.</li> </ul>

Top Priority Risks From CCRA3	Economic & Social Consequences	Key Nature-Related Policy Areas/Solutions
<p><b>2</b> Soil health from flooding &amp; drought</p>	<p>Soil is a living breathing ecosystem that supports all life and our food system. Food and drinking water are at high risk from the climate impacts to soil. Destructive production methods exacerbate this threat through high chemical inputs and lack of crop diversity causing soils to be exhausted. CCRA3 estimates annual soil compaction costs at £470m, and costs from soil erosion, including the impact on water quality, at £150m.</p>	<ul style="list-style-type: none"> <li>– Halt destructive production methods.</li> <li>– Accelerate the transition to <a href="#">agroecology</a> and agroforestry to restore soil.</li> <li>– Create nature-based solutions on farmland to store water, help prevent flooding and water shortages and to alleviate soil erosion.</li> </ul>
<p><b>3</b> Natural carbon sequestration and storage</p>	<p>UK peatlands store around 3.2bn tonnes of carbon but 80% of our peatlands are degraded, now responsible for 5% of <a href="#">all UK emissions</a>. At current rates of decline 50%-60% of our peatlands are expected to be lost by the 2050s. Blue carbon (ie. carbon in marine ecosystems) is also a vital carbon store but highly damaging bottom trawling is destroying sea beds releasing emissions equivalent to <a href="#">aviation</a>. Blue carbon emissions and sequestration rates in wetlands and seas are not yet included in UK emissions accounting.</p>	<ul style="list-style-type: none"> <li>– Major increase in ambition for peatland restoration (England's Peat Action Plan commits to only 280,000 hectares by 2050 - of a total of 3 million).</li> <li>– Major increase in ambition for expansion of woodland (Target for England is only an extra <a href="#">2% by 2050</a>).</li> <li>– Expand inland &amp; coastal wetlands.</li> <li>– End bottom trawling and overfishing in all Marine Protected Areas.</li> <li>– Switch to sustainable food production.</li> </ul>
<p><b>4</b> Crops, livestock &amp; commercial trees</p>	<p>The food system is at high risk due to its overwhelming focus on livestock and the vast areas of monocrops to support it, leaving us reliant on imports for the majority of fresh food. <a href="#">Defra's 2022 report</a> on food security offers stark warnings about the increased risk of heat stress to livestock—1000%-3000%, making it increasingly unviable. Monocrop production is at risk from <a href="#">climate change</a> and pathogens such as <a href="#">fungal attack</a>. We must adapt the food system urgently to protect food security and jobs.</p> <p><b>The CCC warns: "There is no clear evidence that climate risks or opportunities for agriculture and forestry are being strategically planned for or managed"</b></p>	<ul style="list-style-type: none"> <li>– Urgent adaptation measures to diversify and reduce reliance on livestock.</li> <li>– Transition to sustainable agroecology and agroforestry.</li> <li>– Restore agricultural ecosystems, including rivers and wetlands, to increase resilience to climate impacts and absorb carbon.</li> <li>– Forestry could be expanded, with the 'right tree planted in the right place'. Timber production on farms has been shown to be more viable than some <a href="#">livestock farming</a>.</li> </ul>

Top Priority Risks From CCRA3	Economic & Social Consequences	Key Nature-Related Policy Areas/Solutions
<p><b>5</b> Food supply &amp; vital services due to collapse of supply chains</p>	<p>The UK is the world's third largest net <a href="#">importer of food</a>. Dependence on complex, 'just in time' supply chains makes us one of the least food-secure countries in Europe and is a major cause of the cost of living crisis. High risk is locked in due to over-reliance on imports of commodities that are damaging to climate &amp; nature, as well as fresh foods from climate-vulnerable countries.</p>	<ul style="list-style-type: none"> <li>– Increase UK production of fresh foods, that feed people directly, through shorter, fairer supply chains. This would create a vibrant local food economy.</li> </ul>
<p><b>6</b> Power failure threatening people &amp; the economy</p>	<p>Power loss threatens all critical services, including water delivery. <a href="#">178 power stations</a> and 575 substations are in areas of significant surface water flood risk. The UK's <a href="#">coastal nuclear power plants</a> are all at risk from sea level rise and storm surges. That includes plants now shut down, but which still present a serious risk. As we transition to renewables, new electrical power infrastructure will be at increased risk of flooding in rural and urban areas.</p>	<ul style="list-style-type: none"> <li>– Increase natural flood management including flood water attenuation and storage, managed shoreline realignment and saltmarsh restoration.</li> <li>– Retrofit Sustainable Drainage and make it mandatory for new electrical power infrastructure where relevant.</li> <li>– Engineered flood defences are expensive and increases in severe weather events means they are <a href="#">reaching their limits</a>.</li> </ul>
<p><b>7</b> Heat stress threatening human health, wellbeing &amp; productivity</p>	<p>CCRA3 reports 90% of hospital wards at risk of overheating, with the ONS reporting <a href="#">2,227 excess deaths</a> during just one extreme heat event from 10th to 25th July 2022. Increased risk of heat stress highlights the urgent need to ensure plentiful supplies of clean drinking water. The UK recognises the right to water under the <a href="#">UN International Covenant</a> on Economic, Social and Cultural Rights. But <a href="#">16.7 million</a> people already live in water scarce regions across the UK.</p>	<ul style="list-style-type: none"> <li>– Create an urgent action plan for the NHS and those most at risk.</li> <li>– Expand rural and urban tree cover for cooling, which can reduce heat <a href="#">deaths by a third</a>.</li> <li>– Restore peatlands which deliver 70% of our water, to build resilience.</li> <li>– Water collection and storage, particularly on farmland. (<a href="#">Defra estimated</a> farm usage to be two thirds mains supply during 2017.)</li> </ul>

## Top Priority Risks From CCRA3

## Economic &amp; Social Consequences

## Key Nature-Related Policy Areas/Solutions

8

Climate change impacts overseas threatening UK supply chains

Unsustainable consumption, in the UK and other developed countries, is driving climate and ecological impacts that threaten us. By stripping natural resources from poorer nations—land, minerals, forests, water, and marine resources—we are hampering their ability to develop sustainably and to protect the vital ecosystems that we all depend upon.

We are pushing the world's great carbon sinks and stores to tipping points—the 'global safety net'—such as tropical forests, peatlands and the ocean, containing enormous quantities of carbon. Once lost this carbon will be **unrecoverable**, meaning that we could lose control of the climate for good.

- Work with other nations to prevent global carbon stores from reaching **tipping points**.
- Reduce waste and demand for unsustainable products.
- Build resilience, particularly in the food system, through increased self-sufficiency.
- Account for the UK's entire global emissions and ecological footprint.

**"This has been a lost decade in preparing for and adapting to the known risks that we face from climate change.**

**Each month that passes without action locks in more damaging impacts and threatens the delivery of other key Government objectives, including Net Zero. We have laid out a clear path for Government to improve the country's climate resilience. They must step up"**

**Baroness Brown, Chair, CCC Adaptation Committee,  
March 2023**

## 2. CAPTURING AND STORING CARBON THE NATURAL WAY

This section explains how nature can remove carbon at a lower cost and more reliably than unproven engineered solutions.

