



Cabinet Office

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UK Resilience Lessons Digest

Learning to Adapt

Issue 4 | March 2024

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Foreword

From Matthew Clarke, Head of Resilience, Resilience Directorate

I'm pleased to present the fourth edition of UK Resilience Lessons Digest, entitled "Learning to Adapt".

The need to adapt to our changing climate has rarely been so salient. We have seen ten named storms this winter, with wide-ranging impacts on individuals and businesses; heat records are consistently being broken, affecting ecosystems; and last summer saw a season of severe wildfires that threatened communities and habitats.

Our work on climate adaptation, like that of the rest of the Resilience Directorate, is underpinned by the principles of the Resilience Framework (2022): that a shared understanding of risk is fundamental; that we need a whole of society approach to resilience; and that prevention is better than cure.

Since the publication of the third National Adaptation Programme in July 2023, we have prioritised the delivery of the actions set out in response to the risks and opportunities in the third Climate Change Risk Assessment. Coupled with the Resilience Framework, these roadmaps put us in a stronger position than ever before when it comes to coordinating cross-government action on resilience.

Alongside the measures in the NAP3, we are driving the strategic direction of UK climate adaptation action. We have put effective governance in place to be able to do this: along with Defra, Cabinet Office co-chairs the senior officials Climate Resilience Steering Board (CRSB). The Board sets cross-government strategic direction to meet

targets and milestones that increase UK resilience and adaptation to climate change risks. We recognise that whole-system risks like climate risk can bring challenges, and are aware that we need to be able to respond to and manage risks using a whole-system approach. Having the CRSB in place is part of this journey.

Thanks to our guest contributors, this edition includes an article from the Met Office, highlighting the importance of robust climate science as we move forward on adaptation, as well as guest articles from the Emergency Planning College, Local Partnerships and Bournemouth University Disaster Management Centre. The analysis of lessons on adaptation shows a wide, even spread of challenges: making our policy work even more crucial.

We hope that Lessons Digest 4 serves as a helpful resource that not only shows action and learning taken to date, but also acts as a tool to highlight where further work might be most usefully focused to achieve the overlapping visions of a resilient, adapted society set out by the NAP3 and the Resilience Framework.



Matt Clarke
Head of Resilience
Resilience Directorate, Cabinet Office

Introduction

Welcome to the fourth edition of the **UK Resilience Lessons Digest**, 'Learning to Adapt'.

In the opening foreword of the UK Government's National Risk Register 2023, Deputy Prime Minister the Rt Hon Oliver Dowden highlighted the increasing impact that climate change is having on our day-to-day lives¹. Our experiences of related extreme weather events in the UK testify to this, impressing that the impacts of climate change have shifted from scientific prediction to ever present reality.

The last 12 months alone provide a case in point. In January 2024 it was confirmed that 2023 was the world's hottest year since records began in 1850. It was also a record-breaking year for the extent of Antarctic Sea ice, which reached an all-time minimum. There were unusually high and persistent ocean surface temperatures, and new peaks for atmospheric concentrations of carbon dioxide and methane². Whilst a range of contributing factors influence associated risks and impacts, one thing is clear: human activity is the primary cause of climate change.³

The work to limit the amount of future climate change, such as preventing or reducing greenhouse gas emissions and reaching Net Zero, are essential mitigation efforts. However, these actions alone will not negate the need for the world to tackle the associated impacts – that requires adaptation. Adaptation is the process of adjusting to the current and future impacts of climate change. With the economic costs of climate change already 'locked in' until 2040,⁴ and temperatures continuing to rise, our natural ecosystems simply cannot adapt fast enough.⁵ Research is clear that urgent adaptation action is required to build a climate resilient future.⁶

Now more than ever, problems generated by human influence require human action and societal solutions. The question is – how can positive, long-term adaptation outcomes be achieved with urgency and on rapid timescales? The long-range aim and the near-term requirement seem contradictory.

1 HM Government, 'National Risk Register 2023', August 2023

2 Copernicus, 'Global Climate Highlights 2023', January 2024

3 MET Office, 'Attributing extreme weather to climate change', 2023

4 Climate Change Committee, 'Independent Assessment of UK Climate Risk', June 2021

5 Environment Agency, 'Living better with a changing climate', October 2021

6 UNEP, 'Adaptation Gap Report 2023: Underfinanced. Underprepared', November 2023

But with today's feasible and effective adaptation options looking to become increasingly constrained and less effective as global temperatures increase,⁷ we can't wait to reconcile them.

The climate emergency makes it clear that the time to start, continue or accelerate active adaptation is now.

The urgency for action makes maximising adaptation planning, outputs, outcomes and impacts vital. One of the ways to achieve this is by harnessing existing learning from experiences and research of climate adaptation in action. That is why this latest Digest sets its focus firmly on lessons related to climate adaptation, with the purpose of better understanding barriers and enablers of effective adaptation policy and practice from around the world. It is our hope that by reviewing and synthesising lessons identified so far, we can highlight positive adaptation practices, share knowledge on how to reduce related risks, and avoid maladaptive practices in the process.

As always, we are committed to keeping the Digest relevant to the resilience community. Please do help us to keep on adapting in response to your ideas and feedback. This can be done by scanning the QR code.

We look forward to hearing from you.



Lianna Roast

Head of Thought Leadership
Emergency Planning College



Deborah Higgins

Head of Emergency Planning College

Digital Feedback: Learning to Read Risks



Did you catch our last edition and latest webinar on Learning to Read Risks? If not, you can catch up on the content and the recording on the EPC website.



⁷ Intergovernmental Panel on Climate Change: Working Group II Contribution to the Sixth Assessment Report (AR6) of the IPCC, 'Climate Change 2022: Impacts, Adaptation and Vulnerability – Summary for Policy Makers (SMP)' February 2022

Executive Summary

Timely analysis. Transferable lessons.
Transformative insights

About the Digest

The publicly available UK Resilience Lessons Digest is part of the government's commitment to strengthening whole-society resilience. It sits at the heart of a programme of work at the Cabinet Office Emergency Planning College (EPC) to synthesise lessons learned of all major exercises and emergencies.⁸ These summary pages provide an overview of Issue 4 content, which is tailored to achieve the Digest's three key objectives:



To **Summarise** transferable lessons and themes from a wide range of relevant sources.



To **Share** lessons across responder organisations and wider resilience partners.



To **Coordinate** knowledge to drive continual improvements in doctrine, standards, good practice, training and exercising.

Each issue of the Digest provides an analysis of lessons arising from public facing reports, generated after exercises and/or emergencies. This provides an evidence base for 'learning themes' (i.e., common areas or patterns of learning across reports) and 'transferable lessons' (i.e., lessons with 'all-hazards' applicability, or 'risk agnostic' characteristics) that can be applied in practice to build resilience across the risk cycle.

Learning to Adapt

The UK average surface temperature has already warmed by 1.2°C since the pre-industrial period, and is predicted to warm further by mid-century, even under an ambitious decarbonisation scenario.⁹ Work to mitigate the effects of climate change is vital. The United Nations Environment Programme (UNEP), International Panel on Climate Change (IPCC) and UK Climate Change Committee (CCC) are clear that urgent, increased, and accelerated efforts on climate adaptation are needed now. To support that action in policy and practice, this edition of the Digest presents a focussed review of lessons on climate adaptation. It highlights some of the identified learning on barriers and enablers to achieving positive adaptation outcomes, that reduce risks to climate change impacts and harness associated opportunities.

The Digest is also pleased to present guest articles from:

- The Met Office
- Bournemouth University Disaster Management Centre (BUDMC)
- Emergency Planning College (EPC)
- Local Partnerships

⁸ Emergency Planning College, 'UK Resilience Lessons Digest, Learning Together', October 2022

⁹ HM Government, 'National Risk Register 2023', p.17, August 2023

A summary of content is provided below, in line with the Digests three core objectives: **Summarise, Share and Coordinate**



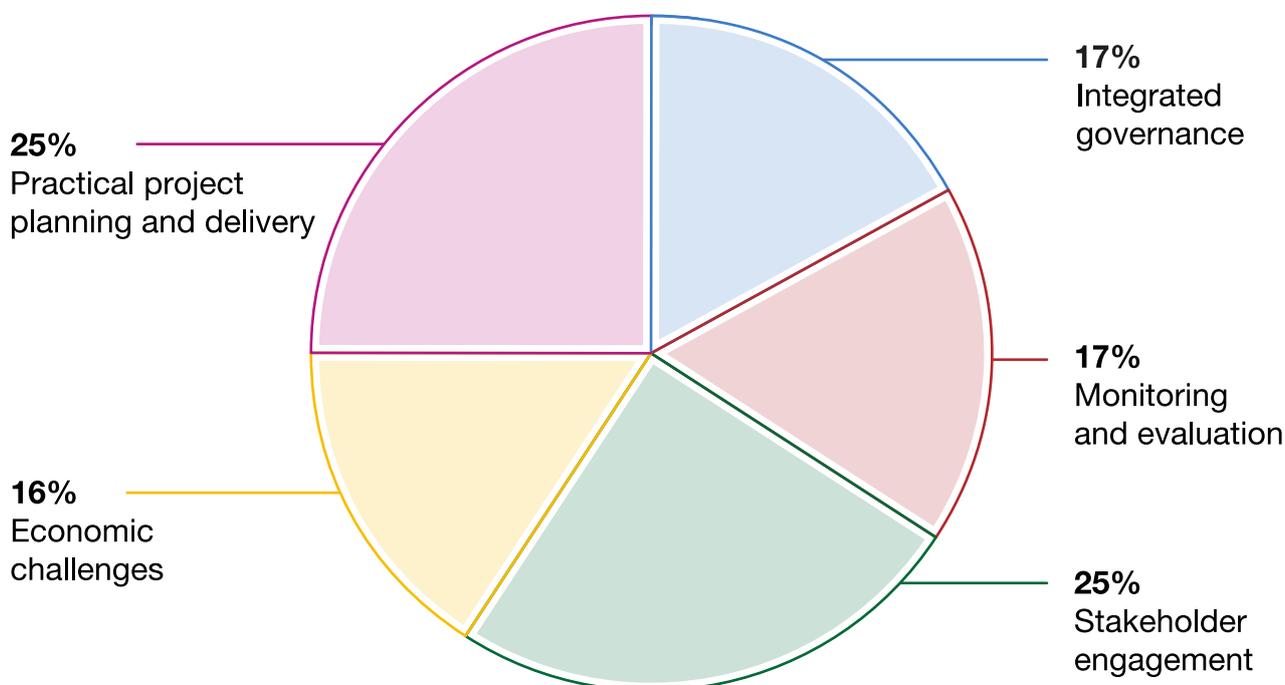
Summarise:

Lessons on climate adaptation

The climate emergency is an inherently global challenge. To reflect this, Learning to Adapt brings international, national, and local lessons from progress and action on climate adaptation into analytical focus. A rapid review of reports helped to develop this focus and extract learning on adaptation from the wider climate science and reviews of mitigation efforts, such as the commitment to Net Zero.

Of the 278 findings across 12 reports, 228 lessons and recommendations could be grouped under five prominent learning themes. There was a notably even spread of highly interconnected lessons across each of the themes, compared with previous Digest analyses. The top two themes highlight the importance of stakeholder engagement, and the barriers/enablers of effective adaptation in practical project planning and delivery.

Figure 1: Prominent learning themes on climate adaptation



Stakeholder engagement

This theme highlighted the importance of deliberate, planned and well communicated engagement with a range of stakeholders when preparing and delivering adaptation action. Poor or absent stakeholder engagement, particularly in local communities, risked preventing the integration of local knowledge into the adaptation initiatives. This can inhibit collective buy-in for local projects and potentially increase the risk of maladaptive actions, i.e., adaptation actions that produce the opposite outcomes to what was intended – such as increasing (rather than reducing) vulnerability.

Practical planning and delivery

Barriers and enablers to effective practical planning and delivery of adaptation action were well evidenced in initiatives that saw international, national, and local stakeholders working together on climate resilience. Examples from the Department of Environment, Food and Agriculture's (Defra) pilot projects under the Local Nature Recovery Strategy, and successful pre-emptive coastal adaptation projects in the Lower Otter Valley (East Devon, England) and the Saône Valley (Normandy, France) provide a range of highly practical takeaways. These included: the primacy of comprehensive planning; the integration of specialist and local knowledge; the importance of setting Specific, Measurable, Achievable, Relevant, and Time-Bound (SMART) goals; and the need for flexible, iterative approaches in delivery.

Monitoring and evaluation

The monitoring and evaluation (M&E) of adaptation action in policy and practice is a current and critical issue to determine both progress and effectiveness of work in this area. Both research and delivery in vastly different geographic and socioeconomic settings recognised that applying a systems-based, 'theory of change' approach to adaptation projects was beneficial. This approach was helpful because it delineated between adaptation activity, outputs, outcomes, and impacts, across the project lifespan (see Figure 2, page 35). This supported the capture of key lessons that could be shared with others and applied in future projects. Budgeting for M&E activity, having a clear data collection strategy and prioritising key metrics were also important for meeting the requirements of any project investors or funding organisations.

Integrated governance

This theme emphasised the catalysing effect that climate legislation, devolved, decentralised and local governance structures, and the mainstreaming of climate adaptation across policy areas had on practical adaptation progress. Achieving and maintaining the level of integrated multi-sector governance that the climate emergency ideally requires was often found to be lacking. However, countries with national adaptation plans embedded in governance structures invariably made more progress than those without them. Integrated governance structures that brought key stakeholders together on the ground in local adaptation project work were found to be very effective.

