# Making Climate Adaptation Matter

## Rescuing mitigation's poor relation

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# Foreword from the National Trust

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The Trust's founders knew instinctively what recent studies have proven – that access to beautiful spaces where heritage and nature thrive, is essential to the wellbeing of our communities. Since the nineteenth century, the National Trust has sought to protect and enhance these places, for the benefit of the nation.

Climate change poses the single biggest threat to the nature-rich landscapes and historic places that the Trust has been looking after for generations. From coastal change which wipes away undiscovered archaeology to higher temperatures causing more frequent wildfire, the risks are multiple and serious.

We have worked with partners to develop an innovative "hazard map" that illustrates the threat climate change poses to our iconic sites. Assuming a worst-case scenario, the map shows that by 2060, 71% of the Trust's sites could be at high or medium risk from the impacts of climate change.

The Trust is working to understand what these risks mean for us, or where climate change may present some opportunities to think differently, and what actions we need to take to meet the coming changes with confidence. But we cannot do it alone.

Climate change is a challenge to the whole of Society, and the problems it poses cross legal and cultural boundaries. The hazards we are facing will not only affect the places we look after, but also the places where people live and work, and they will be felt by all, whether that's more 40-degree summers or higher insurance premiums. Unified action is needed; flooding the bottom of a valley can only be stopped by the actions of those at the top.

As such, leadership from Government is critical, but the UK is lagging seriously behind. The Climate Change Committee recently concluded that we were 'strikingly unprepared' for the effects of climate change.

The Trust commissioned this report to ask why this issue, of such importance to ensuring our society continues to thrive, has been so neglected. It draws comparisons with the climate mitigation agenda which, while still not on track, has made significant strides since the introduction of a Net Zero target in 2019. We wanted to know what we could ask of Government to stimulate genuine change – and we welcome the findings of this report, which offer some insight. The Trust will continue to support and encourage Government to make the significant changes that this report proves are needed.

Ultimately, we find it striking – but perhaps not surprising – that 79% of people are concerned that declines in nature, driven by climate change, will affect them personally; and 58% are similarly worried about the damage to historic monuments. It is clear that we, as a society, understand the value of our biodiversity and our heritage, as clearly as we know that they are under threat. We will continue our work to look after these unique assets, and while we know some change is inevitable. We will ensure our beautiful places continue to welcome people for generations more, regardless of changes to our climate. Now is the time for Government to step up and do the same.

# The case for action

# Our climate is changing

The climate of the United Kingdom has been warming over the past century. Instruments have documented a one degree rise, on average, since the late 1800s.[1] Over the past decade or so this change has become more perceptible for humans: 2022 was the UK's warmest year ever.[2] Winter rainfall has increased, making flooding a more frequent occurrence, while summer rainfall has become more concentrated and sudden, making drought a regular event in the South East at the same time as flash flooding is on the rise. Sea level has risen by around 17 cm since 1900.[3]

So what? The weather is changing but few will remember a time when winters were frosty and dry or summers more temperate. Why should we care? We need to pay attention because our climate is changing faster than many of the mechanisms that rely upon it. Our native flora and fauna cannot evolve fast enough to adapt to seasons that no longer resemble those for which they were once perfectly suited. Our homes are not built to withstand this new reality, nor is much of our public infrastructure.

Being unprepared for these changes lays us open to extremely negative side effects. To pick just one example, during recent hot summers (such as 2018 and 2022) we saw a sharp increase in the daily death count[4], an increase in violent crime[5], transport problems due to melting road surfaces and buckling train rails[6], farmers lost crops and livestock to the heat[7] and water companies had to implement drought plans. Prolonged periods of heat can also cause pipe movement and property damage due to soil shrinkage as well as creating favourable conditions for wildfire.

The summer of 2018 was joint-hottest on record (alongside 2006, 2003 and 1976) but the chance of a repeat is now 12-25% in any given year. By 2050, the chance of a summer this hot will increase to around 50-60%, making them more common than not.[8]

During the course of our research, we spoke to a broad range of experts, from the Climate Change Committee, to the Wildlife Trusts, to the Association of British Insurers. Each described the destructive impact of climate change on their sector *right now,* and expressed a real concern about the lack of action and urgency thus far from central government.

These are not minute changes, visible only to an expert eye: in May 2023 we polled the UK public: 23% say that climate change has already had an impact on them personally and a

[1] Met Office, *UK Climate Projections: Headline Findings*, August 2020, pp.6
[2] BBC News, *UK weather: 2022 was warmest year ever, Met Office confirms*, January 2023
[3] Met Office, *UK Climate Projections: Headline Findings*, August 2020, pp.7
[4] The Guardian, *Hottest day of 2022 saw 638 more deaths than normal in England,* January 2023
[5] BBC News, *Heatwave: is there more crime in hot weather?*, July 2018
[6] ITV News, *Transport disruption as Eurotunnel, roads and rail hit by hot weather,* July 2018
[7] Farm Diversity Magazine, *The impact of the 2018 UK heatwave on crops and livestock,* June 2019
[8] Met Office, *UK Climate Projections: Headline Findings*, August 2020, pp.7

further 34% expect it will do so within the next decade. Only 14% do not think climate change will ever have an impact on them.[9]

The British public believe that the country will be affected in all manner of ways: 81% are expecting the UK will either be greatly or slightly affected by the destruction of nature caused by rapidly changing weather impacts, 82% are braced for health risks from heat waves and other unpredictable weather, and 76% think that insurance premiums will rise.

The British public are worried about how climate impacts will affect them personally: 79% are worried about the destruction of nature caused by rapidly changing weather impacts, 76% the health risks from heatwaves and unpredictable weather, and 58% the damage to historic monuments caused by changing weather.

What is more, only 4% of British adults think that the country is prepared for more hot summers. Almost half - 45% - say that the country is 'Not at all prepared'. When asked about specific sectors preparedness for more hot summers, 50% believe roads and railways are not at all prepared, and 38% that historic buildings and tourist destinations are not at all prepared.

Climate change is already happening here in the UK. It is causing major disruption at both an individual, community and economy-wide scale and neither the public nor the experts believe that we are prepared for what is coming. Here are three case studies that show what is currently at risk.

[9] Public First, *National Trust polling,* May 2023

## Case study: Wildlife and wildfires

The Wildlife Trusts is an organisation bringing together 46 wildlife trust charities from across the UK, which totals 2,300 nature reserves and approximately 98,500 hectares of land. The foundation is already observing climate-related impacts on their sites, from saltwater intrusion on marsh land in Norfolk, to increasingly frequent and intense wildfires in Staffordshire, and disappearing butterfly habitat in Bedfordshire… to name but a few. These numerous examples, spanning the entire UK, show that climate change is already having a tangible impact on nature.

In 2018, a 60-hectare fire swept across the Roaches, in Staffordshire. The summer of 2018 was one of the hottest and driest since 1976 and therefore what began as a campfire escalated quickly into wildfire, causing the destruction of over 200 acres of moorland.[10] At its height, 12 fire engines and a helicopter were on site with welfare pods, water carriers and specialist equipment, and a number of homes were evacuated.

To prevent this happening again, Staffordshire Wildlife Trust have been working hard to make the Roaches more resilient to the increased risk of fire caused by climate change. They have found that traditional approaches, like cutting fire breaks into vegetation, will not be suited to this site and therefore the Trust have come up with the solution of 'wet' firebreaks. During the 2018 wildfire, they noticed that previously rewetted areas slowed, stopped and changed the fire's course and also later showed quicker recovery from the fires destruction. Therefore the Trust are using peatland rewetting techniques which will slow the spread of future fires. The Trust have also employed two staff members to engage with the public during high-risk times to try and prevent a repeat of the 2018 campfire-started wildfire.

This is an example of adaptation after a disaster, and adaptation with multiple benefits - it is increasing the Roaches' resilience to wildfires, and in turn the safety for members of the public using the site, as well as restoring blanket bog, increasing biodiversity, storing water, stopping carbon emissions and protecting carbon stored in the peat soils. Like the Roaches, wildlife across the UK is in danger from the extreme weather caused by climate change, and will require huge resources and novel, place-based solutions to adapt.

[10] Wildlife Trust, *Roaches Appeal*, accessed 12th January 2023
Image: BBC News/Alsager Fire Station, *The Roaches: Moorland fire 'devastating' for wildlife,* August 2018, accessed Jan 2023


## Case study: Flood risk and insurance

One of the greatest impacts of climate change in the UK is the increased severity and frequency of flooding. The UK Climate Change Risk Assessment judged that river and surface flooding presents a 'very high' risk to people, communities and buildings from river and surface flooding.[11] It is predicted that by 2050 over 1.3 million households in the UK will be at risk of substantial flooding, which is an increase of 250,000 from current levels.[12]

Indeed, flooding is *already* a huge problem in the UK, with many high profile flooding events having caused huge economic and personal loss. Flooding is not a future, far-off problem but a climate risk we are already experiencing, as Dr Bates of Bristol University succinctly puts it:

> *"There is often this narrative in flooding that we're going to have disastrous floods in the future… that implicitly suggests that we've got the problem under control now, which we really don't."*[13]

The February 2020 flooding in Cumbria is a good example of the destructive impacts of flooding. More than six inches of rain fell in the County in 24 hours, just four years after a similarly destructive flood that had been billed a *"once in a century event."*[14] It was estimated to have cost £360 million to repair the damages to homes and businesses.[15] With each flood, there is also a huge hidden cost - a longitudinal study revealed that flooding has severe and long-lasting consequences on mental health, such as depression and PTSD.[16]

Efforts to adapt the UK housing stock lag far behind what is needed.[17] This represents a huge drag on the insurance industry, and there is a real chance that homeowners will soon be facing sky-high re-insurance costs and homes therefore rendered 'uninsurable.'