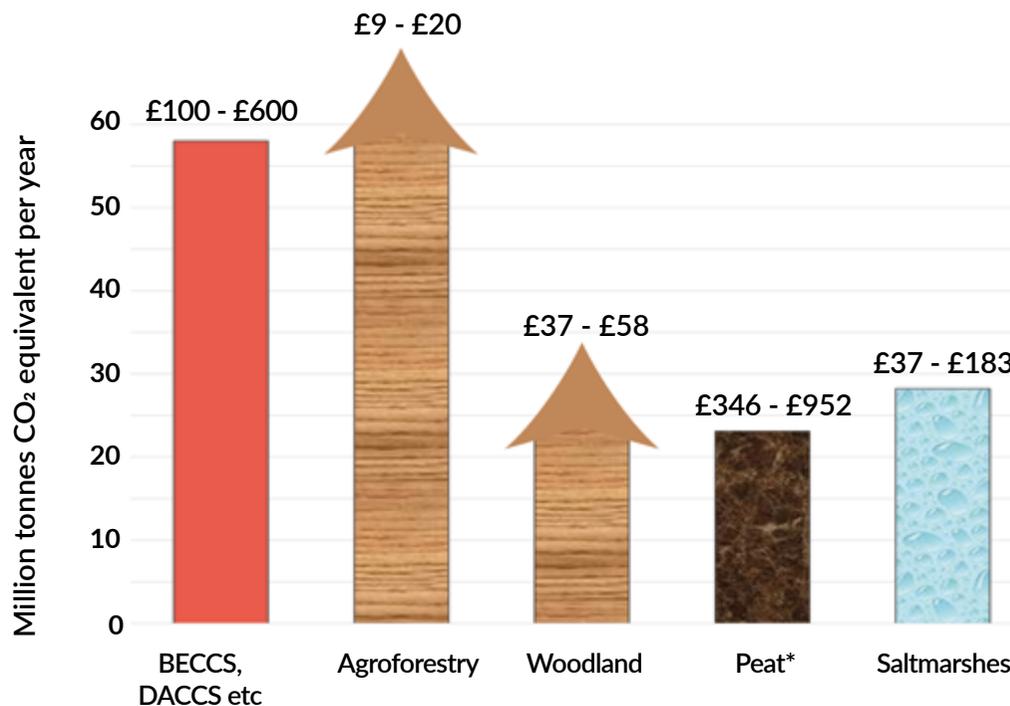
The UK's 6th Carbon Budget assumes that by 2050, engineered solutions like Bionenergy with Carbon Capture and Storage (BECCS) and Direct Air Capture with Carbon Storage (DACCS) will remove residual emissions of **58 million tonnes of CO<sub>2</sub> per year**.

Zero Hour's report [Net Zero: The Ambition Gap](#) sets out the science on why these technical solutions will not be capable of delivering the removals claimed, and on the contrary, are likely to cause further warming.

NBS offer a much cheaper, proven alternative to absorbing residual emissions. Estimates of NBS sequestration potential are often downplayed, with assumptions made that the UK economy will continue to operate 'business-as-usual'. But once we consider the climate-nature crisis as a whole and accept the urgent need to make transformative changes, including to our food system, the potential of NBS grows considerably.

The chart and following pages illustrate just four key categories of NBS that offer the most potential to deliver greater CO<sub>2</sub> removal than unproven negative emissions technologies, whilst providing a whole host of co-benefits. We use the upper end of estimates here to demonstrate the extraordinary potential of NBS.

CO<sub>2</sub> sequestration potential with approximate costs per tonne removed



\* Peat figure represents total emissions saved by restoring 100% of UK peatlands

## 1. Agroforestry



The Climate Change Committee has recommended that agroforestry be implemented on **10% of arable farmland** by 2050. The Woodland Trust sets its sights higher at **30% of pasture land**, with expected annual removals of 21m tonnes CO<sub>2</sub> equivalent by 2062.

With even more ambition, agroforestry could potentially be established on 50% of pasture and

arable land, a scenario proposed by agricultural experts at [Cranfield University](#), enabled by transition to a healthier, more plant-rich diet, which requires much less land. This could deliver removals of up to around 60m tonnes CO<sub>2</sub> equivalent per year, based on maximum sequestration rates per hectare per year of **10 tonnes CO<sub>2</sub> for arable and 23 tonnes CO<sub>2</sub> for pasture**.

Based on the grant support offered by the [Scottish Government](#), the cost per tonne of CO<sub>2</sub> equivalent removed by agroforestry is around £20 for arable, and just £9 for pasture. Since this is dramatically cheaper than the **£100 to £600 range** for BECCS and DACCS, there is considerable headroom to significantly increase the grant in order to facilitate rapid take-up.

Image: Agroforestry, Soil Association

## 2. Woodland



Friends of the Earth propose that **1.4 million hectares** of poor-quality grade 4 agricultural land in England be used for new woodland. At the Royal Society's sequestration rate of **12.5 tonnes CO<sub>2</sub> per hectare**, this would remove 17.5m tonnes CO<sub>2</sub> equivalent annually. [John Muir Trust \(JMT\)](#) estimates that by reducing grazing pressures, woodland could spread across 3.9 million hectares of Scotland's uplands removing an average of 7m tonnes CO<sub>2</sub> equivalent annually. JMT uses an extremely conservative

Image: Woodland, Jane King

sequestration rate from [a study](#) which does not include carbon taken up by the soil. That totals 24.5m tonnes CO<sub>2</sub> for England and Scotland combined, before even considering the significant potential in Wales and Northern Ireland, both very nature-depleted.

Based on [Government grants](#) for new woodland in England, the cost per tonne of CO<sub>2</sub> removed by woodland ranges from £37 up to £58, the higher figure applying where new woodland qualifies for up to £8,000 of 'additional contributions' for providing public benefits like flood protection.

It takes time for newly planted woodland to begin sequestering significant amounts of carbon, it is therefore essential that existing woodlands are protected. As highlighted on page 14, woodland on farmland has been reduced by 14%.

### 3. Peatland



Peatland stores a huge amount of carbon, but it is being lost at an alarming rate (due largely to drainage for [agricultural use](#), overgrazing and burning) now making up [5% of UK emissions](#).

Our degrading peatlands are now emitting around [23m tonnes CO<sub>2e</sub>](#) of greenhouse gases every year. At current rates of decline 50%-60% of peatlands are expected to be lost by the 2050s. But the home nations plan is to restore just [0.7 million](#) hectares in total (England: [0.28m](#), Scotland: [0.25m](#), Northern Ireland: [0.15m](#) and Wales: [0.05m](#))

Image: Protected peatland: iStock/K Neville

of around [3 million hectares](#) of UK peatland. This will mean continued emissions of around 17.5m tonnes CO<sub>2</sub> equivalent a year.

Whilst the costs to restore 100% of the UK's peatlands are significant, at [£8bn to £22bn](#) (cost per tonne of CO<sub>2</sub> equivalent - £346 to £952), the ONS estimates the additional benefits, including naturally cleaning water to reduce the costs of water treatment for drinking water, at five to ten times the investment.

### 4. Saltmarshes



The Wildfowl & Wetlands Trust (WWT) has identified potential to create [306,668 hectares](#) of new saltmarsh across the UK. At the estimated sequestration rate of up to [92 tonnes CO<sub>2</sub>](#) per hectare per year, recorded at Steart Marshes in Somerset, saltmarshes could remove up to 28m tonnes CO<sub>2</sub> equivalent annually.

It should be noted that saltmarshes also emit greenhouse gases which have to be considered when calculating sequestration potential. In addition sequestration rates recorded for mature saltmarshes

Image: Saltmarsh Tollesbury, Essex: Tollesbury Parish Council

are significantly lower at [4.4–5.5 tonnes CO<sub>2</sub> per hectare per year](#). These wetlands are more effective at capturing carbon as they grow. Nevertheless, that makes them a vital tool in combating climate change, with a need to cut net emissions as fast as possible now to avoid crossing dangerous climatic tipping points.

NB: Climate change is placing nature under increasing stress—and as temperatures rise, the risk that ecosystems break down, losing their carbon storage capacity, grows. This creates added uncertainty around the sequestration potential of NBS and means governments should:

- Make rapid emissions reductions now, as a matter of urgency, to limit global heating; and
- Target significantly higher carbon removals than required from NBS to provide some contingency against ecosystem losses due to global heating.

### 3. UNLEASHING THE POTENTIAL OF NATURE-BASED SOLUTIONS

This section summarises how a nature-rich UK will enable NBS that can be used to protect against the risks outlined in the CCC's Risk Assessment [CCRA3](#), as well creating jobs, prosperous communities and a more resilient economy. References are included to some of the comprehensive analyses already carried out by NGOs and scientists—such as Oxford University's [Nature-based Solutions Initiative](#) report on how effectively NBS can tackle the CCC's priority risks, showing that they are much more affordable than 'engineered solutions', particularly when factoring in the multiple co-benefits.

A [British Ecological Society](#) report focuses on the ability of NBS to support biodiversity recovery and to mitigate climate impacts.

The [Wildfowl & Wetlands Trust](#) demonstrate that wetlands are cost-effective and land-efficient because they store more carbon per hectare than other habitats, including forests. Restored saltmarsh at WWT Steart Marshes have been shown to absorb around [92 tonnes of CO<sub>2</sub>](#) equivalent per hectare per year.