Economic challenges

A lack of funding and resources were common themes identified as barriers within and across adaptation projects. In some cases biased thinking with a preference for short-term mitigation projects over comprehensive, long-term investment in adaptation action was cited. In others, the challenge was securing any investment at all, when the full scope of impacts would not be evident or without uncertainty for a sustained period. Financial enablers included the pooling of smaller budgets and multi-stakeholder investment, which meant that far more could be achieved together than in organisational or institutional isolation. It was also highlighted that conventional cost benefit modelling does not always suit adaptation programmes. Being able to quantify the wider social and economic benefits of adaptation would help project owners to make a stronger, more holistic business case for the positive impacts of initiatives at the early planning and investment stages.

Conclusion

In conclusion, findings, lessons and recommendations on adaptation in response to the climate crisis are not always as explicitly outlined and easy to source as lessons from other exercises and emergencies. This is in part due to the holistic and varied framing of adaptation activity across a range of policy drivers. It may also be due to the fact that learning in this area is still very current. The lessons and learning themes reflected the highly interconnected, multi-stakeholder, multi-sectoral nature of the challenge being addressed. The research demonstrated that despite geographic and socioeconomic variations, common patterns of learning in relation to adaptation can be seen across international, national, and local arenas. It is also clear that many of the associated lessons have relevance and applicability for resilience professionals working across a range of policy, planning and project remits.





Share:

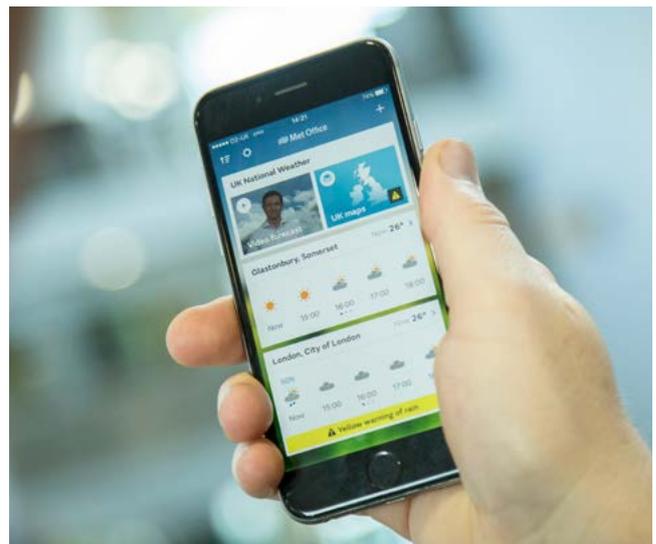
International and national level learning

International learning: Spotlight on Sierra Leone – Lessons from the AFRICAB and EVALDIS projects

Bournemouth University Disaster Management Centre (BUDMC) first developed a relationship with disaster management partners in Sierra Leone during the Ebola epidemic in 2014-16. Since then, the Centre have continued to work with the West African country to support wider resilience efforts. As a nation counted among the top 10 per cent of countries most vulnerable to the impacts of climate change, building resilience has been a local and national imperative. In this article Professor Lee Miles, Professor of Crisis and Disaster Management and Deputy Dean of the University's Business School, shares lessons from the design and delivery of two award-winning projects with Sierra Leonian partners. These included AFRICAB (Driving African Capacity-Building in Disaster Management, 2018-2021) and EVALDIS (Evaluating Local Disaster Management in Sierra Leone, (2022-2023). Combined, the AFRICAB and EVALDIS projects supported increased disaster resilience, and provided an evidence base for Freetown City Council's first ever Climate Action Strategy in 2022/23.

National learning: Climate change in the UK – The role of the Met Office in responding to climate change

The Met Office was recently granted Category 2 Responder status under the Civil Contingencies Act (2004), in recognition of the essential role they play in national resilience. This includes taking the lead as the official source of weather warnings during severe and extreme weather events, as well as providing critical climate science to inform the UK's planning and response to the climate emergency. In this article Met Office Climate Science Communicator, Lizzie Fuller, explains how this work informs climate adaptation, mitigation and the emergency response to related impacts. A copy of the latest publication from the Met Office, a 'Go-to guide on UK severe weather and climate change' is also included.





Coordinate:

Applied academic insights and practical tools for lesson implementation

Academic insight: Adaptation, Extreme Weather and the Events Industry

In this article Ben Crabb, Crowds and Event Specialist and Resilience Capability lead at the Emergency Planning College, explains how the events industry is being impacted by the effects of climate change. He presents some academic insights on why industry adaptation may be more incremental than immediate, and signposts to key national plans and resources to support both event managers and local emergency planners.

Tools for Implementation: Local learning and the Adaptation Toolkit

Whether new to climate change, just setting out on an adaptation journey, or looking to further enhance existing adaptation action, the Adaptation Toolkit can help. Produced by Local Partnerships, the free toolkit is packed full of practical information and resources for Local Authorities and resilience stakeholders. In this article Rachel Toresen-Owuor, Senior Director on Climate at Local Partnerships, provides an overview of the toolkit and shares examples of how it's content can be put into action to support local adaptation action.



Sidelights

As in previous editions, the Digest continues to use Sidelights to provide helpful definitions, insights and related knowledge.



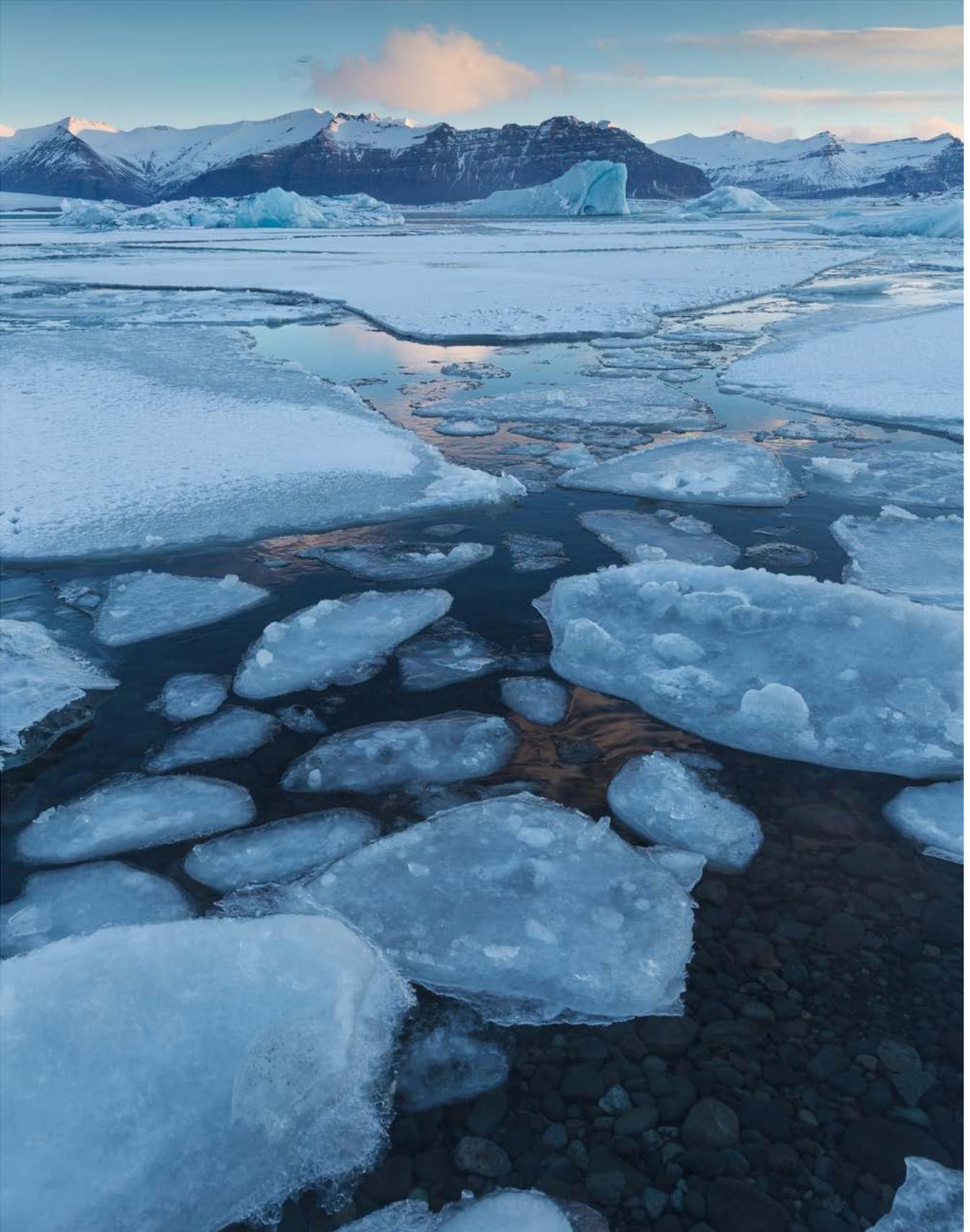
Make it active

Wherever this icon appears there are suggestions for further reading, or questions that can be reflected on to support thought and action beyond this publication.



Resources

At the end of the Digest the resources section provides a summary of transferable lessons from the analysed reports, along with links for further reading.



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Learning to Adapt

An overview of the climate adaptation landscape

This article provides an overview of the adaptation ‘landscape’. It includes a short introduction to key institutions, UK legislation, national policy, and helpful definitions. Climate science can be highly technical, and climate disinformation can make it even harder to find the wood for the trees on global agendas like adaptation.

This overview is shared with the goal of helping to coordinate knowledge on climate adaptation, which has generally received less attention and airtime¹⁰ than climate mitigation measures like the transition to Net Zero. This was highlighted in 2021 by the UK Committee on Climate Change, who described adaptation (compared to mitigation) as ‘The Cinderella of climate change, still sitting in rags by the stove: under-resourced, underfunded and often ignored’.¹¹ The purpose is to support an increasingly comprehensive view of adaptation in context, demonstrating how local action is connected to the wider national resilience and global climate change agendas.

What is climate adaptation?

Climate adaptation refers to actions taken to limit the impacts of a changing climate, such as increased severe weather events. In plain terms, it is the process of reshaping our places, our infrastructure, our economy and our lifestyles so we can live safely and well in a climate-changing world. Examples of adaptation action include: building flood defences; conserving bio-diversity; restoring or enhancing coastal wetlands; and projects to increase local capacity for climate change impacts, e.g., extreme weather.¹²

Why do we need to adapt?

Adaptation is critical to minimise the impact of climate change on our lives now and in the future.¹³ All countries need to adapt to reduce the harmful effects of climate change, even in a world where warming is limited to 1.5°C.¹⁴ The economic costs of climate change are now ‘locked in’ until at least 2040, even with mitigation measures. Only adaptation, i.e., tackling climate impacts in the UK, can reduce the economic costs of climate change over the next two decades.¹⁵ Furthermore, the UK has committed to a shared ‘Global Goal on Adaptation’ of “enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change”, as part of The Paris Agreement (2015) – a legally binding international treaty on climate change.¹⁶

10 Sir James Bevan, ‘Saving Cinderella: mitigate to survive, adapt to thrive’, November 2022

11 Climate Change Committee, ‘Independent Assessment of UK Climate Risk’, June 2021

12 Sir James Bevan, ‘Saving Cinderella: mitigate to survive, adapt to thrive’, November 2022

13 Met Office, ‘Climate Change Mitigation’, 2024

14 Climate Change Committee, ‘COP28: Key outcomes and next steps for the UK’, January 2024

15 Climate Change Committee, ‘Independent Assessment of UK Climate Risk’, June 2021

16 Climate Change Committee, ‘COP28: Key outcomes and next steps for the UK’, January 2024

Why is adaptation action urgent?

The global climate has already changed and the need to adapt cannot be avoided. A level of future impact has been 'locked-in' due to human activity that has already taken place. As global temperatures continue to rise, an increasing number of adaptation opportunities will be lost. It is significantly cheaper to invest early, anticipating and preparing for risk, than to live with the costs of inaction by rebuilding, recovering, and compensating for losses.

Which key institutions and processes support climate adaptation?

There are many organisations and institutions playing key roles in the response to the climate emergency. These include (but are not limited to):

- **United Nations Framework Convention on Climate Change (UNFCCC)** is the United Nations secretariat (UN Climate Change) tasked with supporting the global response to the threat of climate change.¹⁷
- **The United Nations Environment Programme (UNEP)** is the leading global authority on the environment.¹⁸ UNEP are the authors of the Adaptation Gap Report, which reviews progress between adaptation action that has been implemented and societally set goals.¹⁹

- **The Intergovernmental Panel on Climate Change (IPCC)** is the United Nations body for assessing the science related to climate change. The IPCC prepares regular, comprehensive Assessment Reports and reports on other specialist topics.²⁰
- **The UK's Climate Change Committee (CCC)** is an independent, statutory body established under the Climate Change Act 2008. The committee advise the UK and devolved governments on emissions targets and report progress on climate change (including **adaptation**) to Parliament.²¹



17 UN Climate Change, 'About the secretariat | UNFCCC', 2024

18 UN Environment Programme, 'About the UN Environment Programme', 2024

19 UNEP, 'Adaptation Gap Report 2023: Underfinanced. Underprepared', November 2023

20 IPCC, 'The Intergovernmental Panel on Climate Change', 2024

21 Climate Change Committee, 'About the Climate Change Committee', 2024

What is the national approach to climate adaptation?