Given that we know that flooding in the UK will only increase in severity and frequency, what is preventing our preparedness? One key problem is that, after a flooding event, the affected homes are returned to their original condition, rather than improving their resilience such as

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[11] DEFRA, *UK climate change risk assessment,* January 2022, pp.8
[12] Fathom, *UK Flood Map,* accessed 4 January 2023
[13] Independent, *Top 10 areas of Britain most at risk of flooding due to climate crisis revealed,* April 2022
[14] BBC News, *Storm Ciara: Cumbria begin clean-up after flooding,* February 2020
[15] Association for British Insurers, *Insurance payouts to help customers recover from storms Ciara and Dennis set to top £360 million,* March 2020
[16] BMC Public Health, *The English National Cohort Study of Flooding & Health: psychological morbidity at three years of follow up,* March 2020
[17] UK CCC, *UK housing: Fit for the future?,* February 2019
Image: The Guardian, *'I can't go through this again': Cumbrians struggle with floods aftermath,* December 2015, accessed January 2023

installing flood resilient doors. For homeowners, the upfront cost of resilience measures is the primary barrier. For insurers, there is a market failure at work. A single insurance firm is not incentivised to spend money improving flood resilience because all firms will reap the reward - it offers them no competitive advantage.

The government has tried to intervene with the creation of Flood Re and its *Build Back Better* initiative, but it may not be enough. *Build Back Better* is a reinsurance scheme by the UK government and insurance industry which aims to make flood-cover more widely available and affordable to the most at-risk households, and incentivise homeowners to improve their home resilience by reimbursing costs of up to £10,000 to adapt their homes.[18] The idea is that when the Flood Re initiative ends in 2039, enough homes and businesses will be well-adapted that, when the insurance market once-again becomes risk reflective, insurance will be affordable.

However, if the UK is not well-adapted at the point that *Build Back Better* ends, then millions of homes will be rendered uninsurable, and millions of people will personally experience the devastating impacts of flooding.

[18] Flood Re, *Press Release*, 2020

## Case study: The threat to our historical landmarks

The National Trust is already seeing the impacts of climate change on the nature and heritage it protects, and has recognised climate change as the single biggest threat to the precious landscapes and historic houses it cares for.

These threats are multiple, from rising temperatures damaging some of the finest paintings in the Trust's care, to pests and diseases threatening collections, trees and plants. The changing climate is also altering the way visitors and staff use, navigate and enjoy the places the Trust cares for. For example, research predicts that changing weather patterns will lead to busier off-peak seasons and increases in visitor 'surges' - particularly in coastal sites on warmer days.[19] Increasingly frequent and severe heatwaves means that coastal infrastructure like roads and health care services could become overwhelmed in summer months, and historic sites may become unavailable due to reduced income or health and safety concerns.

Ham House and Gardens in Richmond, one of the grandest Stuart Houses in England, demonstrates the multiple risks the Trust faces. In Spring, dry weather has begun to affect the blossom, fruit and young plants and there has been a marked increase in pests and diseases. The box hedge, a staple of any English country house garden, is now suffering from box tree caterpillar. And in Summer soaring temperatures are drying out the soil, scorching the plants that once thrived in the historic kitchen garden, and browning the lawns. In July 2022 the water meadow suffered a wildfire.[20] Along with drought, Ham House is also very vulnerable to flooding due to its position on the River Thames. Staff have witnessed increasingly frequent and severe flooding of the grounds over the past five years.

Whilst climate change is *already* taking its toll on Ham House, we can expect these impacts to become more extreme. To take changing weather as an example, there is now a 10-25% chance of a heatwave each year, compared to a less than 10% chance a decade ago. 40C days could be a common occurrence by 2040.

In order to deliver on its missions the Trust must prepare for these climate change impacts. For example, to protect Ham House's nature from increasingly severe droughts, the Trust has restored the Victorian irrigation system to collect rainwater in chambers that irrigate through the rest of the gardens. It has also chosen its planting with the changing weather in mind,

[19] ITV News, *National Trust data reveals how climate change could hit UK summer days out,* August 2021
[20] National Trust, *Responding to climate change at Ham House,* accessed 12th January 2023
Image: National Trust Images/ Chris Davies, *Tulips and muscari on the lawn and south front of Ham House and Garden, Surrey*

establishing a variety of apple trees which are known to thrive in a variety of climate and resist certain diseases. And to protect its visitors, the Trust's team are working to make sure they can find shade and shelter, for example moveable benches that can be positioned in shade. These are some of the biggest changes in Ham House's history.

The Trust is now beginning to understand and map out how climate change will impact every one of their unique sites. It is working hard to combat these challenges – and find the opportunities – of a changing climate across all of its 250,000 hectares of land, 192 mansions and castles, more than 200 parks and gardens, and for its almost 28 million annual visitors.

# Preparing for the future

Discussing climate adaptation is a masterclass in probability. The climate impacts described above are already here - they are certain and require action. The future is, of course, less certain but the range of possibilities is fairly well-defined.

In recent years the Intergovernmental Panel of Climate Change (IPCC) has focussed predictive modelling work on four scenarios known as RCPs, or Representative Concentration Pathways. Each RCP describes a different future based on the concentration of greenhouse gases in our atmosphere. For each scenario, the IPCC projects outcomes (for which it also provides guidance on probability). The IPCC's 2023 report will add more pathway projections, but until then we have figures for these four:

- RCP2.6 is described as a 'very stringent' pathway, which sees global $CO_2$ emissions begin to fall by 2020 and go to zero by 2100 and global methane and sulphur dioxide emissions reduce rapidly. Like all of the RCPs, this scenario also envisages negative emissions (absorption or removal) of around 2 Gigatons of $CO_2$ per year.

- RCP4.5 describes emissions peaking around 2040 and then declining.

- RCP6.0 shows emissions peaking in 2080 and then declining, after the world employs a range of stabilisation technologies.

- RCP8.5 is considered a 'worst case scenario' in which emissions continue to rise throughout the 21st century. There is some debate about whether sufficient fossil fuel reserves exist to drive our atmosphere to this limit. However, emerging research on feedback loops suggests that when we breach certain tipping points for oceanic warming, ice melts and deforestation further sequestered carbon is released into the atmosphere, contributing significantly to atmospheric concentrations of warming gases and increasing the likelihood of RCP8.5.

**Figure 1: Predicted increases in temperature and sea level that arise from each RCP**[21]

**Table SPM.2 |** Projected change in global mean surface air temperature and global mean sea level rise for the mid- and late 21st century relative to the reference period of 1986–2005. {12.4; Table 12.2, Table 13.5}

| | | 2046–2065 | | 2081–2100 | |
|---|---|---|---|---|---|
| | **Scenario** | **Mean** | ***Likely* range**[c] | **Mean** | ***Likely* range**[c] |
| **Global Mean Surface Temperature Change (°C)**[a] | RCP2.6 | 1.0 | 0.4 to 1.6 | 1.0 | 0.3 to 1.7 |
| | RCP4.5 | 1.4 | 0.9 to 2.0 | 1.8 | 1.1 to 2.6 |
| | RCP6.0 | 1.3 | 0.8 to 1.8 | 2.2 | 1.4 to 3.1 |
| | RCP8.5 | 2.0 | 1.4 to 2.6 | 3.7 | 2.6 to 4.8 |
| | **Scenario** | **Mean** | ***Likely* range**[d] | **Mean** | ***Likely* range**[d] |
| **Global Mean Sea Level Rise (m)**[b] | RCP2.6 | 0.24 | 0.17 to 0.32 | 0.40 | 0.26 to 0.55 |
| | RCP4.5 | 0.26 | 0.19 to 0.33 | 0.47 | 0.32 to 0.63 |
| | RCP6.0 | 0.25 | 0.18 to 0.32 | 0.48 | 0.33 to 0.63 |
| | RCP8.5 | 0.30 | 0.22 to 0.38 | 0.63 | 0.45 to 0.82 |

This table, reproduced from IPCC reporting, shows the predicted increases in temperature and sea level that arise from each RCP. The range of potential sea level increases by the end of this century ranges between 26 and 82cm and temperature increase from 0.3 to 4.8 degrees centigrade. That is an extraordinary span, representing a range of very different outcomes.