The John Muir Trust reports that restoration of the Scottish uplands would involve rural communities and could result in [6m tonnes](#) of carbon being removed from the atmosphere per year by 2040.

See section 4 for more detail on benefits for communities, jobs and the economy.

Image: Native species hedgerow, Jane King

### Farmland



UK farmland covers around 70% of land area, incorporating a wide range of habitats and therefore has the most potential for NBS of any land use type. We urgently need a comprehensive [land use framework](#) to determine the full potential to combine sustainable food production, NBS and biodiversity recovery. Land needs to be released from economically and environmentally unsustainable food production to accommodate all three. The CCC recommends releasing between a [quarter and a third](#) of farmland for CO<sub>2</sub> capture and other NBS. The National Food Strategy sets a goal of [30% meat](#) reduction to achieve this, over 10 years.

#### Carbon

Soils on conventional farmland are generally polluted and eroded and mycorrhizal fungi networks, crucial for absorbing and storing carbon, are often seriously degraded.

[Agroecology](#) and agroforestry will improve soil quality and ability to support biodiversity and store carbon. Organic farmland absorbs on average [3.5 tonnes](#) more CO<sub>2</sub> per hectare than conventional farmland, and is around 25% more effective at storing it in the long-term. If we transition to a more plant-rich diet we can release land dedicated to intensive livestock production, and instead adopt agroecology/ agroforestry and organic methods whilst still delivering more food per hectare, and locking away large quantities of CO<sub>2</sub> (See section 5).

The CCC recommends increasing hedgerows by 40%, or around 100,000 miles by 2050, for carbon capture and biodiversity. The Environmental Improvement Plan commits to only 45,000 miles. [The Woodland Trust](#) estimates that

establishing agroforestry in 30% of UK grassland (at 84,000 hectares per year for 40 years starting in 2022) would result in net zero emissions from the grassland sector by 2050 and could absorb 21 million tonnes of CO<sub>2</sub>e per year by 2062. We need a step change in the expansion of woodland. Defra's 2022 land use stats show woodland cover on UK farmland dropped to around 5%—down by 14% on the previous year.

**Grasslands** are the UK's most extensive habitat type, covering around 40% of land. But only 2% of this is semi-natural and species rich, capable of supporting biodiversity recovery and absorbing significant quantities of CO<sub>2</sub>. Reducing pressure from livestock grazing offers huge potential for all types of grassland habitat to be restored and expanded, to increase biodiversity and lock away carbon.

### **Flooding, drought and cooling**

The CCC's priority risk 4 above ('Risks to crops, livestock and commercial trees') highlights the urgent need to transition to a more diverse framework of mixed farming,

The Environmental Land Management schemes (ELMS) are voluntary and currently far from ambitious or robust enough to counter the destructive demands of the food market. In its 2023 Progress Report, the CCC warns that ELMS are "targeted based on demand rather than used to promote delivery of environmental outcomes" and in the absence of robust monitoring, farmers could receive funds irrespective of results.

with smaller areas of annual and perennial crops that can more easily be protected from flooding and drought.

Agroforestry can reduce flooding and soil erosion. Tree cover combined with water features also helps reduce risk of heat stress to livestock and crops.

Capturing water in heavy rain events and storage in the landscape, coupled with appropriate river catchment management, will be essential to ensure water availability

in times of drought, and to relieve pressure on mains supply.

### **Economy and jobs** (See section 4 on jobs)

Diversifying production can protect farmers' incomes by guarding against monocrop failure. There is huge potential to create thriving local food economies and improve farmers' incomes through the supply of a wide range of produce direct to the public.

Reducing intensification would encourage more people into farming and increase jobs per farm—the Soil Association says organic farms provide on average **32% more jobs** per farm. A case study from **Totnes**, Devon, found that encouraging a shift of just 10% of the weekly food spend to independent food shops would result in an extra £2 million for the local economy. The economic benefits would increase significantly if this were replicated across the country.

**Agroforestry:** **Wakelyns** in Suffolk have pioneered agroforestry since 1992, growing a huge variety of crops within a system of productive trees and hedgerows. **Wakelyns** have developed climate and pest resilient grains and grow fruit, nuts, pulses—including lentils and chickpeas; vegetables and vines. Produce is sold direct and online through a network of food hubs. Rich levels of biodiversity on the farm are the primary method of pest control. This type of farming can feed the population whilst restoring ecosystems, enhancing biodiversity and enabling nature-based solutions



Image: Wakelyns agroforestry

## Peatland and Moorland



### Carbon

UK peatlands are our biggest carbon store locking away 3.2bn tonnes of CO<sub>2</sub>. But 80% are degraded and responsible for around **5% of the UK's emissions**. The [John Muir Trust](#) estimates that 4.5m tonnes of CO<sub>2</sub> equivalent could be sequestered each year, by Scotland's peatlands alone, by 2045. The full benefits of peatland restoration are enormous:

### Drinking water, flooding, drought and wildfires

Peatland and moorland supplies 70% of drinking water. Restored peatlands hold large quantities of water, helping prevent water shortages, improving water quality, saving millions on water treatment.

Healthy peatlands prevent water from cascading off bare hillsides causing flood damage to nature, farmland and properties downstream and are much more resistant to wildfires.

### Economy and jobs

Reimbursing farmers to reduce stock levels and restore peatlands, at rates that reflect its true value, is the most cost effective method to transform our uplands.

The Office for National Statistics [estimates](#) that restoring all UK peatlands would cost £8bn-£21bn but would deliver carbon benefits alone of "£109 billion and would outweigh the costs by an estimated 5 to 10 times."

Added benefits identified are increased ecotourism, educational opportunities and job creation in some of the most employment challenged communities.

Jobs could be created at all skill levels, such as peat restoration and maintenance (which could

**Degraded peatlands are causing 5% of UK emissions. The Office for National Statistics estimates that restoring all UK peatlands would deliver carbon benefits of £109bn, outweighing the cost by 5 to 10 times**

yield **£4.62 for every £1** pound invested), wildlife monitoring, project management and a range of technical and professional jobs. (See section 4).

Image: Protected peatland: iStock/K Neville

## Woodland, Scrubland and Hedgerows



### Carbon

Woodland can absorb large quantities of carbon and ancient and veteran trees & hedgerows have millions of tonnes locked away but have no default legal protection.

The CCC recommends increasing UK woodland cover from 13% to at least 17% by 2050 to absorb 14m tonnes CO<sub>2</sub>e per year. A report from Friends of the Earth estimates that the UK can find enough land to [double tree cover](#).

The most cost effective and efficient way to increase woodland for sequestration is to encourage natural expansion of existing woodland.

### Flooding & drought

The annual cost of flooding is already around [1.3 billion](#), and expected to rise. It is vital that we increase tree, hedgerow and shrub cover to help prevent flood damage to farmland, ecosystems and built infrastructure.

Trees, hedgerows and shrubs perform multiple services: reducing the amount of rainfall reaching the ground, drawing excess water out of the ground, increasing infiltration rates and helping prevent soil erosion. Trees, hedges and shrubs in [river catchments](#), combined with other actions such as re-meandering, can slow the flow of water, helping to prevent pollution run off into rivers as well as aiding water storage in the landscape, helping to alleviate water shortages in farmland and wildlife habitats.

Evidence from the [Pontbren Project](#) in Wales shows that shelterbelts of trees quickly reduced water flows by up to 40%, and ground drainage was 60 times higher.

### Cooling & air purification

Tree planting beside rivers and in the countryside helps keep water and land cool. Cities are warming much faster than rural areas, and tree planting in [urban spaces](#) can lower surface temperatures by up to 20°C and air temperatures up to 8°C. London's trees remove around 2.4 million tonnes of air pollution each year.

### Economy & jobs

Woodland and hedgerows are some of the most iconic features in the UK landscape. The multiple ecosystem services above ultimately translate into economic benefits for sustainable farming, including: increased biodiversity, increased crop yields through improved soil quality, pollination and pest control as well as a supplementary income crop through coppicing.

The [John Muir Trust](#) demonstrates that responsible deer management to enable woodland regeneration, can provide

communities with a source of income and sustainable food.