- The UK was among the first countries to legislate for climate adaptation. **The Climate Change Act 2008** provides a strong framework for the UK Government, requiring them to complete a Climate Change Risk Assessment (CCRA) every 5 years, followed by a National Adaptation Programme (NAP), setting out how the government will address the risks identified in the CCRA.²²
- **There is a whole-government approach to climate adaptation.** In England the Department for Environment, Food and Rural Affairs (Defra) coordinates departmental action on domestic adaptation to climate change, including the NAP. However, climate adaptation is a devolved matter. Northern Ireland, Scotland and Wales also produce their own NAP publications.

The legislative framework for each country's action on adaptation is set out in the CCA 2008 for England, Wales, and Northern Ireland, and the Climate Change (Scotland) Act 2009 for Scotland. The UK government is committed to working closely with the devolved administrations to support climate adaptation across the UK.



Resources

For further information on each Administration's approach to adaptation please see the resources section.



²² HM Government, 'The UK Government Resilience Framework', p.3, December 2022

How are the risks associated with climate change assessed in the UK?

- **The UK Climate Change Risk Assessment (CCRA).** The CCRA directly informs the Government's NAP. The independent evidence assessment is developed at a UK-wide scale involving scientists, economists, government departments and stakeholders from across the United Kingdom. The latest edition, published in 2021²³ sets out 61 risks and opportunities currently facing the UK, which were accepted in the Government's response.²⁴ CCRA Summaries for each UK country (England, Northern Ireland, Scotland and Wales) are also available.²⁵

What is the National Adaptation Programme?

- **NAP²⁶** details the actions that government and others will take to adapt to the impacts of climate change in the UK. Northern Ireland, Scotland and Wales also each have their own NAP documents.²⁷

- **The latest NAP3²⁸ was published in 2023.** It sets out key actions on adaptation for 2023 to 2028. It also includes the strategy for the fourth round of climate adaptation reporting under the Adaptation Reporting Power. NAP3 is driving a step change in ambition from the previous programme (NAP2), setting out the UK's vision for adaptation, as 'a country that effectively plans for and is fully adapted to the changing climate, with resilience against each of the identified climate risks'.²⁹ The programme is focussed on 3 main themes: 'action', 'information' and 'coordination', while continuing to work closely together to tackle climate change at both national and local levels.³⁰

How is adaptation linked to the UK Government's National Resilience Framework?

- The National Resilience Framework sets out how the UK Government's ambitions on resilience complements the bespoke plans and programmes of work that seek to manage individual risks and build cross cutting capabilities, underpinning resilience across Government. The CCA, CCRA and NAP are specifically identified a key area within those programmes and plans.³¹

23 UK Climate Risk, 'Technical report (CCRA3-IA) – UK Climate Risk', June 2021

24 HM Government, 'UK Climate Change Risk Assessment 2022', January 2022

25 UK Climate Risk, 'National summaries' June 2021

26 HM Government, 'The Third National Adaptation Programme (NAP3)' July 2023

27 UK Climate Risk, 2021. National summaries

28 HM Government, 'The Third National Adaptation Programme (NAP3)' July 2023

29 HM Government, 'The Third National Adaptation Programme (NAP3)' July 2023

30 HM Government, 'The Third National Adaptation Programme (NAP3)', p.8, July 2023

31 HM Government, 2022. 'The UK Government Resilience Framework'

- Climate change is also recognised in the National Risk Register (NRR). It is referred to as a chronic risk that can make acute risks more likely and serious.³² For example, climate change can lead to an increase in the frequency and severity of weather conditions that cause floods and wildfires.³³
- Adapting to changes in the climate can also provide opportunities for businesses in new markets and can drive innovation of new products and services. In addition, businesses which are well-adapted to climate change are likely to experience less disruption (as a result of climate change) and lower damage costs, helping to keep their products competitive.

What are the benefits and opportunities of adaptation?

- Adaptation to climate change plays a role in supporting sustained economic growth by making our economy more resilient. Growth and climate change are closely linked as the climate has important impacts on our daily economic activity. The total UK cost of climate damage could increase from 1% to 1.5% of GDP by 2045 and to 2% to 4% by late century,³⁴ yet adaptation action could reduce these costs by more than 50%.³⁵ Increasing the resilience of the natural environment, businesses, households and infrastructure can also reduce the impact of climate change on long-term growth.³⁶
- Beyond GDP measures of growth, adaptation actions can also positively impact social welfare such as improving health outcomes and protecting natural capital, to ensure that everyone in society is prepared for the impacts of climate change.³⁷ For a range of early interventions, benefit-cost ratios typically range from 2:1 to 10:1. This means that every £1 invested in these adaptation actions could result in £2 to £10 in net economic benefits.³⁸



Resources

For further information on each Administration's approach to adaptation, please see the **Resources** section.

32 UK Climate Risk, 'National summaries' June 2021

33 HM Government, 'The UK Government Resilience Framework', p.17, December 2022

34 CO-designing the Assessment of Climate CHange costs (COACCH) 'Macro-economic costs of climate change', 2020

35 Preinfalk, et al., 'How does adaptation affect the public finances? In COACCH Policy Brief, September 2021. Monetary Valuation of Risks and Opportunities in CCRA3, 2021', September 2021

36 UK Climate Risk, 'Technical report (CCRA3-IA), Chapter 6: Business and Industry' June 2021

37 HM Government, 'The Third National Adaptation Programme (NAP3)', p.15, July 2023

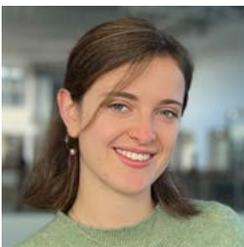
38 Watkiss et al., 'Monetary Valuation of Risks and Opportunities in the CCRA3', May 2021

Climate Change in the UK

The role of the Met Office in responding
to climate change

Climate Science and Services in the UK

In 2022 Cabinet Office undertook a statutory Post-Implementation Review of the Civil Contingencies Act (2004). The review recommended that the Met Office be granted Category 2 Responder status. This was duly actioned, in recognition of the essential role that they play in national resilience, and as the official source of weather warnings during severe and extreme weather events. In addition, the Met Office is also a critical part of the nation's planning and response to the climate emergency. In this article Met Office Climate Science Communicator, Lizzie Fuller, explains the part that they play in providing science to inform climate change adaptation, mitigation and the emergency response to climate related impacts.



Lizzie Fuller
Met Office Climate
Science Communicator

Climate change in the UK

We are already experiencing the effects of our changing climate, with the world now around 1.25°C warmer than before the industrial revolution.³⁹ Extreme weather events around the world are becoming more frequent, more intense and lasting longer. In 2022, temperatures reached over 40°C in the UK which would have been virtually impossible without climate change.⁴⁰ The heatwave had impacts on public health, infrastructure, and the environment – and is just one example of an extreme weather event we must be prepared to experience more frequently in the future. In the UK, these changes in extreme weather are part of a transition to warmer, wetter winters, and hotter, drier summers.^{41,42}

Addressing climate change

Mitigation and **adaptation** are required together to reduce the risks and impacts of climate change, including extreme weather events. Mitigation refers to actions taken to limit the amount of greenhouse gas emissions, reducing the amount of future climate change. Adaptation refers to actions taken to limit the impacts of a changing climate. Mitigation and adaptation together provide co-benefits for other environmental and social goals.

39 Met Office, '2023: The warmest year on record globally' January 2024

40 Kendon, 'Met Office UK: Unprecedented extreme heatwave, July 2022', September 2022

41 Met Office, 'UK Climate Projections: Headline Findings v.2', September 2019

42 Met Office, 'UK Climate Projections: Headline Findings v.2', September 2019



Sidelights

Climate mitigation refers to actions taken to limit the amount of future climate change. e.g. reducing greenhouse gas emissions.

Climate adaptation refers to actions taken to limit the impacts of a changing climate, e.g. increased flooding.

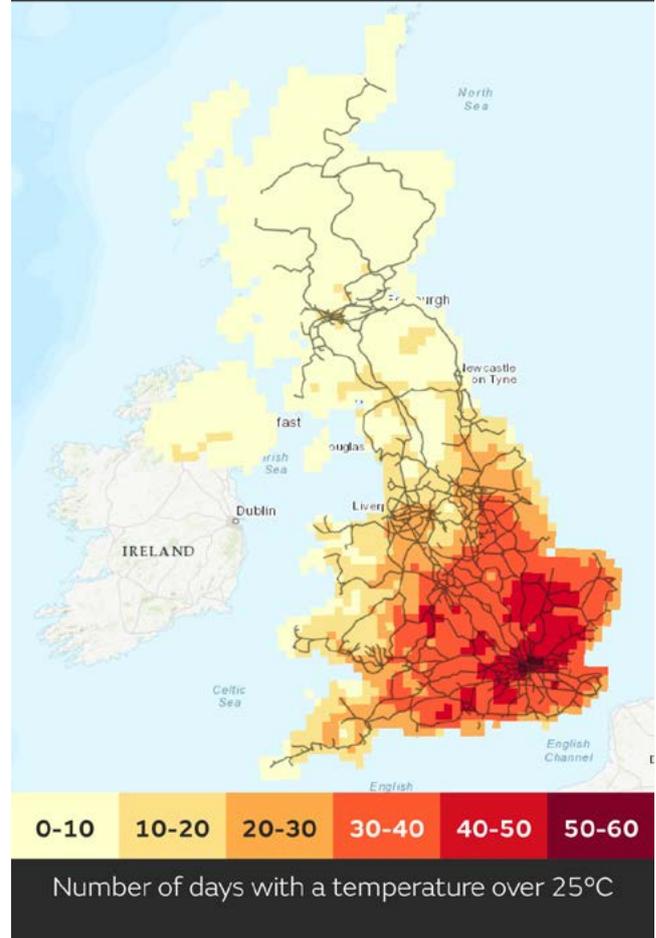
Met Office science has informed the UK's Climate Change Risk Assessment (CCRA),⁴³ which evaluates the most urgent risks and opportunities for the UK from climate change, as well as the UK's National Adaptation Programme (NAP),⁴⁴ which sets out the government's priorities and actions for adaptation.

Climate Science and Services

The Met Office, as the UK's national meteorological service, plays a vital role in providing high-quality weather and climate information and advice to support UK resilience across government, businesses and the public. We are also a world-leader in climate science and services, with the Met Office Hadley Centre for Climate Science and Services providing trusted scientific advice on climate hazards and risk, to inform decisions from a season ahead, out to decades ahead. This information is essential for informing adaptation action, at global, national and local scales. We are also in a unique position to bridge across weather and climate timescales, setting information on future climate change within the context of present-day experiences.



Number of 'Summer days' each year in a 2°C global warming scenario



43 HM Government, 'UK Climate Change Risk Assessment 2022', January 2022

44 HM Government, 'The Third National Adaptation Programme (NAP3)' July 2023

Some of the Met Office's climate services include:

- The National Climate Information Centre (NCIC),⁴⁵ which monitors and analyses the UK's climate records, trends and extremes.
- The UK Climate Projections (UKCP),⁴⁶ which explore how the UK climate may change over the next century.
- The Climate Data Portal (CDP),⁴⁷ which provides access to climate information which can be combined with other types of information, allowing organisations to add their own data assets to assess local risks.

Responding to extreme weather impacts

In advance of, and during, extreme weather, we also play a crucial role in helping people prepare for potential impacts. We provide short and medium-term weather forecasts, issue severe weather warnings and provide the resilience community with weather-related advice through our Civil Contingencies Advisors. We support the National Security Risk Assessment⁴⁸ and have ownership responsibilities for several weather-related risks. We also became a **Category 2 Responder in 2022**, reflecting our vital contribution as the UK's national weather service to national resilience. We also work closely with businesses to unlock the potential of new science and technology and provide operational and

consulting solutions to industry challenges, including with aviation, water and energy sectors. Through these roles, we provide crucial advice and support when it comes to saving lives and protecting property and the economy during times of extreme weather. Our latest advice on weather extremes and climate change follows this article.



Looking ahead

The Met Office continue to work with expert partners across the science community to develop the latest scientific understanding of weather and climate. This enables us to continue to strengthening capability and target key gaps in scientific understanding, or areas where further research may be especially valuable.



Resources

For more information on climate data and adaptation, up-to-date weather warnings, and a range of free, **WeatherReady materials** to support local resilience please visit our **website**.

45 Met Office, 'Climate monitoring with a UK focus', 2024

46 Met Office, 'UK Climate Projections (UKCP)', 2024

47 Met Office, 'Met Office Climate Data Portal', 2023

48 HM Government, 'About the National Risk Register', 2024

Go-to guide on UK severe weather and climate change

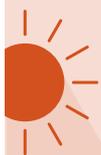
This guide provides top lines on the influence of climate change on the types of severe weather we experience in the UK. These lines are based on published academic literature and should be attributed to the Met Office. The purpose is to provide confidence when talking about severe weather in the UK in the context of our changing climate by using short, clear and authoritative lines from the Met Office.

Overview

Since the Industrial Revolution, the average temperature of the planet has risen by around 1.1°C (IPCC AR6). Using a methodology which includes projections alongside observations, **recent research** by the Met Office indicates the current global warming level could be as high as 1.25°C. This is a rapid change in terms of our global climate system and is already leading to changes in the extreme weather we experience on the Earth's surface, including in the UK.



Extreme Heat



- The frequency and intensity of heatwaves have increased worldwide. A number of major heatwaves in the UK have occurred in the past 5 years (2018, 2019, 2021 and 2022), each seeing new temperatures records set. Notably the England record has been set three times over, including the first official recording of temperatures exceeding 40°C.
- It is virtually certain that human influence has increased the occurrence and intensity of extreme heat events. Numerous climate attribution studies have shown that human influence increased the chance that specific extreme heat events, such as the summer of 2018 and July 2022, would occur.
- The headline findings from UK Climate Projections (UKCP) indicate that on average, summers will become hotter.
 - Met Office UKCP Local projections indicate that hot spells will become more frequent in future climate, particularly over the south-east of the UK. Temperatures are projected to rise in all seasons, but the heat would be most intense in summer.