Climate change mitigation - both policy and implementation - continues to change, and with this so does the likely situation that we face come 2040, or 2080. As a nation we have only partial control over the planet's commitment to mitigation but we have far more agency where adaptation is concerned. How can we decide which future to prepare for if the pathway remains uncertain? A recent Met Office report offers the definitive answer:

> "It is a cornerstone principle of resilience preparation that we plan for a wide range of possible future changes, in parallel with taking actions to reduce the likelihood of the worst scenario becoming reality." Met Office, 2022[22]

For policymakers, therefore, the mission is clear: to stand a chance of thriving as our climate changes during the rest of this century we must try to prevent the worst possible harm by reducing our greenhouse emissions and exhorting others to do the same. And *at the same time*, we must monitor the likelihood of these pathways and prepare our country for what is coming.

For too long we have focussed on mitigation at the expense of adaptation. This report seeks to understand why that happened and how we can improve the situation.

[21] IPCC, *Summary for policymakers: Climate Change 2013: The Physical Science Basis,* 2013
[22] Met Office, *UK Climate Projections: Headline Findings*, August 2022

# Adaptation: the story so far

# Adaptation in the United Kingdom

The National Adaptation Programme (NAP) in the UK runs in five year cycles and uses the Climate Change Risk Assessment as its evidence base. It primarily covers England but includes reserved matters - each devolved nation also has their own adaptation strategy. The strategy set out in the NAP is used to form action plans, which set out the key actions and bodies responsible. This takes a 'pathways' approach that focuses on progress towards a 'well-adapted' society without any long term targets. This is particularly the case in infrastructure, where the NAP mentions no defined targets, within clear timeframes.[23]

Climate adaptation monitoring, by which we measure progress towards a 'well-adapted society,' in the UK is in its infancy. The UK does not have a comprehensive framework or the data to show a clear picture of adaptation, which could best be described as a patchwork of data sets.[24]

Defra is the government department with responsibility for adaptation and it reports on adaptation through its Adaptation Reporting Power (ARP), which was created as part of the 2008 Climate Change Act. There have been three reports since 2019, each relying on public and private organisations to submit evidence. Defra asks companies such as water utilities to voluntarily report on how climate change will impact them, self-identifying risks and then ranking them. In this way the monitoring gives its stakeholders a high degree of flexibility in their reporting, focuses on process measures, and focuses on mainstreaming climate risk into public bodies. Its primary aim is to ensure companies integrate climate change risk management into their work, which may not lead to better outcomes.[25]

In their assessment of the ARP2 report, the Climate Change Committee (CCC) identified significant limitations to its approach. The first was that the voluntary nature of reporting meant that 20% of organisations chose not to submit evidence, leading to significant gaps in coverage. Response quality was often low too, with many scoring poorly on methodology. The CCC recommended that the ARP3 cycle be made mandatory and increased in scope to include more organisations, with more detailed guidance to ensure quality and consistency.[26] However, these recommendations were not implemented and the CCC made the same recommendations again in 2022.[27]

The CCC also reports on adaptation via their own Progress Reports. In their 2019 report the Committee stated adaptation had not been resourced sufficiently and policy was not ambitious enough, recommending that objectives should shift to become more outcome focused, time bound and given clear ownership.[28] Four years later, In their 2023 progress report, they reiterated these warnings, describing the country as "strikingly unprepared":

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[23] UK DEFRA, *Second National Adaptation Programme,* July 2018
[24] See Appendix 1.1
[25] Massetti and Mendelsohn, *Measuring climate adaptation: methods and evidence*, October 2020
[26] CCC, *Adaptation Reporting Power: second round review,* March 2017
[27] Labuschagne, *Climate risk to UK infrastructure: Three key fixes to improve reporting,* July 2022
[28] CCC, *Progress in preparing for climate change – 2019 Progress Report to Parliament*, July 2019

> *"The current National Adaptation Programme fails to match the scale of the challenge now facing the country. It lacks a clear vision. It is not underpinned by tangible outcomes or targets. It has not driven policy and implementation across Government…This* (the NAP3) *is a make-or-break moment to avoid a further five years of lacklustre planning and preparation for the changing climate by Defra."*[29]

In their assessment of European adaptation monitoring, reporting and evaluation systems (MRE systems) the European Environment Agency (EEA) state that the UK *"has so far not improved progress in adaptation because the CCC's recommendations have not been implemented"*[30]. The next update in the National Adaptation Programme (NAP3) is due for publication this Summer 2023, which the CCC describes as a *"make-or-break moment"* if the country is to prepare itself for climate change and deliver on its Net Zero commitments.

The UK's devolved nations have each published strategies and various plans, with Scotland being the most advanced.

## Wales

The Welsh 2020-25 adaptation strategy mirrors the English government in many ways but is at a less developed stage. Like the UK NAP, it runs in five year cycles and adopts a pathways approach. For example, many of the targets are to develop and research, such as co-design a new support scheme for the agricultural sector, and the outcome indicators that do exist, such as the number of schemes enabling nature based solutions, do not have corresponding targets.[31] Like most nations, Wales therefore favours gradual improvement ("*develop… incrementally improve… promote*") rather than quantifiable outcome-based targets.[32]

## Scotland

Scotland published an action plan for the period 2019-24. It is quite sophisticated and emulates the recent CCC Net Zero monitoring maps, creating flow charts of themed risks, actors, process and outcome measures, and indicators.

The government has committed to the following:

- Assign responsibility to key stakeholders, such as fire and rescue services for resilience to flood risk[33]
- Like the UK NAP, there is a preference for tracking progress towards a long term, quite intangible outcome *"People in Scotland's diverse communities are informed, empowered and adapting to climate change"*

[29] CCC, *Climate change has arrived, yet the country is still strikingly unprepared,* March 2023
[30] EEA, *Monitoring and evaluation of national adaptation policies throughout the policy cycle,* August 2020, pp.36
[31] Welsh Government, *Prosperity for all: A Climate conscious Wales,* November 2019, pp.32
[32] Welsh Government, *Prosperity for all: A Climate conscious Wales,* November 2019, pp.30
[33] Energy and Climate Change Directorate, *Climate Ready Scotland: climate change adaptation programme 2019-2024,* September 2019, pp.42

- Over 100 indicators in total. Outcome indicators are used to evaluate the success of existing work, such as no. registrations for flood alerts, uptake of energy efficiency measures, water leakage[34]
- The strategy is designed to be used by not just public bodies but planners and NGOs however their role is not statutory and not well defined[35]

As you will see in the next chapter, Scotland's move from a simplistic to highly complex indicator dashboard is a common trend across the world as adaptation policy evolves. We saw this same evolution in carbon emissions reporting. However, Scotland does stand out for its use of outcome indicators, which many nations are reluctant to include.

## Northern Ireland

The Northern Ireland 2019-24 adaptation strategy[36] stands out from its sibling UK nations because it selects a small number of outcome indicators by which to track progress. For example in the Built Environment priority area three indicators are selected, such as % of properties at risk of flooding. For reference, the Scottish strategy includes hundreds of indicators.

However, having narrowed down the indicators by which to track progress, the Northern Ireland strategy does not then set concrete targets for each. For example X% uptake of Sustainable Drainage Systems by X year. Therefore, just like England, Wales and Scotland, it favours gradual improvement and conspicuously avoids setting long term outcome-based targets.

[34] Energy and Climate Change Directorate, *Climate Ready Scotland: climate change adaptation programme 2019-2024,* September 2019, pp.42
[35] EEA, *Monitoring and evaluation of national adaptation policies throughout the policy cycle,* August 2020, pp.67
[36] DAERA, *Northern Ireland Climate Change Adaptation Programme 2019-2024*, September 2019, accessed February 2023

# Adaptation in other nations

## The Netherlands

The Dutch have two streams for adaptation and resilience. The first is the Delta programme, which primarily focuses on the impact of sea level rise on water safety and fresh water supply. It is divided into three topics (flood risk management, fresh water supply and spatial adaptation) each of which then includes an agenda/vision ("Delta Decisions") and action plans ("Delta Plans").[37] The Delta Decisions are reviewed every six years and the Delta Plans adjusted accordingly, meaning that although they have a view to 2050 they are very adaptable to changing climate risks.

The Delta Programme takes a very human approach, for example using the number of deaths from a climate related impact as an indicator and other non-financial elements such as societal disruption.[38] The programme also recently introduced regional stress tests for flooding.[39] Given that over a third of the Dutch population live below sea level, it is no surprise the Netherlands are well progressed in their adaptation policy for flooding, and have been considering flood resilience since 1958.[40]

The Netherlands has additional targets for coastal flooding - they have committed to a 'flood protection standard' for all citizens. For example, by 2050 100% of Dutch people will be protected by dikes with a 'basic level' of protection from flooding.[41] A basic level means *"the probability of mortality due to flooding shall not exceed Initial years for preparation, then leap in rate of completion an average of once in 100,000 years."*[42] This long term target means it is possible to chart progress, see below.