Forest Research estimates the flood service value of woodland and trees to be [£25.1bn](#).

CPRE's detailed [report](#) on the full environmental, economic and social benefits of investing in hedgerows shows that an increase of 40% by 2050 would create 25,000 jobs, and yield almost £4 for every £1 invested. Woodland expansion can yield £2.79 for every £1 invested. (See section 4 on jobs).

## Rivers and Inland Wetlands



### Carbon

Healthy rivers are an essential part of the carbon cycle, transporting carbon throughout the landscape, out to sea where it is stored in plants and sediment. But polluted and [warming rivers](#) are a significant source of emissions of carbon, methane and nitrous oxide. All rivers produce greenhouse gases, but a [study has found](#) that heavily polluted rivers emit up to ten times more CO<sub>2</sub> and methane, and 15 times more nitrous oxide as those in an acceptable ecological state. Urgent restoration of our rivers is essential for the health of people and wildlife, and to avoid extra greenhouse gas emissions.

### Flooding & drought

The climate crisis, coupled with degradation of our river environments is increasing the risk of flooding and drought to communities. Millions of people in the UK are now exposed to a significant risk of inland flooding, with [socially disadvantaged](#) communities facing a higher risk on average. Over many years, changes to river corridors have increased the speed that water moves through catchments, causing flooding and loss of precious soils and water supplies.

These changes, driven by farming, urban development and industry have resulted in straight rivers, drained wetlands, and the removal of trees, hedgerows and shrubs. In urban areas many rivers are encased in concrete channels and there continues to be extensive development in floodplains.

For many years, the [Rivers Trust](#) has been putting in place Natural Flood Management (NFM) techniques

across the country, in both urban and rural locations, to slow the flow of water; reducing the chance of flash flooding; increasing water storage throughout the landscape and implementing sustainable drainage systems (SUDS).

We need to see a step change in the pace of NFM implementations to adapt to the climate change risks outlined in the CCC's CCRA3 report. This can be achieved effectively and efficiently by using natural materials to slow the flow of water and improving drainage with SUDs; by increasing plant cover on farmland and re-meandering rivers. Making space for wetlands and ponds also helps alleviate flooding and enables water storage during extreme rainfall events as well as improving water availability during drought.

These cost effective, nature-based measures will also increase biodiversity and help to filter pollutants, improving water quality and reducing the burden of water treatment for taxpayers.

### Economy & Jobs

Demand for professionals who understand how to implement nature-based solutions in the water environment is increasing throughout the sector. Recruitment is needed for staff with skills in technical design and feasibility for SUDS, habitat restoration and natural flood management. Practical delivery skills are also needed together with project management, communications and stakeholder engagement. Most [investment](#) in water environment restoration is directed towards water companies, with a small amount going to farmers for voluntary ELMS schemes. Little is being directed at the creation of a joined-up strategy to connect the multiple partnerships and stakeholders in river catchments up and down the country. That action would provide new green jobs in local communities, where they are most needed and provide beautiful spaces for community recreation and wellbeing—reducing the cost to the NHS of an increasingly unhealthy population.

## Sea & Coastal Wetlands



### Carbon

The oceans are the world's biggest carbon stores. Blue carbon is not included in the UK's emissions accounting, but bottom trawling emissions are estimated to be around **19m tonnes CO<sub>2</sub>e** per year—4% of national emissions. That makes the **UK 4th** worst offender in the world.

Additional carbon is lost through destruction of other marine habitats and loss of biomass by industrial overfishing. Marine Protected Areas (MPAs) cover 38% of UK seas. Lyme Bay MPA was fully protected in 2008 and has made a good recovery with fish stocks increasing by **almost 400%**.

Although the Dogger Bank MPA has recently been protected with capacity to store 5m tonnes of CO<sub>2</sub>, over 90% of MPAs are still subjected to bottom trawling.

If all MPAs were fully protected from bottom trawling and overfishing, the **target to protect 30% of our seas by 2030 would easily be met**, reducing emissions, capturing millions of tonnes of additional carbon and protecting fish stocks.

There is tremendous potential to sequester CO<sub>2</sub> in marine ecosystems, with saltmarsh having the highest carbon burial rates of all natural systems. Sequestration rates of around **92 tonnes of CO<sub>2</sub>** equivalent per hectare per year have been recorded in WWT's newly restored Steart Marsh. The sequestration potential of saltmarshes is widely underestimated, with reports usually constraining their assumptions to 'business-as-usual'. But we can only get to grips with the climate and nature crisis if we make transformational changes across our

entire economy. So once we consider the reduction needed in livestock farming as well as pragmatically confronting the inevitability that we will lose land to rising sea levels, the potential for saltmarshes is enormous. The WWT has identified over 300,000 hectares suitable for salt marsh, which could sequester up to 21 million tonnes of CO<sub>2</sub> per year.

Sequestration rates of over 50 tonnes per hectare have been reported for kelp, and there is room for a huge expansion of kelp habitat. The Sussex Kelp Restoration Project is under way to restore **16,700** of kelp forest with potential to capture almost 1m tonnes CO<sub>2</sub>e per year<sup>2</sup>. However considerable uncertainty remains around kelp's carbon sequestration potential with some **scientists cautioning** that expectations should be lowered.

### Flooding & Drought

Around **126,000 people** in the UK are at significant risk of coastal flooding. Engineered coastal defences are expensive and have

<sup>2</sup> Estimate based on [research](#) showing sequestration rates of more than **50 tonnes CO<sub>2</sub>** per hectare per year

a limited life. Many of the UK's existing defences are living on **borrowed time** leaving communities under threat. Managed realignment of coastlines restores saltmarshes to protect businesses, homes and farmland further inland. Saltmarshes have been shown to reduce wave height **by up to 80%**, and prevent soil erosion. Kelp, other seaweeds and seagrass also reduce flooding and coastal erosion by absorbing wave energy. Shoreline Management Plans have been drawn up for England and Wales but have not met targets.

### Co-Benefits, Economy & Jobs

Kelp forests, seagrass and saltmarsh habitats all reduce nutrient and pesticide pollution, ocean acidification and support biodiversity—boosting fish stocks.

There are enormous opportunities for the economy and jobs in the emerging blue technology sector and **seaweed farming** is the fastest growing sector of aquaculture in the world, at 8% per year.

Amazon has initiated large-scale seaweed farming in the North Sea via its **Right Now Fund**, which is reported to have potential for up to 85,000 jobs.

## Urban/Suburban Infrastructure



1.8 million people are at significant risk of flooding, projected to rise to 2.6 million by the 2050s. 5.2 million homes and businesses in England alone are at risk from flooding.

The CCRA3 risk assessment shows that lower income households are more exposed to flood risk and 10% of hospitals are in areas of significant risk. Nature-based solutions in urban and suburban spaces can enhance or even replace engineered solutions.

**Green/blue infrastructure and sustainable drainage systems (SUDS)** can absorb CO<sub>2</sub>, cool the environment, reduce surface water flooding, improve water quality,

Image: SUDS in Glasgow, Nature Scot.

and enhance biodiversity as well as enhancing the amenity value of the environment.

SUDS reduce the volume of water entering the drainage/river network with measures including green roofs and walls, rain gardens, vegetated barriers, ditches, soakaways and swales. They allow water storage in ponds or wetlands, increasing water availability and reducing pollution to the water environment through run-off. SUDs can be designed on a regional scale, across river catchments or in a more localised manner in areas of high risk. Combined with tree and shrub cover SUDS can provide a much-needed reduction in the 'urban heat island effect'.

### Economy & jobs

With flood damage costing around £1.3bn p.a., Sustainable Drainage Action Plans are needed to make SUDS part of our built environment, both retrofitted and incorporated into new developments.

The UK Green Building Council has produced a [comprehensive report](#) on the benefits and added value that urban NBS can deliver: "compared to grey infrastructures, NBS provide a multitude of economic, social and ecological benefits ... many of these benefits and their value remain unaccounted for".

Benefits include: carbon storage, improved air quality, improved water quality and availability; reduced temperature, reduced energy use; improved health and wellbeing, reduced noise levels, boosted land and property value, increased biodiversity; as well as improved amenity value and community engagement. Accounting for all of these will result in increased value, leading to investment and jobs that can be directed toward local communities.