Intense rainfall from thunderstorms

- Extreme sub-daily precipitation, such as that associated with thunderstorms, is projected to intensify with climate change.
- In the recent climate, trends in sub-daily rainfall are difficult to detect, due to historically sparse sub-daily observations and natural year-to-year and decade-to-decade variability.
- In the future, rainfall events exceeding 20mm/h, which can cause flash flooding, are expected to be four times as frequent by the 2070s compared to 1980s, under a high emissions scenario.
- Changes are not projected to happen gradually, but instead extreme years with lots of events could tend to cluster. When and by how much these changes are projected to occur varies in different regions of the UK.



Drought

- Whilst there have been observed changes in the drivers of drought in the UK, there is much less evidence of trends in many drought metrics at present.
- However, the impact of extreme hot periods in summer has been noticeable in recent years (2018 and 2022) and shows the impact rising temperatures can have on water supply and demand.
- Currently, there are no UK climate attribution studies available that clearly link human induced climate change with an altered risk of drought events. However, attribution studies have been carried out for extreme temperature events, which can lead to increases in evaporative demand, soil-moisture deficits and considerable impacts on water supplies.
- Most studies into our future climate point towards general increases in frequency and extended duration of meteorological drought for the UK. This general rainfall deficit can exacerbate other forms of drought such as hydrological drought or agricultural drought, but these other forms of drought can have other drivers such as groundwater storage, soil-moisture deficits and low flows.





Heavy rainfall

- Although rainfall observations show large variability in annual, seasonal and decadal rainfall, it has generally become wetter, particularly during winter.
- Climate projections indicate that on average, winters will continue to become wetter and summers drier, though natural variability will mean we will continue to see individual years that don't follow this trend.
- As our atmosphere warms it can hold more moisture, roughly 7% more per 1°C of warming. This can lead to more intense and frequent downpours.
- In autumn, the UK will likely see more days with rainfall totals over 50mm, particularly for western areas of the UK. For summer, despite an overall drying trend, there will likely be future increases in the intensity of heavy summer rainfall events (see 'Intense rainfall from thunderstorms' section).
- It is important to note that there are other factors that contribute to flooding, such as land use, local hydrology and preceding conditions.

Extreme cold and snow

- Despite the warming climate, extreme cold events still occur in the UK due to natural variability.
- The decrease in the frequency, duration, and intensity of these events over recent decades is clearly linked to the observed warming of the planet and can be attributed to human activity.
- For example, attribution studies have found that the unusually cold European winter of 2009/2010, UK cold snap in March 2018 and the cold UK spring of 2013 would be much more likely without human influence on the climate.
- Future UK winter climate will still be variable year to year, so severely cold winters are still likely to occur – just less often – so it is important to remain resilient to severe winters when they do occur.
- Snow in the UK is very conditional on the setup of the weather, it is not just low temperatures that lead to snow. Overall, projections show that the frequency of snow events will decrease in the UK in future. There is less certainty about the intensity of future snow events due to more complex atmospheric interactions.



Windstorms

- In the recent climate, there is no evidence of positive or negative trends in windstorm number or intensity. Trends in windstorm numbers are difficult to detect, due to how these naturally vary year-to-year and decade-to-decade.
- Windstorms can cause impacts from storm surges and high waves in coastal areas. These are expected to worsen as sea level rises.
- In future, most climate projections indicate that winter windstorms will increase slightly in number and intensity over the UK i.e. more winter storms, including disproportionately more severe storms, are projected to cross the UK. However, this has medium confidence because a few climate models indicate differently.



Resources

If you need further information or more in-depth analysis, the best first port of call is the Met Office State of the UK Climate report which is published annually every July in the International Journal of Climatology.

For further information contact the Met Office on PressOffice@MetOffice.gov.uk

Learning Analysis

Lessons on climate adaptation

The Research

This edition of the Digest reviews identified learning from research and experience in national adaptation policy, planning and practical project action. As the climate emergency is a global threat, the research took a multi-level approach to gathering lessons: International, national, agency/departmental and local. Given that today's feasible and effective adaptation options will become more constrained and less effective as global temperatures increase,⁴⁹ rapidly harvesting and harnessing evidence-based lessons in this area is vital.

Methodology

The Digest applied its usual methodology for synthesising lessons and recommendations (see **Digest 1, Learning Together** for further details). However, in keeping with the focus of the research, the methodology itself had to adapt. The reasons for this were:

- 1. Rapid Review:** Reports on climate change effects and impacts are voluminous and technical. Some do focus specifically on the barriers and enablers of climate adaptation, but lessons and recommendations are not always as easily or explicitly set out as they might be following a singular emergency event, debrief or public inquiry. Lessons on adaptation were also clearly more difficult to quantify and articulate, compared with those
- on temperature increase and Net Zero ambitions. This meant that a rapid, preliminary review was required to determine where the evidence-based lessons on climate adaptation were and draw them out for analysis.
- 2. Multi-level learning:** Climate change is a global challenge, but its effects are not equally distributed. The rapid review impressed the importance of international learning for this edition, especially from areas with higher levels of social, economic and geographical vulnerability. Lessons and good practices from adaptation policy, practice and progress in some of the least developed countries provided rich, transferable learning for inclusion in the analysis.
- 3. Updated scope:** The highly integrated nature of problems and solutions around adaptation action meant that lessons were a) relatively 'new' in comparison, for example, to lessons from emergency exercises, and b) often embedded in rich stories of resilience and highly contextualised case studies. This brings a wealth of learning experiences into the global arena but adds additional variables into the analysis. In response, the research approach had to be more flexible. Reports therefore include UK specific lessons, from both extreme weather events (impacts) and adaptation action (solutions), along with wider adaptation efforts aimed at building resilience to the climate emergency more generally. It is recognised that further reports are available with

49 IPCC, 'AR6 Synthesis Report: Summary for Policy Makers – Headline Statements', 2023

relevance to specific sectors, but these were out of scope for this edition.

For more sector-specific information on Climate change and adaptation, see the **Sector Briefings from the CCC on the UK Climate Risk website**.

The Reports

The reports informed the final analysis are listed in the table below.

Table 1. Reports reviewed

No.	Source	Author	Year	Title	Lessons
1	International	UN Environment Programme	2023	Adaptation Gap Report 2023: Underfinanced. Underprepared	12
2	International	UN Environment Programme	2023	National Adaptation Planning: Emerging Lessons Learned From UNEP Projects	21
3	International	United Nations Framework Convention on Climate Change (UNFCCC)	2015	Best practices and lessons learned in addressing adaptation in least developed countries: Volume 3	44
4	International	Intergovernmental Panel on Climate Change (IPCC)	2023	Climate Change 2022: Impacts, Adaptation, and Vulnerability Evidence from the working group on adaptation for Climate Change Synthesis Report (SYR) of the IPCC Sixth Assessment Report (AR6)	38
5	National	UK Climate Change Committee	2018	Adaptation actions in the natural environment and cities: what works?	26
6	National	UK Climate Change Committee	2018	Adaptation actions in the natural environment – what works? Report of Research Findings	16
7	National	National Audit Office	2023	Government Resilience to Extreme Weather Summary Report	6

Table 1. Reports reviewed

No.	Source	Author	Year	Title	Lessons
8	Departmental, Agency and local	Environment Agency	2019	Natural Flood Management Programme: Interim Lessons Learnt	17
9	Departmental, Agency and local	Department for Environment, Food and Rural Affairs (Defra)	2021	Local Nature Recovery Strategy pilots: lessons learned	22
10	Local/Community	New Local	2021	Communities vs Climate Change: the power of local action	17
11	Local/Community	Grantham Research Institute on Climate Change and the Environment	2024	Turning up the heat Learning from the summer 2022 heatwaves in England to inform UK policy on extreme heat	7
12	Local/Community	Promoting Adaptation to Changing Coasts (PACCo), Published by the Environment Agency	2023	Promoting Adaptation to Changing Coasts A Practical Guide	52
Total					278

Research aims

The aim of the research was to answer four key questions:

1. Can common learning themes of relevance to the wider resilience community be identified and evidenced across the selected reports?
2. Do findings, lessons and recommendations demonstrate transferable features that could be used to inform adaptation action and continual improvement in climate resilience?
3. What practical actions do reports suggest that responder organisations and local resilience partners can take to support thought and action in the area of climate adaptation?
4. How do lessons align with the national resilience framework, adaptation planning, and local resilience standards?

Analysis and Findings

Learning themes and transferable lessons

Learning Themes

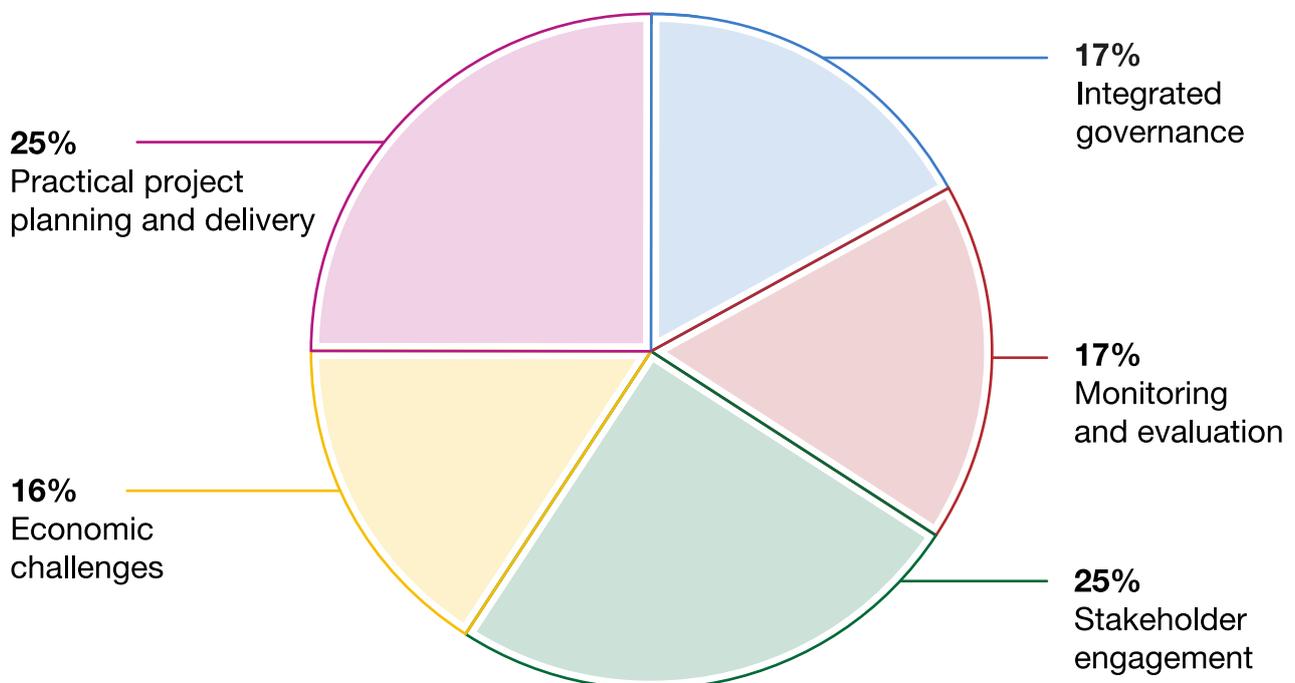
Of the 278 findings, 228 lessons and recommendations could be grouped under five prominent learning themes.

These were:

- **Integrated governance**
- **Monitoring and evaluation**
- **Stakeholder engagement**
- **Economic challenges**
- **Practical project planning and delivery**

Compared with previous Digests, findings from this research yielded the most even spread of learning across the top five themes. Despite this there was a leaning towards lessons on stakeholder engagement and practical adaptation project work. Many learnings straddled several thematic areas, which may have influenced results. For example, reports demonstrated that monitoring and evaluation (main theme) required clear leadership (sub-theme) and multi-stakeholder engagement (sub-theme), but that economic challenges (sub-theme) could be a barrier to progress and/or success. This may suggest that the highly interconnected nature of climate risks, and the drive (policy and practical) to build increasingly integrated, multisectoral climate resilience, is in turn generating more integrated lesson learning themes.

Figure 1: Prominent learning themes on climate adaptation



This noted, the main thematic areas are expanded below. Transferable lessons under each theme are also included.

- **Stakeholder engagement**

This theme highlighted the importance of deliberate, planned and consistently communicated engagement with a range of stakeholders when preparing and delivering adaptation action. Poor or absent stakeholder engagement, particularly in local communities risked preventing the integration of local knowledge into the adaptation initiatives. Practical work and research both suggested that this can inhibit collective buy-in for local projects and potentially increase the risk of maladaptive action.