The second stream is the National Adaptation Strategy (NAS), published 2016, and its corresponding implementation programme published in 2018. The programme covers topics outside the Delta programme remit, and is divided into six main policy goals. For example: "increase the awareness of the necessity of climate adaptation."[43] It focuses on progress measures and the gradual integration of adaptation into existing structures, rather than setting outcome based targets. An updated version is due to be published before year end.

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[37] National Delta Programme, *Delta Programma 2023 (English) - Print version,* September 2022
[38] Centre for Public Impact, *The Delta Act: reinventing the Dutch approach to coastal management,* September 2019
[39] National Delta Programme, *Delta Programma 2023 (English) - Print version,* September 2022, pp.29-30
[40] Centre for Public Impact, *The Delta Act: reinventing the Dutch approach to coastal management,* September 2019
[41] National Delta Programme, *Delta Programma 2023 (English) - Print version,* September 2022, pp.36
[42] National Delta Programme, *Delta Programma 2023 (English) - Print version,* September 2022. pp.36
[43] Ministry of Infrastructure and the Environment, *Implementing with ambition: Implementation Programme 2018-2019,* March 2018

**Figure 2: Progress against 2 targets of the 2023 Delta programme[44]**

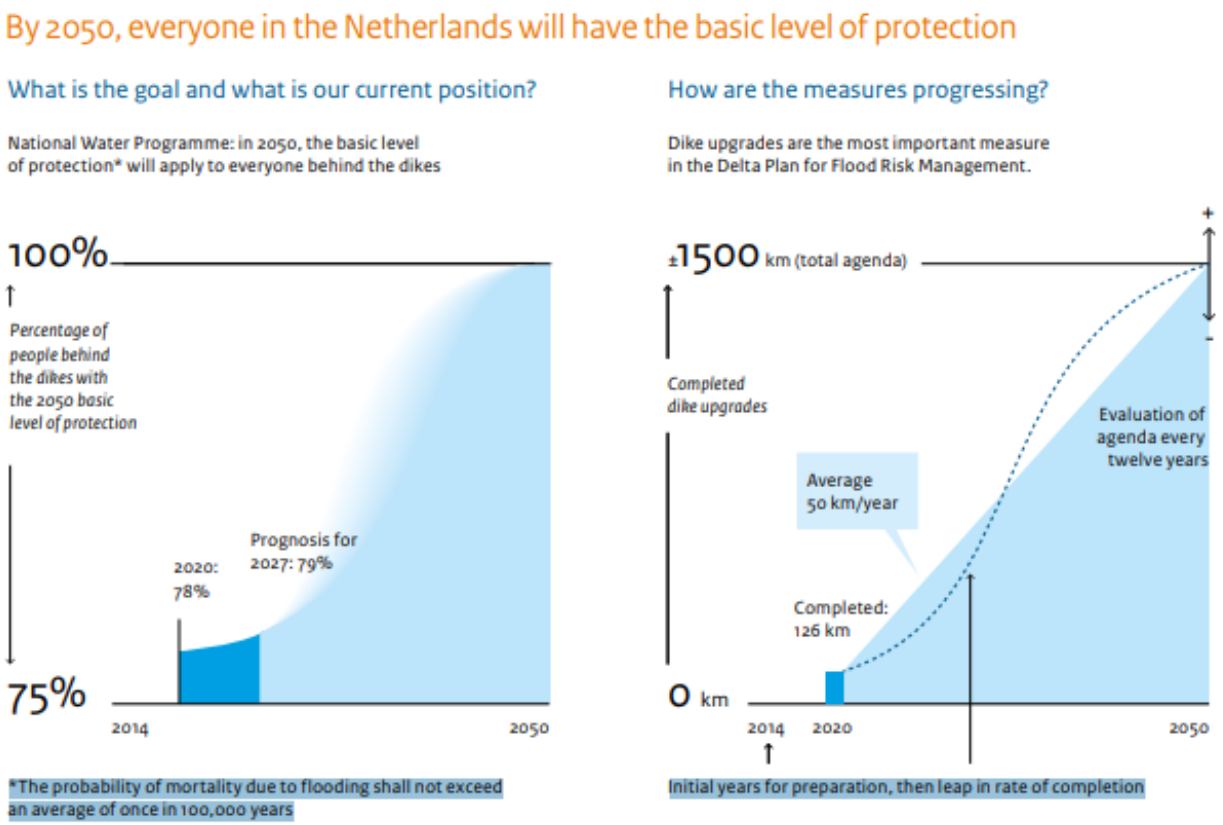


*Figure 7 Flood risk management - By 2050, everyone in the Netherlands will have the basic level of protection*

## Switzerland

Switzerland has one of the most advanced adaptation monitoring systems in the EU. Over time their action plans have increased in complexity and number of indicators, with the 2020-25 plan selecting 75 actions, 12 of which were cross-sectoral.[45] The monitoring 'maps' are organised by theme and then each action has its own ladder system, running from procedural to output to outcome and finally impact measures.[46] Each action is assigned to a participatory body.

Criticisms of the plan bear a striking resemblance to those of UK efforts. The EEA states that the plan lacks quantitative goals, but acknowledges the difficulty of *"proving causality between the measures implemented and the reduced risks and complexity of the adaptation policy."*[47]

[44] National Delta Programme, *Delta Programma 2023 (English) - Print version,* September 2022. pp.36
[45] Swiss Federal Council, *Anpassung an den Klimawandel in der Schweiz: Aktionsplan 2020–2025,* August 2020
[46] Swiss Federal Council, *Anpassung an den Klimawandel in der Schweiz: Aktionsplan 2020–2025,* August 2020, pp.93-94
[47] EEA, *Monitoring and evaluation of national adaptation policies throughout the policy cycle,* August 2020, pp.69-70

As the CCC has recommended to the UK government, the Swiss government has stated the need for targeted measures and notes that many Swiss regions are still inadequately prepared for climate risks, such as overheating.[48] However, no targets have been published.

## Ethiopia

Ethiopia set out their adaptation plan in 2019 and are in the process of consulting on a monitoring system. Unlike the UK, the adaptation strategy's core purpose is to integrate adaptation into Ethiopia's long-term development pathway, therefore it focuses on integrating climate risk management into existing programs.

The monitoring system is fairly simple and high level: long term objectives are subdivided into expected results, indicators, and bodies responsible for collection of data.[49] The groups responsible for reporting are almost entirely public bodies and the system is self-evaluating, taking the form of quarterly and annual reports from every tier of government from local delivery to executive teams. One positive of adaptation being tagged into development is that there are already existing networks and a centralised database, meaning presumably collection will be easier and accountability backed by donors audits as well as political masters.

Like the UK, Ethiopia's approach focuses on process measures rather than outcome measures, and there are no outcome targets set.

## USA

There is no overarching sustainability strategy for the United States akin to the UK programme. Rather, there are requirements for states and federal departments to consider climate risk.

Firstly, in 2021 via an Executive Order, major Federal agencies were required to develop an adaptation and resilience plan and provide annual updates.[50] These plans focus on process measures, such as the Department for Agriculture's plan which focuses on the integration of climate risk management into its programs and qualitative outcomes such as *"build resistance by enhancing soil health."*[51] In 2022 each agency published a progress report. There is no evidence of evaluation or criticism of these plans.

Secondly, the central USA government requires federal departments to publicly report on their energy efficiency and sustainability via annual scorecards (see example here). This bears

[48] Swiss Federal Council, *Anpassung an den Klimawandel in der Schweiz: Aktionsplan 2020–2025,* August 2020
[49] UNFCCC, *Ethiopia's Climate Resilient Green Economy: National Adaptation Plan,* March 2019
[50] Office of the Federal Chief Sustainability Officer, *Federal Progress, Plans, and Performance,* accessed 27 October 2022
[51] Office of the Federal Chief Sustainability Officer, *Department of Agriculture Agency Progress,* accessed 27 October 2022

many similarities to the UK ARP. It focuses on process measures, and its primary aim is for adaptation readiness, to measure how well the government has integrated climate risk management. Unlike the ARP, it is compulsory but it is more limited in scope than the ARP as it does not include public bodies like utility companies, and asks for far less data.

## California

Several USA states have adopted their own adaptation action plans, in the absence of a national policy requirement. California's adaptation policy and monitoring is at an advanced stage in comparison to other states, perhaps because it is already experiencing the impact of climate change such as the increased severity of droughts and wildfire.

California launched their climate adaptation strategy in April 2022.[52] The strategy organises itself into six priorities rather than taking a sector-led approach. Similar to Switzerland's monitoring maps, each priority is assigned goals, each goal assigned actions, to which timeframes and several success metrics are assigned. There are 150 actions in total. For example:

> *"Priority: Accelerate Nature-Based Climate Solutions and Strengthen Climate Resilience of Natural Systems*
>
> *Action: Increase the pace and scale of wildfire resilience and forest health projects.*
>
> *Success Metric: Scale up forest health treatments to 500,000 acres annually.*
>
> *Timeframe: Completed by 2025."*[53]

The state is required to report on progress annually. Because of the infancy of this strategy, there has been no review published yet, nor third-party review comparable to the CCC Progress Report.