By accelerating implementation of SUDS in all [new developments](#), without further delay, the Government will encourage investment and new green jobs.

Proposed changes to the Retained EU Law Bill, to relax current laws on pollution levels for new developments, will put the public and ecosystems at greater risk from environmental breakdown. Particularly from the increased risk from pollutants, carried in flood water, infiltrating homes and habitats.

**"Proposed changes to the Levelling-up and Regeneration Bill will reduce the level of environmental protection provided for in law and amount to a regression"**

**Office for Environmental Protection, August 2023**

## Biodiversity Benefits of NBS

Restoration actions such as rewetting peatlands, expanding and protecting woodlands and wetlands; adopting agroecology/agroforestry and preventing damaging overfishing are essential, both to halt and reverse biodiversity decline, and to provide nature-based solutions such as carbon capture and the alleviation of flooding and drought.

Restored ecosystem must be fully protected into the future to enable biodiversity to recover, and to maximise return on the investment.

Adopting nature-friendly farming and fishing will have the most widespread, positive impact. Organic farming relies on rich levels of biodiversity for pest control and pollination, to maintain yields; supporting around 75% more wild bees and **50% more wildlife** than conventional farms.

The [British Ecological Society's](#) nature-based solutions report emphasises that rich levels of biodiversity, in well connected habitats, are crucial to keep

ecosystems healthy and functioning; to make them more resilient to climate change and to maximise their potential for NBS.

The report describes the biodiversity benefits of NBS for each habitat type, including agriculture and the built environment.

Oxford University's [nature-based solutions report](#) points out that "Careful NBS design is needed to maximise the benefits for biodiversity and avoid adverse impacts". It warns of the dangers of taking a narrow approach to designing NBS, for a single outcome such as tree planting for short-term carbon gains. A holistic approach is essential to reverse biodiversity decline, capture carbon and maximise long-term benefits for mitigating climate impacts.

A UK-wide [land use framework](#) and parallel sea use framework are both vital to determine the optimum approach for holistic management of ecosystems on land and at sea.



### Biodiversity increase at Steart Marshes

Before the [Steart Marshes](#) wetland was created in 2014 the area was farmland with biodiversity in decline and local people at risk of flooding from sea level rise. The Wildfowl & Wetlands Trust worked with the Environment Agency in collaboration with the local

Image: Steart Marsh restoration, WWT.

community on a coastal realignment scheme to capture carbon and protect homes and livelihoods. It is now an established working wetland, a combination of saltmarsh, freshwater wetland and grassland.

Managed by a network of ditches and habitat features with some grazing by local farmers, Steart is now home to 10% of UK's species—plants, insects, birds, mammals and fish—some haven't previously been seen at the site.

In 2019 Steart became a Priority Site of National Importance for dragonflies. Rates of carbon absorption of up to **92 tonnes of CO<sub>2</sub>** equivalent per hectare per year have been recorded.

## 4. JOBS AND THE ECONOMY

Analysis from [Green Alliance](#) demonstrates how nature restoration and NBS can contribute to shaping a prosperous green economy. It finds that transitioning to a nature-rich UK can create more jobs per pound invested than traditional industries which are environmentally negative and high in emissions.

Climate change impacts, such as flooding, drought and overheating, are increasingly affecting our lives and businesses, as well as the wider economy. Countries that fail to protect people and livelihoods from dangerous climate impacts will increasingly see their economies collapse. Coupled with rapid cuts in emissions, nature restoration and nature-based solutions can help address these risks and protect the UK's food supply, fresh water, power, health and education infrastructure, homes and livelihoods.

The UK is lagging behind the rest of [Europe](#) in developing nature-based solutions and supporting

technologies. British businesses are missing out on opportunities to lead on NBS innovation, creating thousands of sustainable jobs at all skill levels, that can be directed to the communities most in need.

Jobs include: retrofitting sustainable drainage systems in urban and rural communities; local food production, ecotourism, sports and hospitality; as well as green finance and investments, and natural capital assessment.

Green jobs are being created but not at the pace required because we are too reliant on voluntary measures such as ELMs in farming or individual action by companies. Many businesses want to do the right thing, but they are locked into an unsustainable system, and will lose out if they take unilateral action. History has shown that after almost 40 years and billions of pounds spent investing in agri-environment schemes, alongside countless conservation projects, and collaborations with businesses, we

**Transitioning to a nature-rich UK can create more jobs per pound invested than traditional industries which are environmentally negative and high in emissions.**

have failed to protect and restore nature. So we need a regulatory framework to drive a just transition with a level playing field, maximising the amount of land dedicated to mitigation and adaptation, improving food security and creating jobs where they are most needed.

### **Nature-friendly local food: unlocking economic potential**

By transitioning to a sustainable food system, rich in pulses, fruit and vegetables and with less meat and dairy, we can free up enough land for nature and nature-based solutions, as well as unlocking a wealth of job opportunities for communities. A greener, fairer, more

diverse food system will also lead to more prosperous and resilient neighbourhoods and communities with potential to create more green jobs than any other sector (see section 5 on food system transformation).

Expanding local food production to supply nearby communities will create shorter, fairer supply chains, reduce food waste, and minimise packaging and transport. Analysis from Sustain shows that local

A case study from [Totnes](#), Devon, found that encouraging a shift of just 10% of the weekly food spend to independent food shops would result in an extra £2 million for the local economy. Oxfordshire's local food economy contributes £2.2 billion, or 10% of the local economy and the Oxfordshire Councils' [Food Strategy](#) is a plan for growth: "pound-for-pound, money spent in the local food web supports three times the number of jobs as the equivalent spent in national grocery chains".

outlets support three times the jobs of national supermarket chains. An increase of just 10% in smaller independent outlets could create as many as [200,000 new jobs](#) in food retail alone.

Alternative routes to consumers, such as direct supply via box schemes and markets and through [food hubs](#), cooperatives and local outlets, improve incomes for producers. Farmers often get less than [1% of food profits](#), making it almost impossible for many to adopt nature-friendly production methods.

The Food Foundation found that the UK doesn't produce or import enough fruit and veg for the [minimum health](#) recommendations. Rectifying this presents huge opportunities. A network of UK producers, growing a wide diversity of sustainable produce, can feed the population with a more plant-rich diet throughout the year, on much less land than the conventional farming system. Increased self-sufficiency, particularly in fruit and veg, will help alleviate the cost of living crisis and improve our food security. This will also ease the pressure on Dover port.

### Organic producers—investing in nature and communities

The Soil Association found that organic farms provide [30%-50%](#) more jobs than conventional farms.

[Riverford](#) Organic Farmers is the largest organic retailer in the country and has proved that producing and selling fresh organic food directly to the public, whilst investing in a nature-rich landscape, is profitable.

Riverford generates more food and jobs for the benefit of local communities than conventional food businesses. It delivers around 65,000 mixed, fresh food boxes across the country each week, with a diverse range of produce, including meat and dairy, using a network of growers [and producers](#) and its home farms. It supplies individual customers, businesses and organisations via distribution hubs and franchisees and employs almost 1,000 people directly, in a wide range of roles from production and ecosystem management to marketing and sustainability.

Riverford is now employee owned so profits are shared. It has been voted among the top 100 best companies



In Oxfordshire, two small organic growers, [North Aston Organics](#) and [Tolhurst Organics](#), are producing a huge quantity of food on only around 6-8 hectares respectively. Between them they can supply more than 800 households each week, across the region, with a wide range of fruit and vegetables via the online retail platform [Ooooby](#)—including greens and salad crops throughout the year. Supplying all of the UK's 28.2 million households with fruit and vegetables based on this and similar models, (an average of 60 boxes per hectare) would require

only around 470,000 hectares or 2.6% of our agricultural land (golf courses take up around 124,806 hectares). Analysis from [University of Exeter](#) and [Community Supported Agriculture](#) shows that organic horticulture and box schemes employ around 1 FTE job per hectare on average. Even when allowing for efficiencies in larger operations, there is potential to create hundreds of thousands of jobs and increase exports by expanding home-grown, nature-friendly fruit and veg production.

Produce is sold directly via the farm gate, at markets and online; through cooperatives or local retail as well as restaurants and cafes, generating many more jobs. We need to make urban and rural land available for new growers, but some of our most productive farmland, such as in Kent—once the 'garden of England'—is being lost to developers.