A strategic approach and key, practical steps were enablers of positive stakeholder engagement experiences. These included:

- Developing a stakeholder engagement strategy to promote a more inclusive, planned approach.⁵⁰
- Recognising that climate change initiatives provide elected officials, local authorities, higher education institutions, and grant-awarding bodies or investors with an opportunity to create new democratic relationships with lead organisations and local people.⁵¹
- Identifying key stakeholders and tapping into existing networks in the earliest phases of adaptation project design and development.
- Different stakeholders need to be engaged differently – projects require a wide range of inputs and there cannot be ‘one-size-fits-all’ engagement.⁵²
- Establishing a common understanding of the project purpose and championing opportunities for residents and community groups to be constructively involved by providing views, contributing local knowledge and/or supporting local governance functions (as appropriate).⁵³

50 UNFCCC, ‘Best practices and lessons learned in addressing adaptation in least developed countries: Volume 3’, 2015

51 Tiratelli et al., ‘New Local: Communities Vs Climate Change’, October 2021

52 HM Government, ‘Local Nature Recovery Strategy pilots: Lessons Learned’, July 2021

53 Burgess-Gamble et al., ‘Promoting Adaptation to Changing Coasts: A Practical Guide’, p92-95, March 2023

Transferable lessons on stakeholder engagement

Source	Lesson
Adaptation actions in the natural environment – what works? Report of Research Findings	Early and comprehensive stakeholder engagement is important... early and thoughtfully planned communication strategy was identified as a success factor. Taking on board the experiences and insights of stakeholders – not just at a practical or operational level but as a source of conceptual thought, analysis and ideas about how adaptation actions should be designed and appraised – is important in securing their continued buy-in.
Best practices and lessons learned in addressing adaptation in least developed countries: Volume 3	Another area of investment in improving inclusiveness is the meaningful integration of traditional knowledge and the know-how of indigenous peoples into climate knowledge systems and NAP processes, to identify key risks and adaptation options. p5
Promoting Adaptation to Changing Coasts A Practical Guide. p92-95	Never stop engaging with the local community and stakeholders on your project...Capturing stakeholder feedback is an essential activity to check how they feel, what they understand and to identify knowledge gaps or concerns. Put yourself in their shoes.
Turning up the heat Learning from the summer 2022 heatwaves in England to inform UK policy on extreme heat	Local knowledge and lived experience need greater acknowledgment... peer-reviewed science and formal sources of data and evidence... need to be enriched by the lived experience and knowledge of those who are most vulnerable to impacts.



Make it active

This theme aligns with the principle of resilience as a ‘whole-society’ endeavour, as set out in the **UK Government Resilience Framework**. Relevant good practice guidance can also be found in the **National Resilience Standards: #3 Communicating risks to the public and #5 Community resilience development**. Further information on this theme can be found in the **Third National Adaptation Programme; Chapter 7: Working together**.

- **Practical planning and delivery**

Barriers and enablers to effective, practical planning and delivery of adaptation action were especially well evidenced in initiatives that saw international, national and local stakeholders working together on climate resilience. Examples from the Department of Environment, Food and Agriculture's (Defra) pilot projects under the Local Nature Recovery Strategy,⁵⁴ and successful pre-emptive coastal adaptation projects in the Lower Otter Valley (East Devon, England) provide a range of highly practical takeaways.⁵⁵ These included the primacy of comprehensive planning, and the importance of integrating both specialist and local knowledge. The importance of setting SMART goals and the need for flexible, iterative approaches in delivery was also noted. Convening cross-working groups within projects, and establishing clear roles, remits and responsibilities were also key enablers.⁵⁶

Barriers with the potential to negatively impact planning and delivery included:⁵⁷

- A shallow understanding of vulnerability
- Inequitable engagement of stakeholders
- an insufficient understanding of how to define adaptation success
- Inconsistent or unclear communications
- Not being realistic about project timelines and other project dependencies, including the continually changing climate, that might impact progress



54 HM Government, 'Local Nature Recovery Strategy pilots: Lessons Learned', July 2021

55 Burgess-Gamble et al., 'Promoting Adaptation to Changing Coasts: A Practical Guide', March 2023

56 Environment Agency, 'Natural Flood Management Programme: Interim Lessons Learnt', January 2019

57 Climate Adaptation Platform, 'Some Climate Adaptation Initiatives Lead to Maladaptation', January 2023

Transferable lessons on practical project planning and delivery

Source	Lesson
Natural Flood Management Programme: Interim Lessons Learnt	[NFM] ...projects need to be adaptable in their approach and should not be seen as fixed before practicalities have been agreed with local people. Give project teams enough flexibility to work with partners to agree designs and costs and have an approved business case before fixing the details of a timetable for delivery. p27
Best practices and lessons learned in addressing adaptation in least developed countries: Volume 3	Identifying how existing programmes can contribute to the process will ensure early success, help achieve a coherent adaptation response for the country and inform how individual efforts can best be scaled up to national level. p23
Climate Change 2022: Impacts, Adaptation, and Vulnerability	C4.4 To minimize maladaptation, multi-sectoral, multi-actor and inclusive planning with flexible pathways encourages low-regret and timely actions that keep options open, ensure benefits in multiple sectors and systems and indicate the available solution space for adapting to long-term climate change (very high confidence).



Make it active

This theme aligns with the principle of resilience that emphasises preparation and 'prevention over cure', as set out in the **UK Government Resilience Framework**. It also relates to the first NAP3 thematic programme area: 'Action'. A summary of actions relating to the planning and delivery of national adaptation work are detailed in the **Third National Adaptation Programme; Summary of the actions in NAP3**. Transferable good practices in this area can be found in the **National Resilience Standards: #13 Local recovery management**.

- **Monitoring and evaluation**

The monitoring and evaluation (M&E) of adaptation action in policy and practice is critical to determine both progress and effectiveness of work in this area. Research and experiences across vastly different geographic and socioeconomic settings converge to suggest that achieving effective M&E in adaptation work can be very challenging. In contrast to climate mitigation efforts, e.g., reaching Net Zero, targets and indicators associated with long-term adaptation efforts are far more challenging to define and quantify.

Beginning with the end in mind was key. If M&E metrics (qualitative or quantitative) were not defined in advance and collected for the first time before the project began, there would be no baseline evidence in place to measure change from. Failing to do this created a critical barrier in measuring the effectiveness and impact of adaptation action.

One enabler in the effective identification of success indicators and project evaluation of change included the application of a ‘theory of change’ methodology. This approach delineates between adaptation activity, outputs, outcomes, and impacts, across the project lifespan. Adaptation work in vastly different geographic and socioeconomic settings converge in support of this systems-based approach, which is also widely recognised as good practice in across a range of sectors and scenarios. Budgeting for M&E activity, having a clear data collection strategy and prioritising key metrics were also important for: a) capturing learning that could be applied and shared with others; and b) for meeting the requirements of any project investors or funding organisations. Ultimately, the goal was to ensure the right data was collected for the right reasons.

This noted, many challenges in predicting and measuring effective adaptation were well articulated by the UK Climate Change Committee, on the basis that any single action might have multiple outputs, outcomes and impacts (see Figure 2).

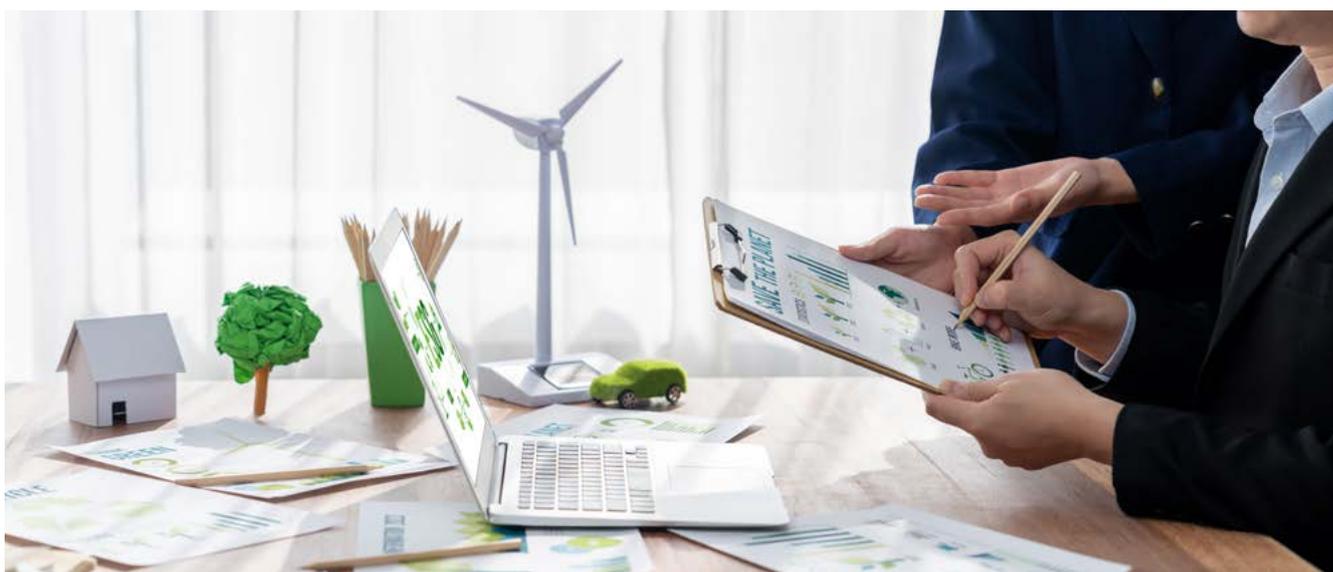


Figure 2: Key monitoring and evaluation (M&E) constructs. Adapted from Adaptation actions in cities: what works? Report of research findings from Committee on Climate Change, 2018, p.13. Produced in association with AECOM and Sniffer.)

Increasingly difficult to predict and measure

(a given action can have multiple outputs, outcomes and impacts)

Key construct	Action/activity	Output(s)	Outcome(s)	Impact(s)
	The work actually undertaken as part of a project. A given project can comprise many discrete and interrelated actions or activities	What an action/activity produces. This could be physical (e.g. a new flood wall; a research paper), experimental (e.g. workshop attended by stakeholders) or virtual (e.g. online tool).	The change(s) generated by output(s).	The consequences of an outcome(s). The primary focus of this project has been the impact on risk, but actions may have a range of other impacts that do not specifically relate to risk reduction.
Worked example	Implement sustainable urban drainage features in schoolyards	Area de-paved (m ²)	Volume of water that can be effectively absorbed by the de-paved area in a 1-in-100 year rainfall event (m ³)	Extent to which the action has reduced exposure and sensitivity of the schoolyard to flooding.

Transferable lessons on monitoring and evaluation

Source	Lesson
Climate Change 2022: Impacts, Adaptation, and Vulnerability	M&E facilitates learning on successful and effective adaptation measures, and signals when and where additional action may be needed. M&E systems are most effective when supported by capacities and resources and embedded in enabling governance systems (high confidence). p.28
Promoting Adaptation to Changing Coasts A Practical Guide	Setting up a monitoring and evaluation system at the beginning [of the project] is essential to establishing a baseline in adaptation needs against which progress can be measured over time. p77
Best practices and lessons learned in addressing adaptation in least developed countries: Volume 3	Prioritise monitoring activities based on available budget... your monitoring plan will help ensure you are collecting the right types of data for the right purpose.

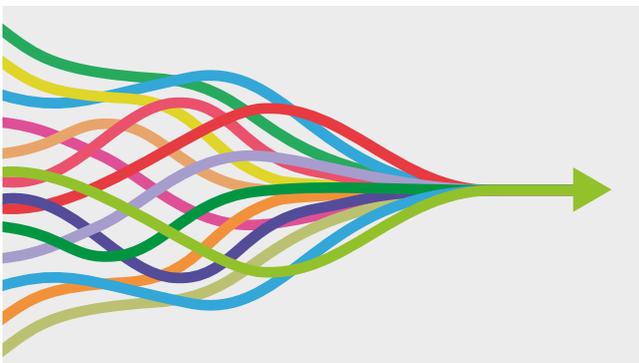


Make it active

This theme aligns with the continued development of a shared understanding of the risks (and opportunities) we face, through continual improvement and lesson identification, as set out in the **UK Government Resilience Framework**. Transferable good practice on validation and evaluation can also be found in **National Resilience Standards: #7 Training and #8 Exercising**. Further information is detailed in the **Third National Adaptation Programme: Approach to Climate Change – monitoring and evaluation** and UK Resilience Lessons Digest: **Learning Together – Practical tools for change**.

- **Integrated governance**

This theme emphasised the catalysing effect that climate legislation, devolved, decentralised and local governance structures, and the mainstreaming of climate adaptation across policy areas had on practical adaptation progress. However, achieving and maintaining the level of integrated multi-sector governance that the climate emergency ideally requires was often found to be lacking. For example, the IPCC reported that ‘most observed adaptation is fragmented, small in scale, incremental, sector-specific, designed to respond to current impacts or near-term risks, and focused more on planning rather than implementation’.⁵⁸ In the UK, the CCC also identified a need for improved institutional structures to help reduce ‘siloes’ adaptation projects, encourage holistic approaches and address climate risk alongside other policy agendas.⁵⁹



Despite these challenges, countries with national adaptation plans embedded in governance structures invariably made more progress than those without them. This was especially clear in the UN Environment Programme’s Emerging Lessons Learned report on developing NAPs across UNEP projects:

“The introduction of national adaptation laws or decrees has proved to be a key catalyst with vertical and horizontal integration. Integrating climate change adaptation, especially ecosystem-based adaptation, into wider national policies and planning processes is essential.”⁶⁰

At the local level, integrated governance structures that brought key stakeholders together on the ground in adaptation project work were also found to be effective. For example, during five **Local Nature Recovery Strategy pilots** launched by Defra between 2020-2021, the establishment of ‘pilot area teams’ that brought key stakeholders together to form local governance structures and practical project functions was found to be an enabler of success.⁶¹

58 IPCC: Working Group II Contribution to the Sixth Assessment Report (AR6), ‘Climate Change 2022: Impacts, Adaptation and Vulnerability – Summary for Policy Makers (SMP)’ p.20, February 2022

59 Power, et al., ‘Adaptation actions in cities: what works? Report of research findings, AECOM and Sniffer’, August 2018

60 UNEP, ‘National Adaptation Planning: Emerging Lessons Learned from UNEP Projects’, November 2023

61 HM Government, ‘Local Nature Recovery Strategy pilots: Lessons Learned’, July 2021

Transferable lessons on integrated governance

Source	Lesson
Best practices and lessons learned in addressing adaptation in least developed countries: Volume 3	Building on existing institutional arrangements enables the smooth integration of adaptation measures. Given the medium to long-term nature of adaptation, as well as the involvement of all parts of government, effective institutional arrangements are necessary to ensure a holistic and sustainable approach to adaptation. p.52
Adaptation actions in the natural environment and cities: what works?	Projects are more likely to move forward if high-level support can be secured from the outset either through backing by elected officials, or through championing the project at an executive level (or both). p.21
Climate Change 2022: Impacts, Adaptation, and Vulnerability	Inclusive governance that prioritises equity and justice in adaptation planning and implementation leads to more effective and sustainable adaptation outcomes (high confidence). p.28 (C.5.6)



Make it active

This theme aligns with the principle of resilience as a ‘whole-society’ endeavour, as set out in the **UK Government Resilience Framework**. Relevant, transferable good practice guidance can also be found in the **National Resilience Standards #1 LRF** governance support arrangements. There is also information of thematic relevance in the **Third National Adaptation Programme**, where ‘coordination’ (taking an integrated approach through governance, engagement and coordinated policymaking) is a key overarching theme.