California is also taking important steps in communicating adaptation to the public. Rather than a report, it published a dedicated website for its adaptation strategy, which includes a section summarising the projected climate change impacts for Californians.[54] During the development of the 2022 strategy, they ran an 'adaptation forum' for interested parties, including researchers, businesses, and local government, to feed into policy.[55]

[52] California Climate Adaptation Strategy, *Website main page,* accessed 2 November 2022
[53] California Climate Adaptation Strategy, *Goal A,* accessed 2 November 2022
[54] Governor's Office of Planning and Research, *California Launches Updated Climate Adaptation Strategy to Protect Communities from Accelerating Impacts,* April 2022
[55] California Adaptation Forum 2021, *Website main page,* accessed 2 November 2022

## Finland

Finland's Adaptation Plan ran from 2014-2022 and included a mid-term evaluation published in 2020. Finland will soon submit a new adaptation plan to Parliament for the period 2023 onwards.

The 2014-2022 plan created a template package of measures and objectives that can then be tailored to each sector. This gave government departments a great degree of autonomy. For its reporting, the first stage was self-evaluation from departments, including group interviews. The second stage included workshops and an online survey for local government, and two events for non-governmental actors.[56]

The 2020 evaluation noted several key limitations.. Like Defra's ARP3 report, the collection of data on non-governmental actors was not comprehensive because the reporting was voluntary for private actors. The report also pointed out that dividing the issue of adaptation by sector was unhelpful given the *"multidimensional nature of climate change. The sectors often lack clearly defined responsibilities, practices and operating instructions for their adaptation work."*[57]

Like California, Finland consulted widely on their strategy, with a particular focus on local government: running interviews, workshops and a survey.[58] These helped to clarify the state of climate action in municipalities, and barriers to action.

In addition, two national events brought together individuals from ministries, researchers in the field, and representatives of non-governmental organisations, trade and various sector unions interested in adaptation action. These workshops focused on *"identifying the goals of adaptation action and the second sought to define measures for their realisation."*[59]

[56] MMM.FI, *Finland's National Climate Change Adaptation Plan 2022*, November 2014
[57] Mäkinen et al., *Implementation of Finland's National Climate Change Adaptation Plan 2022 : A Mid-term Evaluation,* October 2020, pp.65
[58] Finnish Government, *Adaptation to climate change in Finland: Current state and future,* 2022, pp.13-17
[59] Finnish Government, *Adaptation to climate change in Finland: Current state and future,* 2022, pp.14

# Overarching observations

It is clear that the UK is not alone: other nations are also struggling to streamline and mainstream their adaptation strategies and reporting. There is huge variety in the level of detail and approach each nation has taken.[60]

There is little uncertainty when it comes to climate risk prediction – we can make pretty reliable predictions based on several climate scenarios. However there *is* a lot of uncertainty around the outcome of an adaptation action eg. "If I do X action for X number years this will lead to X impact on X outcome measure." And we can see this challenge clearly in how nations have approached adaptation - a common theme is a focus on process measures (which track activity rather than outcomes), integration of adaptation into their existing risk management procedures, and a reluctance to adopt targets which use an outcome indicator.

There are two underlying problems feeding this uncertainty:

### Lack of evidence

Policy makers lack the evidence base to meaningfully attribute an action, for example flood mitigation efforts, to an outcome, such as reduction in flood related insurance claims. The OECD states that there is a critical need to acquire long time series to effectively measure impacts - a lack of which makes it very difficult to set meaningful and helpful targets and evaluate impact.[61] For example, the second UK Climate Change Risk Assessment evidence report identified approximately 200 evidence gaps.[62]

This issue is compounded by timeframes in adaptation that stretch far beyond common programme cycles, so there are significant timelags between interventions and measurable impacts. Furthermore, collecting data is expensive and time consuming[63] which is why we see adaptation often built into existing systems, as in Ethiopia's plan[64] or attempts to prompt action by raising awareness of risks, rather than committing to government investment - such as in the British and Finish approaches.

But gathering this evidence is vital - this was clear in our interviews with members of the CCC adaptation team, and Professor Neil Adger.[65] We see this in the CCC's (unheeded) recommendations that Defra invest in filling the data gaps identified in their 2022 Monitoring Framework document. They explicitly state that this gap is *"hindering Government's ability to effectively develop, target and implement policies, and the Committee's ability to track*

[60] EEA, *Monitoring and evaluation of national adaptation policies throughout the policy cycle,* August 2020, pp.7
[61] OECD, *National Climate Change Adaptation: Emerging Practices in Monitoring and Evaluation*, 2015, pp.45
[62] CCC, UK *Climate Change Risk Assessment 2017: Evidence Report,* 2017
[63] UK DEFRA, *Measuring adaptation to climate change - a proposed approach,* pp.8, accessed 21 October 2022 from Climate-ADAPT
[64] OECD, *National Climate Change Adaptation: Emerging Practices in Monitoring and Evaluation*, 2015
[65] Interviews with Neil Adger and CCC Adaptation team, Appendix 1.1

*progress."*[66] In many areas, we simply do not have the information to ensure we are making the best policy decisions, and convince decision makers that an intervention will be effective.

### Continuous context of climate change.

Adaptation is not an outcome, but as Brooks et al. put it, "*a diverse suite of ongoing processes that enable the achievement of development objectives under changing conditions."*[67] It is impossible to set a threshold for when *"adaptation is enough and therefore achieved"* and this would not be a productive goal.[68] For example, policy to restore 100% of peatlands may be redundant by 2050 if many of these areas turn into grasslands, meaning policy will need to change.[69] SImilarly, many forms of adaptation will cost money that could be invested elsewhere - and some types of adaptation may represent poor value for money. This makes the task of selecting long term targets a difficult one, and also creates uncertainty around the benefits of a given action, given the goal posts will likely change.

### This has led to...

Nations have reacted to this uncertainty by focussing on adaptation readiness and using process measures. For example the UK ARP, or USA scorecards. These tend to focus on public bodies, and ask them to self-evaluate, often leading to reporting that is very limited in scope. Process measures are used to measure progress against a baseline of *"projected climate risks in the absence of current or planned action."*[70] Essentially, working to improve resilience, but without a clear end goal.

In recent years, increasingly complex indicator dashboards have been developed - organising hundreds of indicators, targets and actions into themed 'monitoring maps' - as in the case of Switzerland or California. There is still a focus on process measures but these have begun to include some medium term targets and periodic adjustments (given the continuously changing nature of climate risk).[71] The OECD notes that systems such as these are a compromise: *"Finding a balance between setting explicit policy objectives/aims/targets and maintaining flexibility of MRE* [monitoring, reporting and evaluation] *systems is likely to be beneficial"*[72].

### What does this mean?

States have been grappling with the difficulty of creating a clear vision for adaptation, given the lack of data and uncertainty of impact. We see a gradual shift from simple voluntary reporting from public bodies to complex indicator dashboards. There has been a focus on

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[66] CCC, *2022 Progress Report to Parliament,* June 2022, pp.157
[67] Brooks and Frankel-Reed, qtd. Climate-ADAPT, *Twelve reasons why climate change adaptation M&E is challenging,* pp.2, accessed 21 October 2022.
[68] Craft and Fisher, *Measuring effective and adequate adaptation,* December 2016, pp.11
[69] Interview with Brendan Freeman, CCC Adaptation team, Appendix 1.1
[70] OECD, *National Climate Change Adaptation: Emerging Practices in Monitoring and Evaluation*, 2015, pp.40-42
[71] OECD, *National Climate Change Adaptation: Emerging Practices in Monitoring and Evaluation*, 2015, pp.21
[72] EEA, *Monitoring and evaluation of national adaptation policies throughout the policy cycle,* August 2020, pp.36

process measures, and this is still the dominant approach. However, there is a clear frustration in academia and in the self evaluation of these action plans that there is a lack of mid and long term targets, a lack of a focus on outcome measures.

No nation has 'solved' the problem. As the OECD states, monitoring systems and strategies have been a compromise between setting clear targets to push for action, and acknowledging that adaptation policy necessarily must adapt to climate risk, and there is a lack of data to inform decisions.

# What limits action on adaptation?

It is clear from our case studies that a lack of evidence and the complex, continuous nature of the adaptation challenge are barriers to fast and effective action. But these problems also dogged climate mitigation in the past century and were overcome by determined campaigning. Why has action on adaptation lagged behind our global, much-publicised action on mitigation? Our research suggests five key reasons:

- **Denial and time horizons**
- **Complexity**
- **Evidence base**
- **Sponsoring department**
- **Campaign emphasis**

Denial is the first and most complicated reason suggested by our interviewees and reading. The length of time over which we expect climate impacts to affect the UK makes it easy for most Britons who read about the changes coming our way to push it to the back of their minds. This, they think, is something about which I can do very little and it is far less urgent than my day-to-day pressures. Even among policymakers this is a pragmatic way to think about the impacts of climate change: a pandemic happening right now will nearly always win out over flooding or heat waves worsening over the span of several decades.