Image: Organic produce, North Aston Organics

to work for, and top 5 in retail.

In London, [Growing Communities](#) has been changing the capital's food system for almost 30 years through an expanding network of organic producers across London boroughs and in neighbouring counties. This exceptionally dynamic and successful model generates £3.70 in benefits for every £1 that customers spend. Those benefits are seen in the farming ecosystems and the community of producers and consumers—including those on low incomes, helping them access healthy sustainable food. Producers are rewarded with 50% of the sale price—over three times more than in the supermarket system for the same products, enabling them to produce organic, climate-friendly food on a fraction of the land used by the conventional farming system.

## Nature-based jobs & Nature Tech

**A National Nature Service Training and skills development is going to be essential to help people transition to new jobs**

**and maximise the potential for communities to prosper.** [Nature 2030 report](#), produced by the Wildlife and Countryside Link (Link), advocates for a National Nature Service to create "*green jobs in urban, rural and coastal habitats and in species recovery.*" A [recent poll](#) shows that almost 70% of the public supports this idea. Link points out the opportunities for employment for disadvantaged and marginalised groups of people, with on-the-job training programmes, and benefits for health and wellbeing.

The Nature 2030 report describes a project at [Allestree Park](#) in Derbyshire, a collaboration between Derby City Council, Derbyshire Wildlife Trust and the University of Derby to transform a golf course into the UK's largest urban rewilding space. This project will deliver wildlife-rich habitat, absorb CO<sub>2</sub> and help us adapt to impacts such as flooding and drought, whilst creating jobs. The Council has described the rewilding project as a 'Natural Health Service' "*providing more opportunities for residents to improve their wellbeing by connecting with nature-rich greenspace.*"

The mental health charity MIND points out the obvious benefits of [nature and ecotherapy](#) for the alleviation of long-term mental health issues, which are a huge drain on the NHS.

A [National Nature Service](#) is being developed by Nature Service Wales, in collaboration with multiple organisations including the Food, Farming & Countryside Commission, the Future Generations Commissioner together with environmental NGOs. The vision for this project stems from the urgent need to regenerate communities in Wales and provide opportunities for young people to thrive in a greener, post Covid-19 economy. It recognises that ambitious, systemic solutions are needed to "realign how we face the climate, nature and health emergencies, whilst responding to immediate economic challenges including widespread unemployment".

[Nature Service Wales](#) has published evidence on the economic benefits of funding green job creation showing that current levels of youth unemployment in England and Wales

are likely to lead to £32-£39 billion in lost earnings which means billions of pounds of lost revenue in local economies. The report argues that young people deserve a commitment to invest in their future and that 250,000 green apprenticeships could be created for an investment of £10 billion over the next 5 years.

[Green Alliance](#) demonstrates that just three types of enhancement—woodland creation, peatland restoration and urban green infrastructure—could create at least 16,050 jobs in the "20% of constituencies likely to face the most significant employment challenges".

### Nature-rich UK, unlocking the potential

Estimated return for every £1 invested in restoration

Peatland:	£4.62
Woodland:	£2.79
Hedgerows:	£4.00
Saltmarsh:	£1.31

The Office for National Statistics [estimates](#) that restoring all UK peatlands would cost £8bn-£21bn but would deliver carbon benefits alone of "£109 billion and would outweigh the costs by an estimated 5 to 10 times."

The [CPRE has calculated](#) that following the CCC's recommendations to increase hedgerows by 40% can create 25,000 jobs over the next 30 years and yield almost £4 for every £1 invested.

The New Zealand Government has developed a national nature service, the [Jobs for Nature](#) programme, investing over \$1bn to support economic and nature recovery. Thousands of people are being offered life-changing training in nature-based work, providing new skills and work in temporary and full-time jobs; introducing many into long-term careers in conservation. The programme is targeted towards community groups, showing people the true value of nature and local natural resources. Two years into its four-year run, the programme has already improved over 5 million

**Lyme Bay MPA:** is a success story, proving that people and nature can thrive, side by side. Lyme Bay [Fisheries and Conservation Reserve](#) is a collaboration between scientists and local fishers, coordinated by Blue Marine Foundation. Fully protected since 2012, within 4 years overall species abundance and diversity had more than doubled and fish stocks have now increased by [around 400%](#).

Fishers have described the future of the reserve as a 'goldmine' due to the benefits for the marine environment, for fish stocks and the communities that depend on it. The now healthy reefs and species levels have proved more resilient, recovering from storm damage far more quickly. The fishing fleet has been saved,

hectares of land for nature and helped over 10,000 people into employment. By contrast the UK Government has committed to restoring only 300,000 hectares of wildlife habitat by 2042, relying mainly on the voluntary ELM schemes.

with around 40 boats operating in the Reserve. A new sustainable fish brand '[Reserve Seafood](#)' has been created. Local consumers pay less for fresher fish and the fishers are paid more. The brand sells at a premium in the London restaurant market and the overall income of the fishing community has increased by 25%.



### **A dynamic marine environment**

Marine ecosystems have the most potential to absorb excess heat and CO<sub>2</sub>, and offer a wealth of opportunities to regenerate local economies. But none of this will be possible without full, enforced protection from damaging practices in all Marine Protected Areas (MPAs) and an end to overfishing. More than 90% MPAs are still subject to bottom

trawling, wrecking ecosystems and causing emissions levels [similar to aviation](#).

Kelp forests, seagrass, saltmarsh, oyster reefs and the sea bed are all important blue carbon habitats. They also act as fish nurseries, regenerating fish stocks. The UK is failing on ocean health with only 30% of the most valuable fish stocks considered to be in a healthy state. **By fully protecting all its MPAs, the UK would be able to meet the COP15 target to protect 30% of its waters by 2030.**

Seaweed farming is the fastest expanding sector of aquaculture in the world, growing at [8% per year](#). But the UK is lagging behind with projects hampered by lack of marine protection, technical expertise and adequate processing facilities for harvested seaweed. There is huge potential for kelp forests and other seaweed aquaculture to increase biodiversity and fish stocks, help clean seawater of nutrient pollution, absorb CO<sub>2</sub> and help prevent coastal erosion and flooding. Seaweed can also be transformed into a wide variety of products such as food,   
Image: Lyme Bay fishing vessels, Love Lyme Regis

packaging and a replacement for leather. British company [Oceanium](#) is pioneering these technologies. Amazon has recently funded the first large-scale seaweed farm between wind turbines in the North Sea. According to Amazon, kelp and seaweed farming has the potential to create [85,000 full-time jobs](#).

Rapid expansion and enforcement of Nearshore Byelaws to halt damaging trawling along the UK coastline, will unlock local economic opportunities such as the [Sussex Kelp Restoration Project](#). The project is underway to restore [16,700](#) hectares of kelp forest, with potential to capture up to 1m tonnes CO<sub>2</sub> equivalent a year <sup>3</sup>.

As well as the emissions benefits of kelp, the restored ecosystems and sea bed will support seaweed farming and, as in Lyme Bay, local sustainable inshore fishing. According to Sussex Inshore Fisheries and Conservation Authority, the benefits of the protected kelp forests will lead to an [economic gain for the community of](#)

<sup>3</sup> Estimate based on [research](#) showing sequestration rates of more than [50 tonnes](#) CO<sub>2</sub> per hectare per year



more than [£3 million](#) a year.

### Natural regeneration & rewilding

Rewilding Britain's report '[Rewilding and the Rural Economy](#)' demonstrates significant benefits of a '*Nature-based Economy*' that '*helps nature heal and flourish*'. Rewilding Britain has now analysed the impact of nature restoration and rewilding at 50 sites across its 'Rewilding Network' of landowners in England, covering around 42,000 hectares of rewilding.

There has been a 78% increase in full-time equivalent jobs on the rewilding land-holdings, from 153 to 272 as well as more sustainable, high quality food production.

Volunteer numbers have increased

12-fold across the 50 sites, from 147 volunteers pre-rewilding to 1,780 volunteers during rewilding.

Incomes are in decline on conventional farms but Rewilding Britain finds that the nature-based economic model is boosting farmers' incomes and supporting increased prosperity in rural communities. Farms no longer rely mainly upon Defra subsidies but are generating much more diverse income sources.