- **Economic challenges**

A lack of funding and resources were common themes identified as barriers within and across adaptation projects. In some cases, biased thinking with a preference for short-term mitigation projects over the longer-term benefits of investing in comprehensive adaptation action was cited. In others, the challenge was securing any investment at all, when the full scope of positive impacts would not be evident or without uncertainty for a sustained period.

Financial enablers included the pooling of smaller budgets and multi-stakeholder investment, which meant that far more could be achieved together than in organisational or institutional isolation. It was also highlighted that conventional cost benefit modelling does not always suit adaptation programmes. Being able to quantify the wider social and economic benefits of adaptation would help project owners to make a stronger, more holistic business case for the positive impacts of initiatives at the early planning and investment stages.

Transferable lessons on economic challenges

Source	Lesson
Government Resilience to Extreme Weather Summary Report	Coordinated and prioritised approach to investment (in climate/managing risks/extreme weather impacts) to ensure cost effectiveness and maximise benefits
Climate Change 2022: Impacts, Adaptation, and Vulnerability	Conventional cost benefit modelling does not always suit adaptation programmes
National Adaptation Planning: Emerging Lessons Learned From UNEP Projects	Data and research are needed to capture the (indirect) economic returns on investment (such as enterprise opportunities and jobs) that can be unlocked from adaptation actions.
Climate Change 2022: Impacts, Adaptation, and Vulnerability	While it will not be the right model for all circumstances, pooling the small discrete budgets of partner organisations can generate more adaptation progress than if these budgets are spent separately. p6

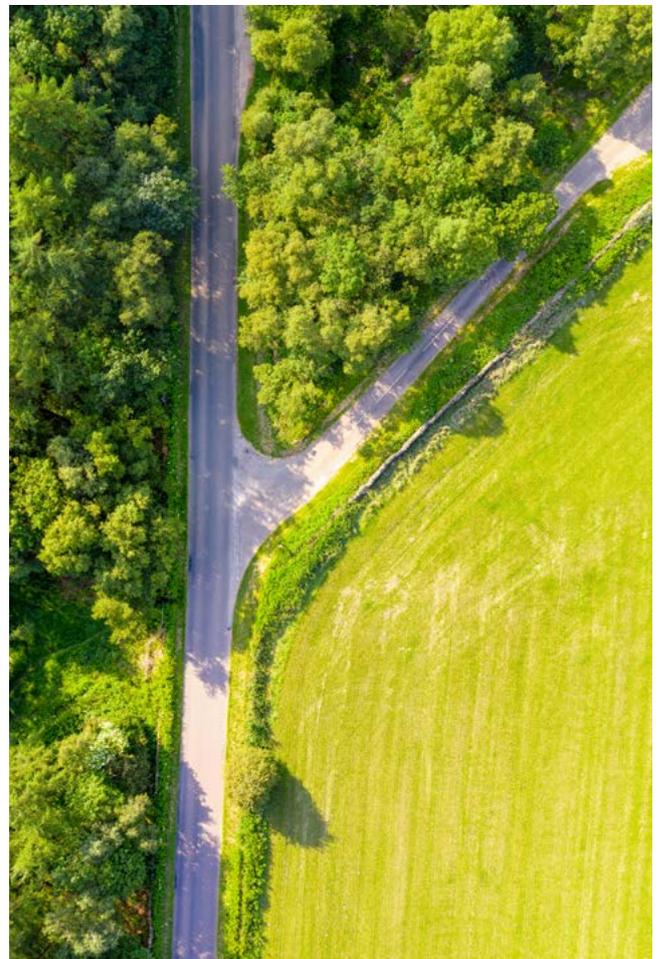


Make it active

This theme aligns with all three principles of resilience, as set out in the **UK Government Resilience Framework**, particularly relating to investment in prevention, rather than cure. Relevant good practice guidance can also be found in the **National Resilience Standards**: Communicating risks to the public and Community resilience development. There is also information of thematic relevance in the **Third National Adaptation Programme** and related **2023 Green Finance Strategy**, This sets out how government will adapt the finance system to climate changes and encourage more private sector investment.

Conclusion

In conclusion, findings, lessons and recommendations on adaptation in response to the climate crisis are not always as explicitly outlined and easy to source as lessons from other exercises and emergencies. This is in part due to the holistic and varied framing of adaptation activity across a range of policy drivers. It may also be due to the fact that learning in this area remains very current. The lessons and learning themes reflected the highly interconnected, multi-stakeholder, multi-sectoral nature of challenge being addressed. The research demonstrated that despite geographic and socioeconomic variations, common patterns of learning in relation to adaptation can be seen across international, national and local arenas. It is also clear that many of the associated lessons have relevance and applicability for resilience professionals working across a range of policy, planning and project remits.





Spotlight on Sierra Leone

Lessons from the AFRICAB and
EVALDIS projects

Introduction

Bournemouth University Disaster Management Centre (BUDMC) first developed a relationship with disaster management partners in Sierra Leone during the Ebola epidemic in 2014-16. Since then, the Centre have continued to work with the West African country to support wider resilience efforts, including capacity building and disaster management evaluation. In the last 5 years, this included the delivery of two award-winning projects:⁶² – AFRICAB (Driving African Capacity-Building in Disaster Management, 2018-2021)⁶³ and EVALDIS (Evaluating Local Disaster Management in Sierra Leone (2022-2023)).⁶⁴ In this article Professor Lee Miles, Professor of Crisis and Disaster Management and Deputy Dean of the University's Business School, shares the lessons that prompted the work and the findings that followed.

ranked 47th out of 181 nations on the World Risk Index 2021,⁶⁶ recording high scores for vulnerability, susceptibility and lack of coping capacities.⁶⁷ Combined, climate hazards and existing vulnerabilities have resulted in significant losses across sectors and communities. For example, Freetown, the country's capital, has experienced over 25 major urban fires since February 2021. This included the **Susan's Bay fire** disaster⁶⁸ of 2021, that resulted in 7,000 people losing their homes in one night.⁶⁹ The country is also prone to water shortages, floods and mudslides. Given the trajectory of climate change, building resilience and strengthening disaster management capacity have been key priorities at both local and national levels.



Professor Lee Miles

Professor of Crisis and Disaster Management and Deputy Dean of the Bournemouth University Business School

Country profile

Sierra Leone is counted among the top 10 percent of countries most vulnerable to the impacts of climate change.⁶⁵ It was also

62 AACSB, 'Innovations that inspire | Building African Capacity to Manage Disasters', 2023

63 Bournemouth University, 'Driving African Capacity Building in Disaster Management (AFRICAB)', 2024

64 Bournemouth University 'Evaluating Local Disaster Management in Sierra Leone (EVALDIS)'

65 UN Sierra Leone, 'Climate Action for Sierra Leone partnership resource brief', July 2022

66 University of Notre Dame Global Adaptation Initiative, 'World Risk Index 2021: Country Index'

67 Miles, L, 'The Conversation – Targeting disaster management: New research evidence from Sierra Leone', November 2021

68 International Institute for Environment and Development (IIED), 'Fire disaster makes more than 1,000 homeless in Freetown', March 2021

69 Miles, L, 'The Conversation – Targeting disaster management: New research evidence from Sierra Leone', November 2021

In 2018 the Centre's activities in Sierra Leone took a notable step-change, resulting in the design and delivery of AFRICAB. The project design drew upon learning from the Centre's prior work:

Key lessons

1. There is often a pressing need for local policymakers to possess the most contemporary evidence base to support disaster risk reduction, preparedness, response and recovery. For this evidence-base to have legitimacy and impact it needs to be (i) developed with the country's own domestic priorities in mind (rather than being dictated by the external preferences and perceptions of what other actors think they need) and (ii) co-created within national and local cultural contexts.
2. New technologies and large-scale climate-solutions are important in addressing climate resilience. However, there are often numerous, specific actions that local and national actors can undertake within their existing powers and scarce resources to leverage sizeable, scalable local and national enhancements in climate resiliency and disaster management. We had learnt that by accurately identifying specific 'gaps' that cause policy, process, or practice to 'fail' (which we refer to as single points of failure (SPOF)), understanding and assessing how severe/critical those gaps were; and then applying any immediate actions to address deficiencies could make tangible differences in practice. It was just a case of knowing where those gaps (and the lessons they represented) were.

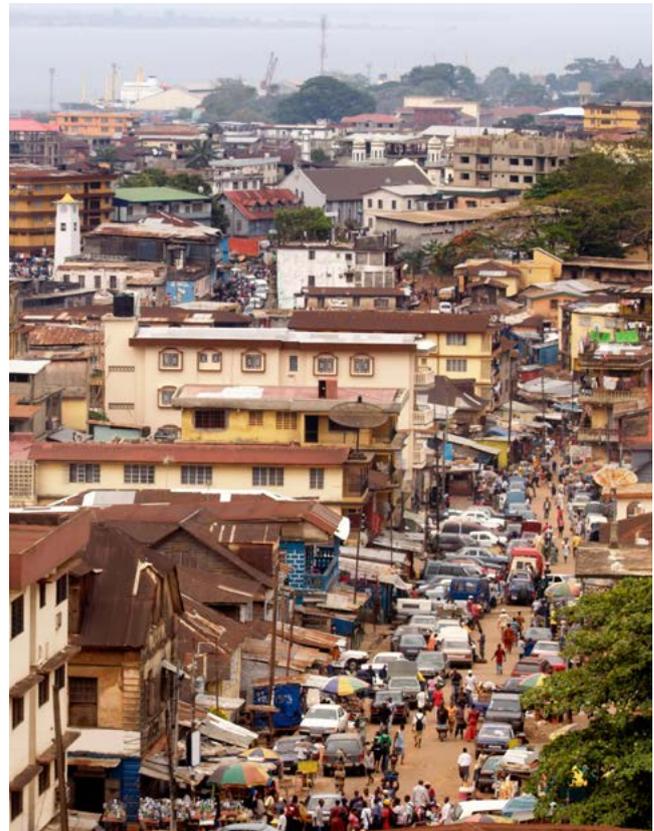


Driving African Capacity-Building in Disaster Management (AFRICAB)

To identify SPOF in Sierra Leone, AFRICAB took the form of a 3-year, country-wide field research project involving 559 participants. Funded by the UK's Global Challenges Research Fund (GCRF), we worked closely with all tiers of government, from the highest national level to local district and ward leaders. Knowing the importance of building local disaster management from the bottom up, discussions also extended to responders, community leaders, disaster management volunteers and informal settlements country wide.

The findings clearly identified areas where national and local stakeholders agreed that there were resolvable gaps⁷⁰ (SPOF). The SPOF spanned 8 thematic learning areas including: technical coordination; communication; capacity-building; procedural; human; physical and economic⁷¹ (see Figure 3).