That challenge is deepened by the complexity of adaptation. Not only will our changing climate bring myriad challenges, the options for adapting our economy, homes, infrastructure and lives are even more numerous and often clouded by further uncertainty. It is unrealistic to expect even the most interested policymakers to keep in mind the many faces of adaptation at once.

Add to these inherent barriers to action the lack of a compelling evidence base for what works to prevent harm and it becomes increasingly clear why neither opinion formers nor those in the civil service and politics have truly got to grips with adaptation as a topic. Time and again as we spoke to adaptation experts they told us that the evidence that change was coming was exceedingly clear: but the research on what we must do to stay ahead of that change remains patchy and inconsistent.

Defra, as the department with responsibility for adaptation, has failed to make significant progress on any of these topics - no compelling vision for lessening the impact of climate change on the UK has been forthcoming, nor does an overarching strategy for achieving the necessary evidence seem to be in place. Moreover, as our understanding of the global impacts of climate change develops, it has become clear that adaptation is far more than an environmental problem - it must reach into planning, defence, diplomacy, migration policy, transport and many other areas. Given these two observations, it seems clear to us that Defra is no longer the appropriate department to hold responsibility for this brief.

Not all of the fault lies with government. A brief survey of non-governmental campaigns shows that mitigation of climate change has been the focus of the vast majority. In recent years, we have seen some campaigns around adaptation in the Global South but this is dwarfed by the diverse and insistent voices focussed upon reducing the UK's carbon footprint.

# Case study: the success of 'Net Zero'

Adaptation has long been described as the "*poor relation*" of mitigation, and the two make for a useful comparison.[73] A decade ago, mitigation encountered many of the same barriers that adaptation faces now, and we can learn from this. Carbon reporting has evolved from simple reporting 'scorecards' to complex indicator dashboards, which we see in the recent CCC net zero monitoring framework.[74]

Several mandatory schemes were developed, which still exist today. For example, the EU Emissions Trading System and the CRC Energy Efficiency Scheme (now replaced by the SECR regime). These require businesses to evaluate themselves and collect data which include carbon emissions, similar to the USA Federal scorecards. Although reporting is mandatory, there are no statutory targets behind these.

In the 2008 Climate Change Act, the government committed to an 80% reduction in carbon emissions relative to the levels in 1990, to be achieved by 2050. This is the first time we see in the UK a statutory and long term target for emissions, rather than a focus on the 1.5 degree temperature rise. A pathway of sorts was created - five-yearly carbon budgets which set shorter term limits on emissions. However, there were limitations - relative contributions from different sectors were not made clear but rather delegated to government departments.

In 2008, responsibility for mitigation moved out of the Department for Environment, Food and Rural Affairs (Defra) to the newly-created Department of Energy and Climate Change. In 2016 it moved to the Department for Business, Energy and Industrial Strategy (BEIS) and finally in 2023 responsibility was given to the Department for Energy Security and Net Zero (DESNZ).

Once the conversation switched from temperature to a Net Zero target, we can see policy quickly progress. By 2015, the year of COP21 and the Paris Agreement, the emphasis was firmly on carbon emissions. The Paris Agreement asked nations to create, by 2020, long term strategies and targets to reduce their emissions ('nationally determined contributions'). In 2019, the UK committed to a 100% reduction in carbon emission by 2050 relative to 1990, and in

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[73] Andrew Steer, qtd. Terry Slavin, *'Poor sister' of adaptation in spotlight at London Climate Action week,* July 2019

[74] CCC, *CCC Monitoring Framework,* June 2022

Image: National Trust Images/Joe Cornish, *A view of the headland at Ravenscar at the south end of Robin Hoods Bay*

2021 the UK committed to the further target of cutting emissions by 78% by 2035 compared to 1990 levels.[75]

The Net Zero strategy was published in 2021 and sought to flesh out a clear roadmap on how these emission targets could be met. It built upon the CCC's advice in the Sixth Carbon Budget and differed to existing policy in several key ways.

Firstly, rather than focusing on the 1.5 degree ambition, the Net Zero strategy focused on outputs and measurable short, medium and long term targets - policy with an end goal. A key difference is that net zero benefits from a single indicator: carbon emissions:

> *"In contrast to the evaluation of climate change mitigation, which generally relies upon one indicator (ie. The balance of greenhouse gas emissions and removals), evaluating adaptation requires consideration of multiple dimensions that interact across time and space."*[76]

The single lodestar around which mitigation is organised is very helpful in setting out the direction of travel (an 'arrival point') by which further policy can be developed and the government held to account.. Although the carbon budgets introduced the single indicator, Net Zero fleshed out the policy pathway to the final target.

Secondly, the Net Zero strategy organised decarbonisation into a neat idea, allowing people to conceptualise a decarbonised future that seemed tangible and possible – a hook on which to hang policy asks. Rather than speaking about all the numerous and complex actions that need to happen (this crucial specificity still exists behind the scenes) Net Zero tells a story which the public and policymakers can understand and get behind.

Just this year, in June 2022, the CCC published a monitoring report which structured carbon emissions reporting into a series of complex monitoring maps, divided by sector.[77] For example, the target for surface transport emissions to reduce by 75% by 2035 is subdivided into:

- 'required outcomes' such as the rapid uptake of zero-emission vehicles
- 'enablers' such as public and business attitudes to ZEVs
- 'policies' such as electric vehicles charging infrastructure
- 'contextual factors' such as battery supply and prices

Therefore in carbon emissions reporting we see a gradual evolution towards complex monitoring maps. The CCC framework is evidence that the policy and reporting on carbon emissions continues to become more sophisticated. We see a similar trajectory in adaptation where there are increasingly complex indicator dashboards and maps, as in Switzerland. Whereas both Net Zero and adaptation have increasingly complex monitoring systems, adaptation is a decade behind, and also lacks the clarity and compelling vision that we see in the Net Zero strategy.

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[75] Gov.uk, *UK enshrines new target in law to slash emissions by 78% by 2035,* April 2021

[76] Guillaume Peterson St-Laurent, Lauren E. Oakes, Molly Cross, Shannon Hagerman, *Flexible and comprehensive criteria for evaluating climate change adaptation success for biodiversity and natural resource conservation,* 2022

[77] BEIS, *Net Zero Strategy: Build Back Greener,* October 2021

# Towards a ‘net zero’ for adaptation

# Why has no one identified a ‘net zero’ for adaptation?

Given the success of Net Zero in galvanising action on mitigation, might adaptation simply require an equivalent single measure of progress? The barriers to action on adaptation identified above show both the strengths and weaknesses of this plan.

A net zero alternative for adaptation would help to reduce complexity and collapse avenues for denial by making indicators of failure clear. Creating such a measure would also create a focus point that NGOs could form campaigns around. Where this plan falls down is in dealing with the hurdles caused by the lack of evidence base and by Defra’s ineffectiveness as sponsoring government department.

Our interviewees and literature review surfaced a series of additional reasons why no one has yet managed to create a net zero equivalent in the adaptation space, most especially:

- Complexity
- International variation
- Risk to alliances

While climate change mitigation policy has been able to focus on carbon levels - and thus on carbon footprint and net carbon emissions - even in that field has simplification been a cause for concern. One need only look at the neglect, until recently, of methane emissions to understand the risks of focussing on a single part of a multi-faceted problem (in that case CO2). In adaptation the complexity is far more acute: here the various outcomes of climate change not only vary radically from one community to another but also interact and, in some areas, reinforce one another. For example, in the UK, high summer temperatures create their own issues for infrastructure and health but also intensify the risks of flooding when heavy rainfall follows.

The interconnectedness of these risks adds allure to the idea of choosing just one as a proxy - perhaps flooding, for example. But problems emerge when one considers how such a system would capture the impact of climate change on two communities: one at the top of a treeless hill, the other at the bottom. If we choose flooding as a proxy for climate impact, we would surely divert resources to the village at the foot of the hill, which would probably suffer from increased deluges. Meanwhile the village at the top could be suffering significant infrastructure damage, loss of topsoil and untold health impacts from extreme heat in the summer, without being flagged as ‘at risk’. Other approaches would tend to draw attention to the plight of wildlife, over infrastructure, or natural capital over human life. No one solution is perfect.

This issue intensifies when we look to the international stage. Net Zero has been successful in part because it alludes to our international responsibilities and engenders a feeling of communal effort. That is unlikely to be possible with adaptation because across the world we face such startlingly different outcomes from climate change.

And as our needs differ, so it becomes trickier to build momentum around a single indicator without fracturing existing alliances. Using the National Trust as an example, if the organisation chose an indicator that seemed to favour impact on buildings, they may alienate nature-focused partners such as the Wildlife Trusts, or potential allies in the health space. Picking just one figure, in short, could worsen the lack of coordination already preventing action on climate adaptation.

To be successful, a net zero alternative for climate adaptation would need to be judged against the following criteria:

- Ability to capture the real progress towards adaptation in the UK
- Technical feasibility of measuring the proposed target
- Political feasibility of using the measure as the basis for a campaign
- Ease with which target can be explained both to the general public and engaged audiences.