Common job types are estate managers, stock managers, rangers, ecologists, wardens and nature-tourism guides as well as other enterprises such as: film/ photography services, business rentals, education, health and wellbeing services, weddings, glamping and camping, conferences and specialist food and drink. "This diversity of income increases the resilience in the medium and long-term, as well as the job opportunities available to local communities."

Image top: Restoring Woodland, the Tree Council  
Image right: Eco tourism, Ullapool, Ecotone Cabins

### Ecotourism and recreation

There are great opportunities to expand nature-focused tourism in the UK, offering the sector a sustainable future. [The ONS reports](#) that nature contributed an estimated £12 billion to UK tourism in 2019 and the value of benefits of green space for recreation was estimated to be [£6.8 billion](#) in avoided healthcare costs. But with dietary disease costing the nation [£74 billion](#) that needs to be increased.

The Nature-based Solutions Initiative [reports](#) that urban woodlands are estimated to provide health benefits worth at least £41 million a year to the 83% of people who live in UK urban areas.

[Rewilding Europe](#) has capitalised on the fact that people are much



more aware of the value of nature in the face of climate change. Eco-tourism is not only supporting nature restoration, it's supporting local communities and seen as a means of retaining populations in rural areas.

In [Scotland](#) alone the sector generates around £1.4 billion a year and 39,000 full-time equivalent jobs. England's national parks generate around £4 billion per year and support nearly 50,000 full-time equivalent jobs. That could be expanded through a widespread network of restored and rewilded sites. Knepp Estate's nature tourism business now has a turnover of around £800,000 per year.

As well as increasing fish stocks by 430%, the designation of [Lyme Bay as an MPA](#) added £2 million to the total value of tourism and recreation in the area. Enforcing protection in all of our Marine Protected Areas will help expand **recreational fishing which already supports more jobs than commercial fishing**, fish farming and processing combined. Freshwater angling in England alone generates 27,000 full-time equivalent jobs so it's vital that we



clean up rivers and increase legal protection.

Trees for Life recently opened its flagship [Dundreggan](#) visitor centre with a 40-bed accommodation facility, offering a wide range of walking holidays, guided tours and educational activities. They expect to attract over 70,000 visitors annually by 2030, and benefit the local community and economy by providing jobs and attracting more visitors to the area. Trees for Life are members of the accredited Green Tourism Business Scheme, designed to ensure standards and maximise economic potential for local communities.

Image: Diving on a Lyme Bay reef, Matt Doggett

The [Centre for Alternative Technology](#) is a fantastic example of how to engage the public in the most important issues of our times. They run residential courses, activities and events on every aspect of the climate and nature crisis with 'practical solutions for our changing planet'. They demonstrate working examples of renewable energy, organic food production and green buildings.

## Technologies & professional services

Growth in technologies and professional services that can speed up the race to Net Zero and transition to a new green economy is essential—supported by investment and training. A report from Nature4Climate describes ‘[Nature Tech](#)’ as “technologies that can accelerate the implementation of nature-based solutions at scale”. In spite of the economic downturn, [PWC](#) reported in 2022 that investment in the sector grew to around \$2 billion, a growth rate of 52% since 2018. [Reuters](#) recently reported that investors are increasingly interested in nature-based solutions for carbon removal over energy-intensive engineered solutions. Some of the claims for Nature Tech require close scrutiny but there are plenty of applications that are tried, tested and working and others that show great potential. Some of the opportunities are explored here:

- Keeping up to date with the latest monitoring tools to measure [carbon sequestration](#) rates is essential for farmers and land managers. The British Society of Soil Science explains the latest methods and [technologies](#).
- GPS guided technology has been used in agriculture since the 1990s but drone and satellite technology along with high resolution digital imaging systems, and bespoke applications are now crucial for [modelling](#), monitoring and assessing all nature-based outcomes.
- The organisation Nature4Climate explains the importance of efficient [data collection and analysis](#), all important to ensure transparency and the monitoring of outcomes.
- There are great opportunities in biotechnology, such as the development of infrastructure to encourage the growth of algae that form [coral-like](#) structures and [reefs](#) that sequester carbon and create habitat for marine biodiversity.
- More expertise is needed for implementation and retrofitting of Sustainable Drainage Systems.



- Expertise in green finance and investments and natural capital assessment.
- Scientific testing facilities for research and monitoring, including [Environmental DNA](#) (eDNA) testing for species recovery.
- More platforms to facilitate growth in the local food economy, such as [Open Food Network](#) and [Ooooby](#).
- Growth in the training sector will be vital for both technical and non-technical roles.
- There are exciting opportunities for professional careers that are vital to facilitate programme planning, implementation and monitoring, offering roles such as: project managers, experts in information technology, communications and stakeholder engagement; planners and surveyors as well as scientists such as ecologists and other life science specialists, including divers and underwater photographers.

Image: Monitoring river biodiversity, Tyne Rivers Trust

## 5. TRANSFORMING THE FOOD SYSTEM

Natural England says we need to free up [1.5m hectares](#), outside of existing protected sites, to meet our Convention on Biological Diversity commitment of '30% of land delivering for nature by 2030'. The CCC's 6th Carbon Budget recommends we halve food waste by 2030 and by 2050 and free up around a [quarter of land](#) from agriculture (around 4 million hectares) for 'natural climate solutions'—by reducing livestock. [National Food Strategy](#) (NFS), says: "Reducing meat consumption is the single most effective lever we can pull."

The NFS does not suggest that we sacrifice food production for nature, but reports that feeding people directly with more home-grown, low carbon fruit, veg, nuts, pulses and grains can provide 12 times more calories per hectare than livestock production. In the largest analysis of its kind, [Oxford University data](#) shows that it takes approximately 35 times more land to produce 100g of protein from red meat <sup>4</sup> compared to pulses. **So we can produce much more food on less land**, making room for nature's recovery and nature-based solutions at the same time as regenerating urban and rural communities through a sustainable, more resilient food economy.

Before nature can begin to recover we must halt the key causes of catastrophic decline. The UK food system is one of the least sustainable and most unhealthy in the world. It is responsible for 35% of emissions, including imports, and is the primary cause of the destruction of nature through the control it exerts over fisheries and agriculture—around 70% of UK land is agricultural. As a direct consequence we are ranked in the [lowest 12%](#) of countries for biodiversity intactness and are suffering a public health crisis.

<sup>4</sup> Averaged for beef and sheep meat

<sup>5</sup> Sources: AHBD on water supply and pig meat production, Daera and Statista

The research lead at the Natural History Museum says "**We have led the world in degrading the natural environment**". The UK is the world's third largest net [importer of food](#) and has the highest consumption levels of [ultra-processed](#) foods in Europe, at more than 50% of average daily intake. Shockingly that rises to [61% for under fives](#) and 75% of calories in [school meals](#). The Food Foundation's report 'The Broken Plate 2022' shows that **dietary-related illness costs the UK £74bn** in reduced life expectancy, low workforce productivity and in direct costs to the NHS (diabetes alone costs [£10 billion a year](#)). The poorest suffer most. Analysis in [The Broken Plate 2023](#) shows that healthy life expectancy in some of the most deprived groups of the population is 19 years lower for women and 18 years lower for men.

UK agriculture primarily produces livestock, on an industrial scale, and around three-quarters of our entire agricultural land is used to feed livestock rather than people directly—including land used to grow animal feed. Defra farm statistics for December 2022 recorded a population of 230 million farmed animals, at the time of survey. Added to that we produced over [1bn chickens](#) and other poultry for UK consumption, a direct cause of the ecological crisis in rivers, such as the River Wye.

Livestock combined with crop monoculture agriculture requires huge quantities of water and agrochemicals, it is the primary cause of water and land pollution ([livestock manure](#) causes 40% of nitrogen pollution). Farmed animals are competing with people and nature for land, food and water—at a time of unprecedented [drought risk](#). UK livestock is drinking more than 1bn litres of water each day,<sup>5</sup> an estimated eight times more than the human population. In 2017 [Defra reported](#) that an average of two-thirds of water used by farms was sourced from mains supply.