Assessing the severity and potential impact of each SPOF in turn led to 27 key recommendations for action. These would address urgent local needs; enhance disaster response planning; and facilitate the development of best practice documentation. The implementation of these recommendations resulted in contextualised, learning-led and co-created disaster management solutions,⁷² including new guidance and training.⁷³



70 Miles, L, 'The Conversation – Targeting disaster management: New research evidence from Sierra Leone', November 2021

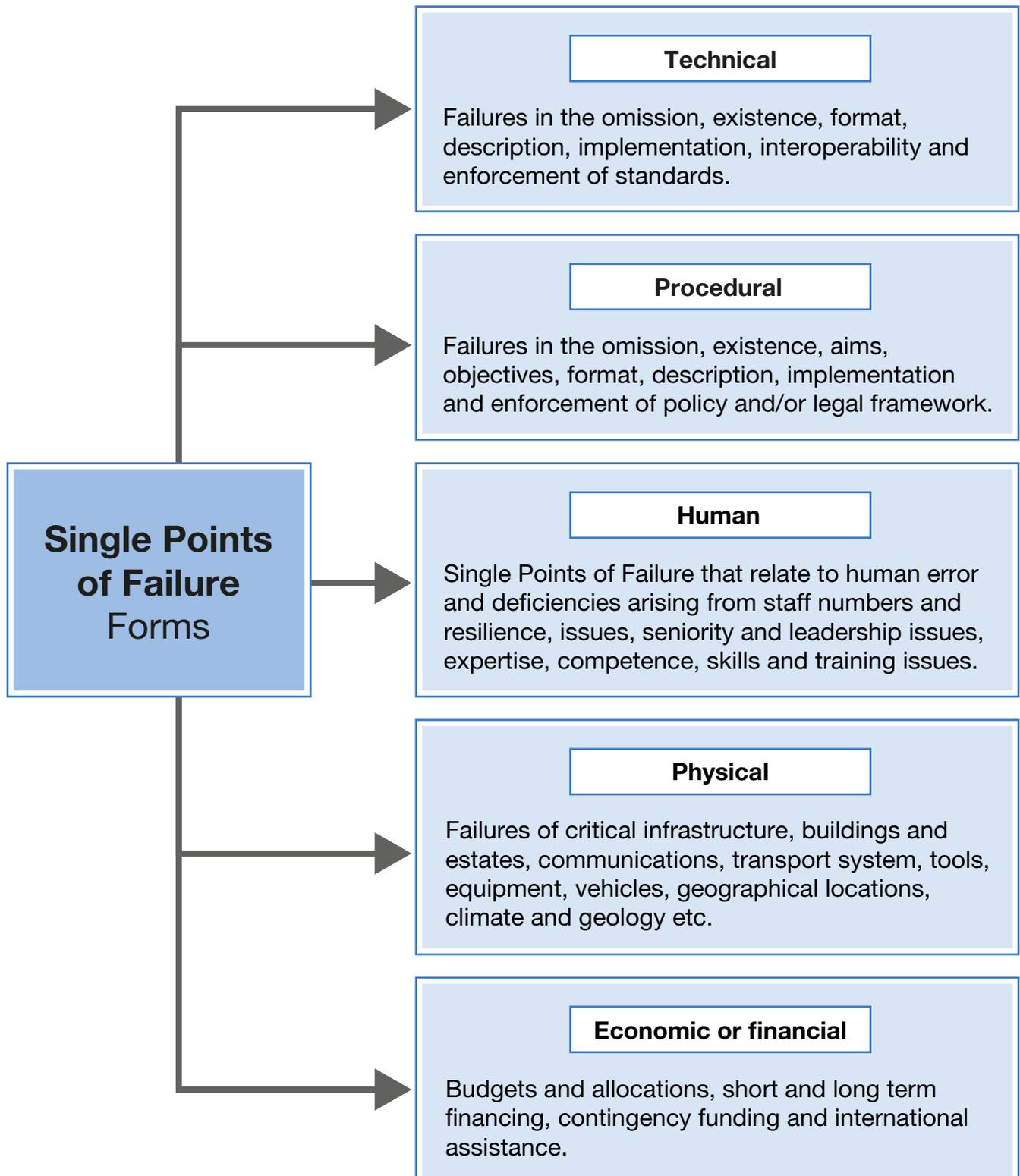
71 Miles et al., 'Improving Subnational Disaster Management in Sierra Leone: Evaluating Local Disaster Management in Sierra Leone (EVALDIS) Final Report 2023 No. 1, p.19', 2023

72 Miles, L, 'The Conversation – Targeting disaster management: New research evidence from Sierra Leone', November 2021

73 Bournemouth University, 'BUDMC helps develop first-ever Disaster Management Minimum Requirement for Freetown', 2020

Figure 3: Forms of SPOF

Source: AFRICAB Final Report (Miles et al, 2021, p. 15). © Bournemouth University Disaster Management Centre



Evaluating Local Disaster Management in Sierra Leone (EVALDIS)

Following AFRICAB, EVALDIS then provided one of the most contemporary research evaluations of the existing state of disaster resilience at a subnational level. Funded by Research England's (RE) Participatory Research Programme, it comprehensively assessed wider challenges confronted at provincial, district, and local levels. Stakeholder engagement included working with the capital Freetown's City Council (FCC), which has a leading climate resiliency profile in Africa, and with volunteer-led Community Disaster Management Committees (CDMC). This represented 1.2 million people across 48 wards combined. The research provided more valuable evidence-based lessons and recommendations that helped to shape Sierra Leone's National Disaster management Agency's (NDMA) thinking, direction and outputs to develop stronger regional capacities across the country in 2023.⁷⁴

The combined AFRICAB and EVALDIS evidence-base went on to inform the development of the FCC's first ever Climate Action Strategy, which launched in 2022/23. It also supported two policy papers developed on climate resilience and disaster early-warning by the Sierra Leone Government, which were presented at the 27th Conference of the Parties (COP 27), in Sharm El-Sheik in 2022.

Lessons Identified

Two key, transferable lessons that were clearly identified through this work were:

1. Research projects that are **co-created with national actors and engage local stakeholders are highly influential in providing evidence that has greater immediacy for policy transfers.** This process can be visualised as an Integrated Knowledge Translation cycle (see Figure 4).⁷⁵
2. It should always be recognised that there are **many informal local solutions and approaches on the ground that reduce propensities for single points of failure in climate resilience.** These are not always readily captured in external data sets and policy reckonings. Bringing national and local stakeholders together supported both disaster risk reduction and climate resilience.

In conclusion the integrated, multi-stakeholder, research-based approach in Sierra Leone closed the gap between valuable, informal (often indigenous) solutions, and official policies and plans. It provides an impactful example of finding the 'sweet spot' in formulating compatible, progressive climate relevant policies; generating meaningful solutions; and enhancing local resilience in practice.

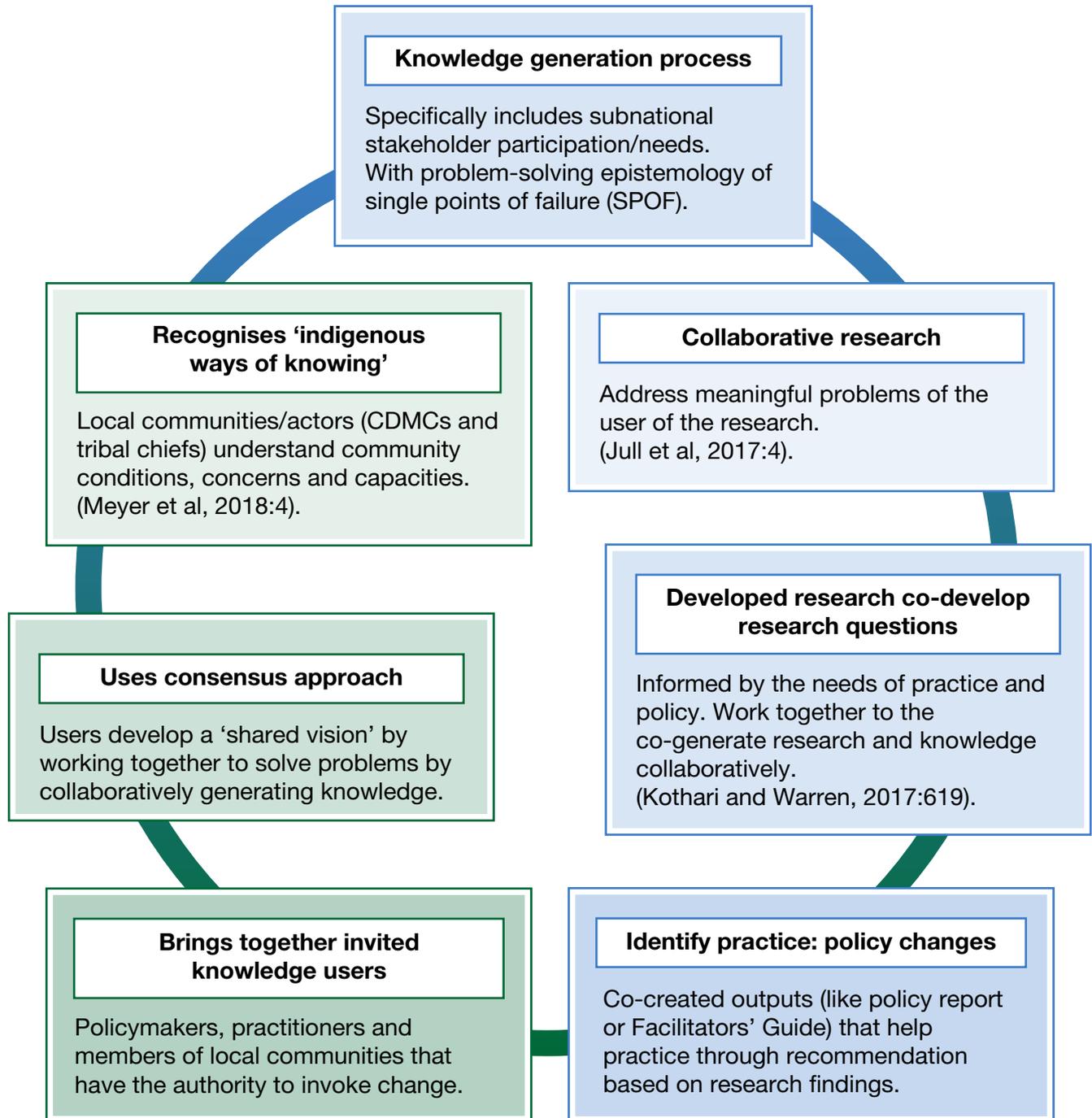


⁷⁴ Bournemouth University, 'New disaster management report launched in Sierra Leone', March 2023

⁷⁵ Miles et al., 'Improving Subnational Disaster Management in Sierra Leone: Evaluating Local Disaster Management in Sierra Leone (EVALDIS) Final Report 2023 No. 1, p.25' 2023

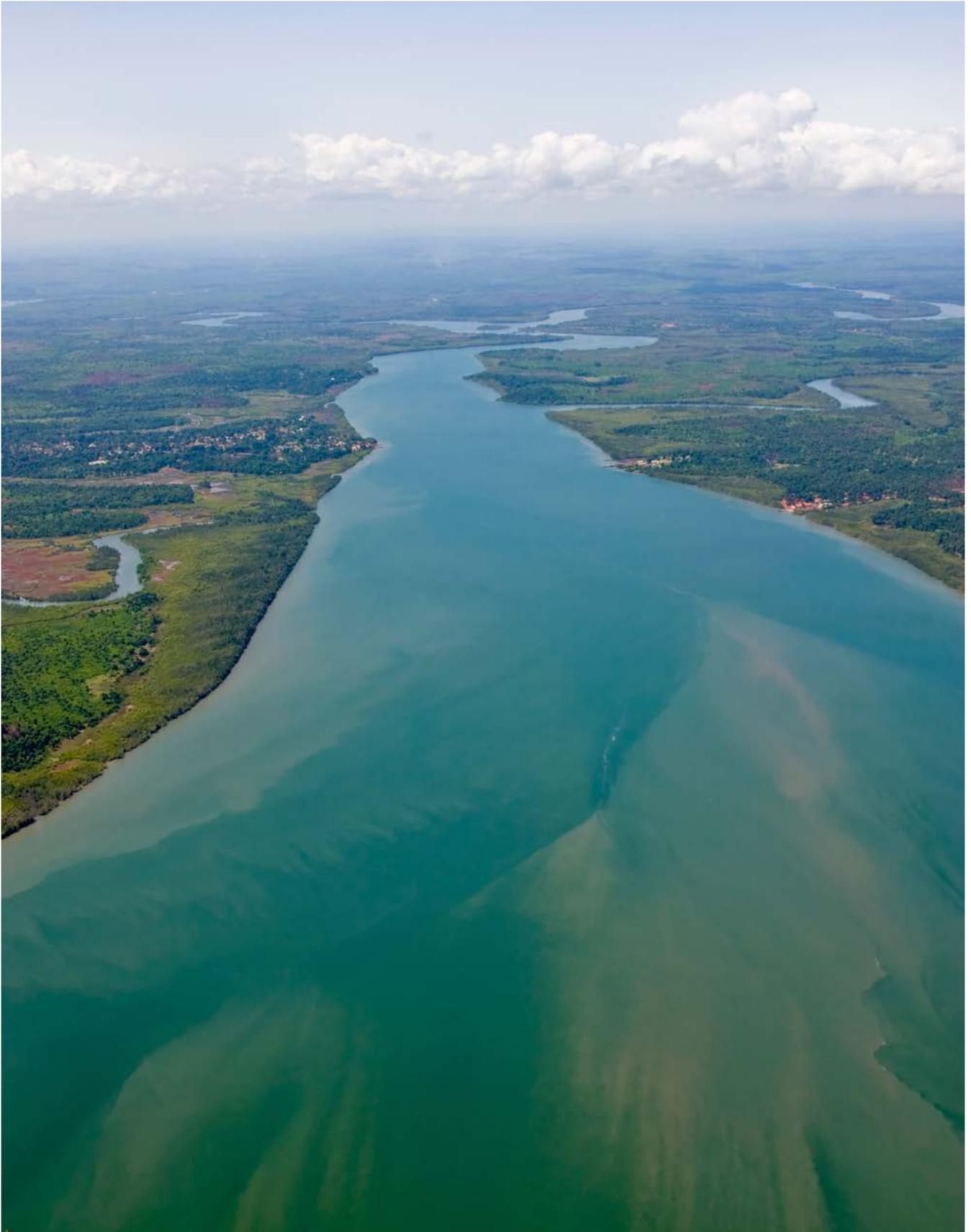
Figure 4: Integrated Knowledge Translation (IKT)

Source: Evaluating Local Disaster Management in Sierra Leone (EVALDIS) Final Report 2023 No. 1, p.25. (Miles et al, 2023). © Bournemouth University Disaster Management Centre



For in-diagram references, please see source document:

Miles et al., 2023. **Evaluating Local Disaster Management in Sierra Leone (EVALDIS) Final Report 2023 No.1.**



Academic insight

Adaptation, extreme weather
and the events industry

In this article Ben Crabb, Crowds and Event Specialist and Resilience Capability Lead at the Emergency Planning College explains how the events industry is being impacted by the effects of climate change. He presents some academic insights on why industry adaptation may be more incremental than immediate, and signposts to key national plans and resources to support both event managers and local emergency planners.