However, no single measure could fulfil the first of these rules to the satisfaction of a broad stakeholder group. The merit of Net Zero was building alliances and a campaign around a singular measure, however if we apply this to adaptation then choosing a singular measure has the opposite effect and poses a risk to alliances.

Therefore, we need to look elsewhere. In search of an alternative approach, we turned our minds to resilience more broadly and set out to see how other sectors talk about risk and targets.

# What other models exist? Four case studies

## The Environment Act

The Environment Act 2021 has been described as the *"Net Zero equivalent for nature, spurring action of the scale required to address the biodiversity crisis."*[78] It gave government the power to introduce binding targets, created a timeline of key deadlines that needed to be met, and created a new environmental watchdog. Like Net Zero, we can see in the Environment Act a recognition of the importance of clear targets - it legally requires government to produce interim and final targets for the natural environment, with clear timeframes.[79] However, whereas Net Zero specified exactly what the targets would be, the Environment Act is not an 'oven ready' strategy. It set out the four priority areas these targets needed to cover, but the responsibility is on government to identify them. .

The Environment Act was effective because it began the process of selecting targets. Although the timeline did slip slightly (the Government recently failed to meet its own deadline for publishing targets[80]), these statutory duties mean that government can be held to account. Usefully for adaptation, where selecting indicators is incredibly difficult, the Environment Act shows that a campaign need not have decided on specific targets, but does need to know what areas are a priority.

## Financial services risk

The financial sector is deeply concerned about the uncertain context of climate change. There has been a lack of *"robust, consistent, trusted data"* on what risks climate change pose to the industry and without this transparency, regulators and investors are concerned that risk could be hidden.[81]

The regulatory system for finance deals with these issues by quantifying risk and measuring response. The two primary ways they do this are via stress tests and the Task Force on Climate Related Disclosures (TCFD).

### Task Force on Climate-related Financial Disclosures

The TCFD began as a voluntary set of recommendations which aimed to make firms' disclosures on climate risk and opportunities more consistent and therefore comparable. The

[78] George Eustice, *Environment Secretary speech at Delamere Forest on restoring nature and building back greener,* May 2021
[79] UK OGL, *Environment Act, Section 11*, 2021, accessed 14 November 2022
[80] UK DEFRA, *Update on progress on Environmental Targets,* Oct 2022
[81] Emma Howard Boyd, *The crucial role of nature-based solutions in addressing the climate crisis,* May 2021

key issue the TCFD seeks to overcome is a lack of information (on what the financial industry is doing, and how it is impacted by climate change). Like all aspects of adaptation, there was a real lack of longitudinal data, and the dynamic nature of climate change combined with the similarly dynamic and complex global supply chains means that understanding the potential impacts of climate change is difficult. As we see often in adaptation policy, the TCFD therefore relies on process measures and a focus on gradual improvement rather than setting clear long term targets.

The TCFD is interesting because firstly we see a progressive change from voluntary to mandatory reporting. Its recommendations have now been written into law in many nations including the European Union and, in April 2022, the UK.[82] In the UK this applies to large companies, for example with over 500 employees, with guidance on voluntary reporting for small businesses.[83]

The TCFD has also helped to communicate adaptation to the finance sector. By improving the quality, consistency and transparency of climate related disclosures., companies and investors are therefore better able to *quantify* how prepared they are for climate risks. The TCFD therefore helps to reorient adaptation from an intangible 'environmental problem' to one that has a direct and quantifiable impact on the finance sector.

**Stress Tests**

Stress tests provide the evidence to investors of different routes to resilience, making clear what the outcomes may be if no action is taken. An example is the Climate Biennial Exploratory Scenario (CBES) which was run by the Bank of England and was an exploratory scenario exercise on climate risk, involving the largest UK banks and insurers. It explored three scenarios of possible policy routes to net zero, an 'early' and 'late' action route and if 'no additional action' was taken.

The key takeaways from the exercise are insightful. Firstly, it identified a lack of data: *"The inability to capture appropriate and robust data in certain areas is a common limitation, which means many climate risks are only being partially measured."*[84] Secondly, CBES calculated the predicted losses for each scenario, for the banking and insurance industry.[85] Stress tests help the industry to understand its exposure to risk, and communicate the value of adaptation in a way that makes sense to them, in terms of risk and money.

[82] Anthesis, *Mandatory Climate-Related Financial Disclosures for the UK,* April 2022
[83] Simmons+simmons, *Mandatory climate-related financial disclosures for large companies*, February 2022
[84] Bank of England, *Results of the 2021 Biennial Exploratory Scenario,* May 2022
[85] Chart 4.7, Bank of England, *Results of the 2021 Biennial Exploratory Scenario,* May 2022

## Pandemic / Cabinet office risk planning

Prior to the pandemic, the UK government was thought to be world leading in its risk preparedness. For example, it ranked second in the 2019 Global Health Security Index.[86] The system we used to prepare for extreme risks continues today, although the government has since committed to a revised Resilience Strategy.[87] Currently, the UK's Civil Contingencies Secretariat (CCS) team produce a National Security Risk Assessment (NSRA) every two years which covers around 120 risks. Departments take part in the development of the NSRA - they identify risks and worst case scenarios. However the CCC does not then audit how departments react to these identified risks. This explains how the Department for Education had identified the risk of a flu pandemic but not created a policy for school closures, meaning they were ill-prepared for the Covid crisis.[88]

The Covid crisis "*laid bare the human and economic cost of poor preparedness*" and led to much discussion on how government can be better prepared for future whole-system risks such as heatwaves.[89] The Institute for Government (IFG) has made a number of recommendations, including the creation of a new unit within the Cabinet Office, separate to the crisis response function, to focus on long term, cross-governmental risk. We understand this may now be taking place. They also suggested the creation of a new external body dedicated to scrutinising our preparedness, similar to the CCC.[90] The IFG also identified that the Treasury plays a crucial role in preparedness, for example in incentivising risk management.

The pandemic is a useful case study because it shows that the government was not as prepared as it appeared to be, that there was a serious lack of Cabinet leadership in making sure departments were responding to risk assessments with proper action plans, and that the Treasury needs to play a bigger role in facilitating preparedness.

## The National Trust approach

The Trust has recognised climate change as the single biggest threat to the precious landscapes and historic houses it cares for. Their teams are already facing the challenge of adapting to changing weather patterns and addressing the damage caused by wildfires, heavy rain, increased humidity, droughts and shifting shores.

Adaptation action is an major organisational challenge for the Trust given the unique impacts of climate change at each of their properties, the uncertainty of which impacts it may need to adapt to, and the uncertainty of the outcome of an adaptation action. Therefore the first step

[86] Elizabeth Cameron, Jennifer Nuzzo, Jessica Bell, *Global Health Security Index*, October 2019
[87] Cabinet Office, *National Resilience Strategy: Call for evidence,* July 2021
[88] National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management,* November 2021
[89] Institute For Government, *Managing Extreme RIsks: How the new government can learn from Covid to be better prepared for the next crisis,* July 2022
[90] Institute For Government, *Managing Extreme RIsks: How the new government can learn from Covid to be better prepared for the next crisis,* July 2022

the Trust took was to create a 'hazard map' that helps to illustrate this threat. It includes basic single indicators like average monthly temperatures; event threshold indicators such as the number of days where temperatures surpass certain temperatures; and compound indicators, such as drought frequency. Strikingly, this map demonstrates that, assuming the worst case scenario of no climate mitigation before 2060, the percentage of National Trust sites at high or medium risk of climate related hazards could increase from 30% in 2020 to 71% in 2060.[91]

The Trust are piloting several methods for how the risk data in the map can be translated into operational decisions. This started with two pilots at Mount Stewart, and one at Wicken Fen and now the Trust are in the process of rolling out a further 11 across the country. These pilots are crucial to quantify the impacts of an adaptation action, giving the Trust the information it needs to produce guidance that all their teams can apply at each property.

All this data can then be fed into an adaptation strategy, which the Trust are in the process of developing. They will consider a pathway approach only where there is the impact evidence to show the outcome of an adaptation action. Otherwise, the Trust will take a threshold based approach. This means that they first consider what the most difficult action they may have to take on a feature in their care, and work backwards to consider various scenarios. Second, they set a threshold of what impacts the Trust would term as unacceptable, or 'intolerable' as the Bank of England terms it, for example the number of days the temperature exceeds a certain threshold or the number of days without water. The advantage of a threshold approach is that it is designed to change - when a threshold is reached, an adaptation action is triggered and the threshold reset. This means the Trust are therefore not adapting to one climate scenario nor are the adaptation actions set in stone long term, which can lead to maladaption. Of course, this approach is heavily reliant on monitoring, and the National Trust is hard at work collecting this data.

But what might adaptation look like on the ground? Ham House is a Stuart house on the banks of the River Thames. Here, climate change is causing increased flooding, intense Summer heat and Spring drought. The National Trust team have been working very hard to make Ham House more resilient. One way is by altering the types of plants introduced to include those more resilient to high temperatures, such as cannas, agavas and a diverse mix of apple trees. A mix of varieties means a stronger resistance to disease. The team also restored the Victorian irrigation system to collect rainfall and irrigate the garden, meaning it will be much more resilient to drought.