**"Our appetites are fuelling the climate & biodiversity crisis and using 70% of fresh water"**

**Antonio Guterres, UN Secretary General**

Added to this, **the level of food imports for animals and people is a key driver of the cost of living and food security crises**, with food inflation reaching almost **20% in March 2023**. Our high demand for imports of damaging commodities such as meat, palm oil, maize, wheat and soy is also threatening ecosystems that contain the world's great stores of **unrecoverable carbon**—the global **carbon safety net** of ecosystems such as forests, peatlands, wetlands and seas.

Delegates at the **UN 2023 Food Systems Summit** heard that **the food system is the biggest single problem for climate and biodiversity**. The summit attracted very little media attention, but was covered by BBC's **The Food Programme**. In his opening statement, Secretary General Antonio Guterres, said "Our appetites are fuelling the climate & biodiversity crisis and using 70% of fresh water."

Restoring nature at the scale required, to increase biodiversity, absorb and store CO<sub>2</sub> and adapt to climate change, requires a system-wide approach to free up land and regulate the food industry (as suggested in the **Nature 2030 report**). This is achievable but the majority of fishers and farmers cannot afford to make the radical changes required to meet climate and nature targets because they are locked into an unfair, unsustainable system.

A coordinated strategy is needed to shift the system to one that is sustainable, healthy and fair, including effective support for farmers and fishers to end damaging practices and adopt low input **agroecology** and sustainable fisheries management.

We are not short of solutions. The Environment, Food and Rural Affairs Committee is running an inquiry into fairness in the food supply chain. **The Food Foundation** has submitted a response, as has Sustain—highlighting a **9-point plan** to create a resilient and healthy food system in the UK.

## Three examples of levers for change

Three 'big ideas' were identified at the **UN Food Systems Summit** as examples of effective levers for change:

### 1. Expansion of independent local food production

This is not a niche activity restricted to subsistence farmers in developing countries, it is a tried and tested model capable of transforming the economy. During the pandemic, smaller local food producers and suppliers kept the country going. They are continuing to supply customers during shortages caused by global supply issues that have left supermarket shelves empty. A report from the **University of Sheffield** shows that lessons need to be learned about the multiple benefits and resilience of local supply.

Growing a wide variety of produce makes smaller producers particularly agile—more resilient to external shocks and more capable of adapting to severe weather events.

The UN reports that networks of producers are appearing in cities across the world because people want action and want to build resilience into the system, as well as

the desire to build community. In the US, the Biden administration is investing in a programme to create resilient, local and regional food systems. Jennifer Mofat, Under-Secretary at the US Department of Agriculture, told **The Food Programme** that \$5bn is being invested to build local supply chains, assisting with marketing and access to consumers in rural and urban areas. This is also designed to help improve access to healthier food, particularly for poorer inner-city populations—there is an urgent need for this in the UK.



Image: Zipcar

## 2. Public procurement policy in favour of local sustainable, healthy food

In the global School Meals Coalition, led by Finland, state purchasing power is being used as a mechanism that is changing food systems. Finland invests in universal free school meals and the Government public procurement system has helped grow local food economies.

Brazil has done the same; its school food programme was created in the 1950s and is serving free food to more than 40 million students. The Lula administration has just increased the programme's budget to \$1.1 billion, 30% of which has to be spent on food sourced from family farms. This is seen not as a cost, but as an investment. Brazil is now assisting 100 other countries on this model.

**A [School Food Matters](#) survey found that 85% of respondents agreed a Healthy Schools Rating Scheme should be made mandatory**



In [Denmark](#), 60% of publicly procured meals have been organic since 2020, and **without an increase in costs due to reduced meat and food waste**. In the UK, ultra-processed foods make up 75% of the calories of [school meals](#).

Sustain's [response](#) to a Government consultation on transforming public procurement, as well as a recent [webinar](#), details the cost savings and huge benefits of sustainable procurement, for the economy, jobs and public health.

Image: EatingWell

## 3. Halt damaging subsidies and promotion and switch to a financial system that accounts for adverse external costs

Government subsidies of \$600 billion are being spent worldwide on the current food system that is driving climate and ecological breakdown. This is resulting in up to \$17 trillion of external costs from rising public health budgets and impacts of climate change.

Switzerland is pursuing this radical and politically sensitive approach, reshaping public policies to reflect 'true-cost accounting', working with the UN's Food and Agriculture Organisation on a programme due to go live within 5 years.

Alwin Kopse, head of International Affairs and Food Systems in the Swiss government said: "We need to embrace a food systems approach and we need to address true-costs so that prices reflect that." The plan is to use incentivising mechanisms such as taxing damaging products and production methods, and subsidising sustainable, healthy food to make it more affordable. In the UK the Food Foundation's

report [The Broken Plate 2023](#) finds that advertising spend on healthy, environmentally friendly fruit and vegetables is just 1% of the £1bn spent on food and drinks advertising, compared to 33% on soft drinks, snacks and sweets. In farming, the average subsidies for [horticultural production](#) are around £3,900 compared with £28,400 for other types of farming.

**Advertising spend on healthy, environmentally friendly fruit and vegetables is just 1% of the £1bn spent on food and drinks advertising—compared to 33% on soft drinks, snacks and sweets.**

# CONCLUSION

## Why we need nature

Zero Hour envisages a thriving, nature-rich United Kingdom—a family of nations where citizens live in harmony with their shared natural world.

We are not external to nature, we are embedded in it. Our natural world, and its diversity, are central for our survival, for a healthy economy, and for creating resilient communities that are able to withstand the major societal risks of our time. It's not a 'nice to have'. Nature is all we have.

By placing the protection and restoration of nature at the heart of our national mission, the UK can and will prosper; investing in nature by rolling out nature-based solutions to climate change across the four nations will allow the UK to:

- Save money, rather than gambling on costly, unproven engineered solutions
- Adapt to the worst impacts of climate change such as flooding, drought and heating
- Mitigate climate change by sequestering and storing huge amounts of carbon dioxide from the atmosphere
- Provide a pathway to secure the functionality and resilience of our ecosystems and the vital services they provide us with
- Ensure food and water security, as warming impacts global food chains; and
- Create jobs and better protect the livelihoods of all working people

## Why we need the CE Bill

Zero Hour is campaigning for the Climate & Ecology Bill. The CE Bill has been drafted by world-leading scientific and legislative experts. It creates a framework, or the scientific 'red lines', within which we must act in order for the UK to do its fair share to keep emissions below 1.5°C and to put our precious natural world in recovery by 2030.

As the CE Bill sets out, in order to give us the strongest chance of keeping global heating within liveable limits, we need to cut emissions very rapidly. This will require reducing energy usage, changing our consumption habits, and other behavioural changes. The removal of greenhouse gases from the atmosphere cannot accommodate a 'business and usual' approach; we need to see transformational change.

CO<sub>2</sub> removal—at pace—is now critical. And as this report illustrates, nature is the most cost effective way to deliver carbon sequestration. Furthermore, the breakdown of nature causes the release of CO<sub>2</sub>, and ensuring healthy ecosystems prevents this. We can protect and expand our saltmarshes; expand and extol the benefits of agroforestry; protect, improve and increase our woodlands and hedgerows; clean up our rivers; protect and restore our peatlands; and maintain the health of our coastal wetlands and seas.

Embedding the protection of nature in all decision-making, as called for in the CE Bill, would mean that these types of 'win, win, win' policies are prioritised by policymakers. But in order to do so—and to unleash the full potential of nature-based solutions—it is essential to free up land. This involves transforming our food system, and the ways that we farm, which can create

more jobs, boost the everyday economy, and put the health of communities and nature first.

A just and fair transition that leaves no one behind is embedded in the CE Bill through the protection of workers and vulnerable communities—and via a citizens' assembly, representative of the UK population—to co-create a plan for a fair way forward to a zero carbon, nature positive future.

Job creation needn't be at the expense of nature. Investing in nature and reforming our food system would produce resilient, local employment; creating more jobs per pound than otherwise invested in traditional industries (which are often environmentally damaging and high emitters).

People and planet can profit from nature's recovery—and the UK has a huge opportunity to lead from the front. From nature tech and ecotourism; reaping the benefits of local food production; pioneering green finance; and rolling out a National Nature Service, there is so much to be gained by fully appreciating the vast, untapped potential and wealth of nature-based solutions in the UK.



Creating a nature-rich UK  
Unleashing the potential of nature-based solutions

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