People are also at the heart of these adaptations. Compostable coffee cups are shredded to use in Ham House's soils and retain moisture, benches are moved to ensure visitors can find shade in times of extreme heat, and the Trust are introducing Mediterranean working hours so their staff can avoid the midday heat. Ham House is just one example of the work the Trust are doing to improve every property's resilience, alongside their hazard mapping and pilots. This is just the beginning of the changes the National Trust will need to make in order to protect the nature, heritage buildings, staff and visitors they care for from the future impacts of climate change.

[91] National Trust, *Hazard map,* accessed 13 January 2023

# Conclusions

## Lessons learned

In order to bring climate adaptation out of the cold and spur real action we need to communicate better. But we also need better tools.

It would be beneficial to reduce the number of measures for climate-dependent change and progress to delay or prevent the impact of climate change. But that is a necessary - not sufficient - condition. The CCC is already working to summarise its adaptation monitoring into a dashboard of 8-10 indicators but further work will be required to turn that dashboard into a public- and government-facing set of targets.

Hidden behind our communication challenge is something even more substantial: an *evidence* challenge. We can only communicate what we know. And while we have a relatively clear idea about the likely impact of climate change on the UK, our interviewees told us time and again that the same is not true for *solutions*: we need to better understand the effectiveness of different adaptation interventions and their human and economic impacts and possible co-benefits. Investment in this area is an urgent requirement and should guide further action on adaptation.

As well as better measuring both impact and action, we also need a far better understanding of what our *aims* are in climate adaptation. The financial industry provides a helpful case study here because it highlights the role of 'intolerable harm' as a clearly-defined concept in financial regulation. Without a clear, shared understanding of what represents intolerable harm, it is impossible to set sensible goals for adaptation work and we will likely fall back upon either aiming to preserve everything as it is now, or making ill-informed trade-offs. The goals set by the Netherlands for flood protection are a useful example of what clear aims can achieve. Work by FInland and California to incorporate the input of citizens and the private sector provides a model for how this can be made part of a national conversation, as do the various Citizens' Assemblies on reaching Net Zero.

None of this reduces the need, shown across so many of our international case studies, for extensive *monitoring*. The complex and continuous nature of climate change means that we are going to be making adaptation decisions for a very long time, often in situations of high uncertainty. Using real-time monitoring, linked to our aims, can allow us to design a series of trigger points for taking timely action. Without good measurement though, we risk moving too late.

We have also identified substantial work that is required to improve the machinery of government behind adaptation work. Defra is not well-suited to carrying forward the adaptation agenda because it is overlooked by other departments and fundamentally rooted in environmental policy. That underestimates the impact on health, infrastructure, housing and the public purse if climate adaptation is bungled. Any solution requires much more powerful political oversight - probably including a Minister with sole responsibility for adaptation or perhaps resilience more broadly - and a tight tether to the Treasury. As it stands, adaptation sits with the 'Minister for Natural Environment and Land Use' along with a number of responsibilities such as tree planting and forestry. This seriously underestimates the scale of the challenge and urgency of adaptation.

To summarise, this report shows that action is required to:

- Ensure we are accurately monitoring the impact of changes in our climate
- Better summarise and communicate the impact of climate change
- Provide better evidence of how best to combat and alleviate the effects of climate change
- Decide upon clear aims for adapting to climate change
- Prepare our Government to deliver this work

None of this is controversial: our polling shows that a significant majority of the country back decisive government action on climate adaptation. Among British adults, 57% agree that Government should *immediately* take proactive steps to respond to the threats of climate change (and a majority in every demographic), with a further 22% agreeing that this should happen 'in the near future'.

# Recommendations

In order to stand a chance of thriving as our climate changes during the rest of this century, the UK must be able to answer three questions:

1. What impact is climate change having on the UK's people, buildings and nature?
2. What are our aims as that change takes place: what is the country we envisage on the other side?
3. What tools are available for achieving those aims?

We are not currently equipped with the answers to these questions. For the first, we have some good quality projections and more patchy measurement. Evidence on the best tools for adaptation across our communities and economies is largely absent. And we have not yet begun to discuss what the British public would describe as 'intolerable harm' in a climate context.

We therefore recommend that:

- The Government must equip itself with the data it will need for decision making in the decades ahead by investing now in excellent monitoring of key climate impacts.

- A significant effort must be made both nationally and internationally to fill holes in the evidence base about what works in adaptation. An emphasis should be placed on quantifying return on investment and co-benefits in order to pave the way for much-needed investment.

- A genuine public conversation needs to happen about the changes that are required over the next 30 years in order to future-proof our country. This could take the form of a Citizens' Assembly or official inquiry to draw up draft guidance of what represents intolerable harm and to begin to assess some of the trade-offs we are likely to face.

This is a substantial programme and would likely pave the way for even more considerable works to our infrastructure, homes and more. A strategy of this magnitude is beyond the capabilities - and subject expertise - of Defra, which has clearly struggled to make an impact on the adaptation agenda. We therefore also recommend that the Government:

- Move responsibility for adaptation to the Cabinet Office, creating a cross-Cabinet Committee or a taskforce (possibly within the Resilience Directorate) that would include team members drawn from many departments - with a significant presence of Treasury civil servants.
- Create a clear ministerial responsibility for adaptation within the Cabinet Office.

Our recommendation to move responsibility for climate adaptation from Defra to the Cabinet Office and create a clear (non-Defra) minister with responsibility for adaptation *as their primary role* is not merely a reflection of Defra's efficacy, or the extent to which other departments are prepared to listen to their Defra colleagues. This report demonstrates the breadth of impact that climate change will have in the UK - and across the world. Even in a more optimistic projection, our landscapes and lives will be permanently changed by hotter summers, increased humidity, increased flooding, soil heave and the many other changes we are now starting to see with our own eyes. Our homes, savings, jobs, national security and health will be on the line. Climate adaptation is not simply an environmental matter.

The Cabinet Office is the 'corporate headquarters for the UK government, in partnership with HM Treasury', its remit includes supporting the National Security Council and Joint Intelligence Organisation, coordinating the government's response to crises and taking a lead in certain critical policy areas. This is the right and proper place for adaptation to sit: in a department that can coordinate the responses of our planning system, water and energy systems, infrastructure procurement, emergency services and more. Treasury input will also be required to make the taskforce function optimally.

If this change proves insufficient, or campaigners feel that a statutory tool is required, we would suggest:

- An Environment Act-style piece of legislation, or Stewardship Act, that requires the Government to suggest targets within a sensible timeframe and creates a statutory target by which they can be held to account. Statutory targets are important for keeping adaptation front-of-mind for policymakers and civil servants. They can also create a clarity and vision which adaptation policy currently lacks.

# Talking about adaptation

The move from Defra to the Cabinet Office is also about more than the machinery of government. We must change how we talk about climate adaptation. This is not an environmental project, nor is it theoretical: our country is changing and we must change with it - or lose a substantial part of our heritage, economy and wellbeing.

A recent report on Critical National Infrastructure (CNI) resilience stated that a lack of leadership in the Cabinet Office was leaving CNI incredibly vulnerable to climate risks:

> *"It appears no Minister is taking responsibility for this topic, and there are no cross-Cabinet Committees driving forward the Government's work on adaptation and CNI resilience... It is hard to imagine the Government taking such a lax approach to any other recognised national security risk."*[92]

This hints at an important truth: that the topics more usually categorised as 'national security risks' are perceived as more important than environmental change. The pace of climate change and its association with other areas of environmental campaigning are major handicaps in the fight to push adaptation up the agenda. We therefore recommend that campaigners working in this space should strongly consider deliberately distancing their language from that used by the climate change mitigation movement and shifting towards a vocabulary based on risk and security.

Creating a functional strategy for climate adaptation is a key step towards building national resilience for the rest of this century. This is not work for an environmentally-minded few, this is a key role of government. **Without a comprehensive strategy for adapting our country to the changes ahead, the UK risks walking blindfolded into the loss of territory, food resources, homes and livelihoods.**

[92] Joint Committee on the National Security Strategy, *Readiness for storms ahead? Critical national infrastructure in an age of climate change,* October 2022

# Appendix A: Interviewees

| Interviewee | Company |
|---|---|
| Neil Adger | University of Exeter, Professor |
| Kathryn Brown | Wildlife Trust, Director of Climate Change and Evidence |
| Brendan Freeman | CCC Adaptation team, Natural Environment lead |
| Ben Howarth, Chris Rumsey and Rebecca Lea | Association of British Insurers |
| Keith Jones and Imogen Wood | National Trust climate advisers |
| Cara Labuschange | CCC Adaptation team, Infrastructure lead |
| Richard Miller | CCC Adaptation team, Head |
| Theo Mitchell | CIFF, Director Climate Strategy |
| Andrew Rogan | UK Finance, Head of Operational Resilience |
| Tom Sasse | Institute for Government, Associate Director |