Introduction

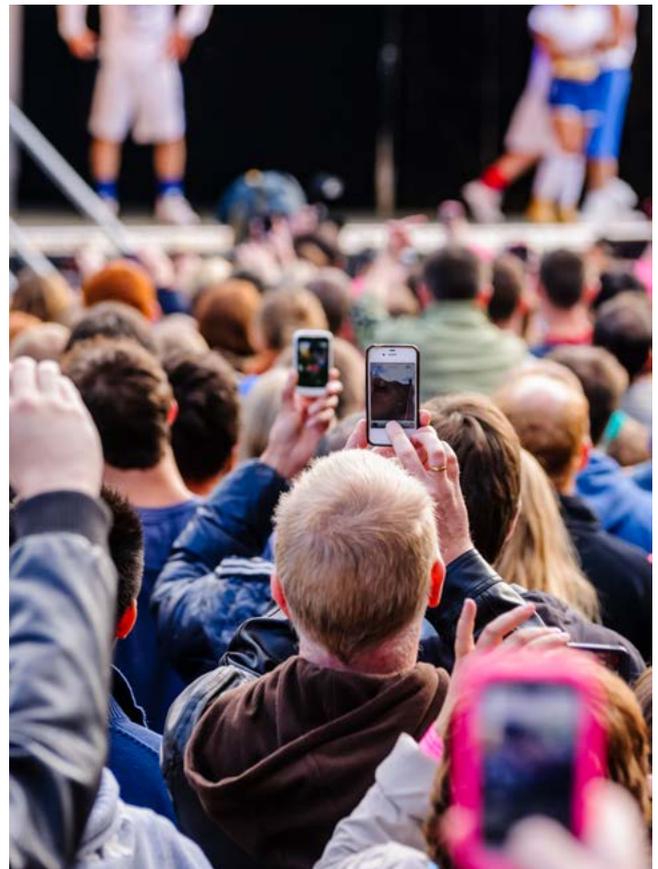
Weather has always played a large part on outdoor events. At least thirty major music events were postponed or cancelled around the world, due to extreme weather in 2023 alone.⁷⁶ Two prominent examples include: Pearl Jam's lead singer Eddie Vedder, damaging his vocal cords in Paris due to wildfire smoke and cancelling three days of shows; and the torrential rain and floods that caused Elton John to cancel his show in Auckland New Zealand. Others in the UK and beyond were also affected by storms, wind, hail, lightning and associated impacts, like event ground conditions deteriorating to an unsuitable level (e.g., the Burning Man Festival).⁷⁷

These extreme weather events, as we know, are linked to climate change. Their impacts on the eventgoers, performers and the event industry can create devastating losses. For example, seventeen fans were hospitalised at an Ed Sheeran concert in

Pittsburgh USA due to heat, and tragically a fan died of heat exhaustion at a Taylor Swift concert in Rio de Janeiro last November.

The events industry and extreme weather

All outdoor events plan for extreme weather as a matter of 'good practice', supported by regulated guidance to ensure adverse weather plans are in place for such eventualities. However, research and experience both suggest that adapting to climate change is still somewhat of a novelty for some in the events industry.



76 Billboard, 'Here Are All The Concerts Affected By Climate Change In 2023', October 2023

77 Context, 'Too hot to party? Extreme temperatures threaten live music shows', January 2024

In general, there appears to be a low level of engagement in climate adaptation by the events industry.⁷⁸ Research shows that most event organisers only change their plans and take action to adapt after they have experienced an adverse event. However, where adaptation action has led to positive changes in the events industry, research suggests that it happens in three stages.

1. The first phase is developing an **acceptance of conditions** and shifting event settings, e.g., awareness or interest after a storm has hit their event or other climate related impacts generate tangible losses.

2. The second phase is **acceptance of action** e.g., the requirement to move the event to another month or season in the year, to minimise health risks amongst spectators and avoid damage to equipment.

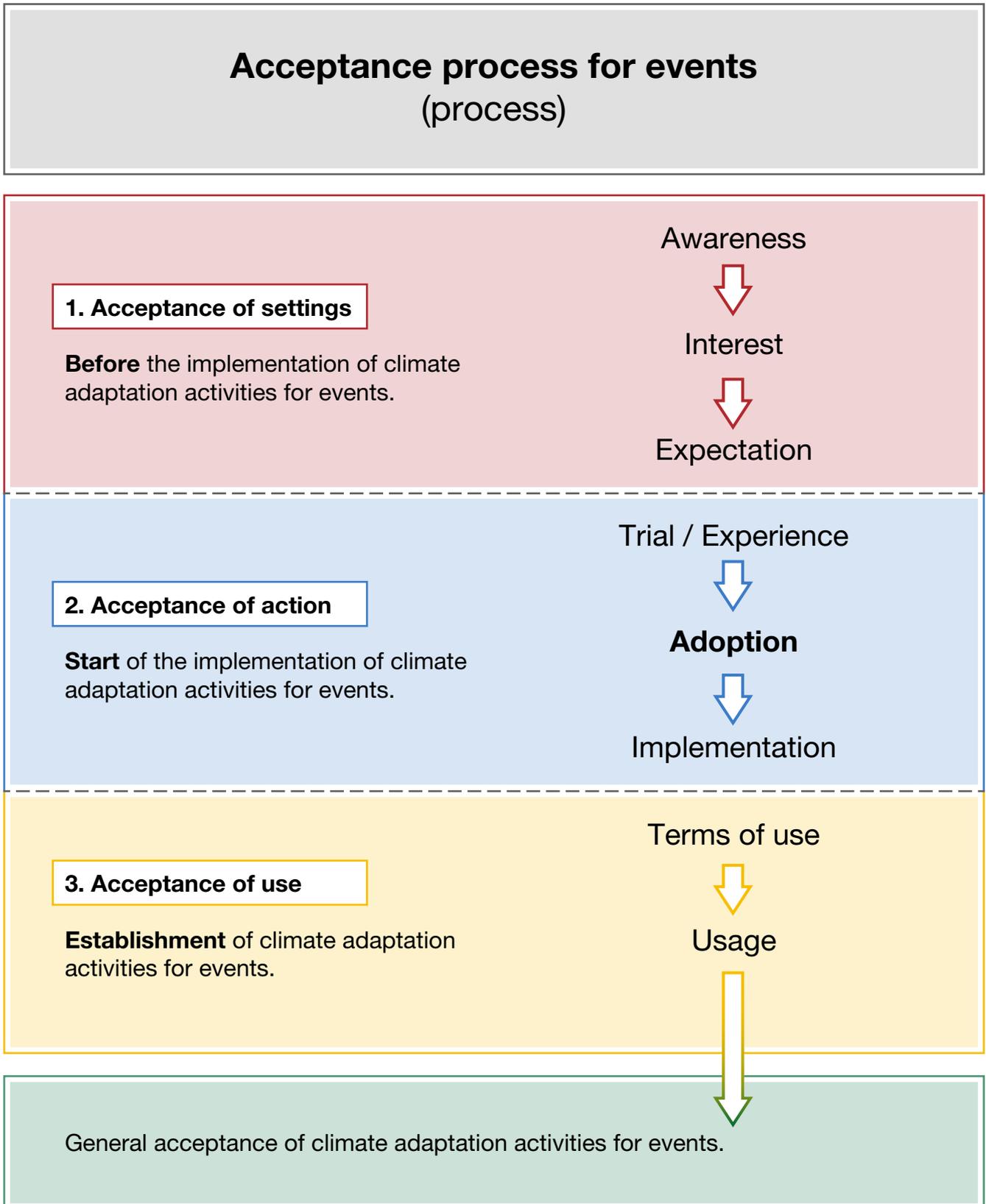
3. The third phase is **acceptance of use**, i.e., the adaptive solutions applied during the second, acceptance of action phase, are no longer an innovation. Instead, they become a standardised model to follow and become embedded in more resilient event risk management cycles.⁷⁹



78 Werner et al., (2024) 'The acceptance of climate adaptation measures in the event industry: a conceptual and empirical overview. In: Event Management Vol.28 p.105-127', January 2024

79 Griese, et al., 'Acceptance of climate adaptation measures for transport operations: Conceptual and empirical overview. In: Transportation Research Part D: Transport and Environment, Vol. 10', December 2021

This three step process has been visualised in the model below, based on research and thinking by Greis et al. (2021):





Sidelights

Did you know that research shows UK music concert attendees are more engaged in with environmental issues than the general public? They also tend to demand more action by the music industry and society to address climate related issues. These findings can be used to generate traction in the industry and motivate climate resilience efforts.

Source: Shaw, D., Brennan, M., McKeever, D., Wong, M., (2022) 'Turn up the Volume' Survey. Music fan attitudes towards climate change and music sustainability. University of Glasgow

This process provides insight on why, perhaps, the events industry remains more reactive than proactive in their approach to extreme weather and climate change. However, the lived experiences of extreme weather events and other climate impacts are becoming more common. This is fostering the acceptance process and leading to change in both perception and practical plans.

What measures are being put in place to support adaptation action?

Several Local Authorities in the UK now publish advice to event organisers on adverse weather. Some of this information, along with other climate change resources can usually be found on local authority websites. At the national level, the **UK Health Security Agency (UKHSA) have also published 'Hot Weather Advice: planning events and mass gatherings'**.⁸⁰ Beyond events, but of relevance to the industry and wider resilience community is also **UKHSA's Adverse Weather and Health Plan**.⁸¹ This was published last year to help protect individuals and communities from the health effects of adverse weather, and to build community resilience.

Conclusion

The events industry at large now needs to learn from recent and increasing experiences of extreme weather in planning and practice. As storms become the 'norm', it is likely the acceptance process will progress on a larger scale. To make that learning active now, please see the 'Make it active box'.

80 UK Health Security Agency, 'Hot weather advice: planning events and mass gatherings', May 2023

81 UK Health Security Agency, 'Adverse Weather and Health Plan', April 2023



Make it active

- Consider risks to health in the event risk assessment e.g., heat (heat stroke/exhaustion) or cold (hypothermia) and ways to mitigate and manage these. For example, provide adequate drinking water throughout and plan how you would increase shaded areas
- Check your local authority website for specific advice to event organisers
- Use and adapt the 'Acceptance process for events' – settings, action, acceptance to develop adaptation actions and build climate resilience
- Use advice from local authorities and government departments regarding adverse and extreme weather, incorporating them into your event safety management plans.
- Use fans views and data regarding their perception of climate change, alongside requirements for event risk management processes, to help motivate and progress adaptation action



Tools for Implementation

The Adaptation Toolkit from Local Partnerships

In this article Rachel Toresen-Owuor, Senior Director at Local Partnerships, writes about their free Adaptation Toolkit. Co-authored with the UK Climate Impacts Programme (UKCIP), the Toolkit is a facilitation tool that seeks to bridge the technical guidance from the Climate Change Risk Assessment 3 (CCRA) and the practicalities of local government. Designed with Local Authorities in mind, it is available to download from the Local Partnerships website.

Local Partnerships

At Local Partnerships, our purpose is to help public sector organisations face the ever-increasing challenge of meeting rising demands for services with shrinking budgets, delivering value and efficacy for the public purse.⁸²

Climate change is one of Local Partnerships' key areas of expertise. Our work in this area supports the public sector to:⁸³

- deliver strategic and practical approaches to achieve net-zero
- plan for a changing climate, by assessing local impacts and necessary changes
- deliver renewable energy infrastructure and energy efficiency projects
- develop and deliver approaches to minimise waste and facilitate a circular economy

The Adaptation Toolkit

At least 70% of local authorities have declared a climate emergency. However, understanding climate risk and carrying out adaptation planning and can be a challenge for many councils to undertake. Adapting to current and predicted changes to our climate, both at the national and local levels, is vital across the economy. Action needs to be taken across Government and beyond, and an important sector for both short- and long-term actions and outcomes is local government. To support, Local Partnerships co-authored the Adaptation Toolkit with the UK Climate Impacts Programme (UKCIP). Designed for Local Authorities, the toolkit is free for the sector to download for our [website](#).



82 Local Partnerships, 'About Local Partnerships', 2024

83 Local Partnerships, 'Our Expertise – Climate', 2024

What is included in the Toolkit?

The Adaptation Toolkit provides a supportive framework to enable local authorities to develop their risk assessments and adaptation pathways. It does this by providing a bridge to the technical information and guidance provided by the UK Climate Projections (UKCP18), Department for Environment, Food and Rural Affairs (Defra) and the Climate Change Committee (CCC). It includes a 5-step process to help you prepare for the impacts the current and future climate could have on your organisation and the services you provide. Whether you are new to climate change, have started the adaptation journey, or are looking to enhance your action on adaptation further, the Toolkit can help you to:

- raise awareness and priority of local climate change risk management and adaptation measures you can take
- make the case for adaptation in your organisation, including assessing your vulnerability to climate change
- access information and resources to help you produce a climate risk register specific to your organisation
- develop a climate-adaptation/resilient strategy, programme, and project
- embed climate adaptation into business-as-usual decision making and risk management, and written into council policy (all service areas)

The toolkit is intended to be read and used alongside other existing guidance documents (including the CCRA) to aid you to develop your understanding of climate risk and resilience for your organisation. It has been structured to guide you through each stage of developing a strategy and action plan for adaptation. Each stage outlines what you can do, what information you need to gather, some guiding questions, and how to record the information. Whilst the toolkit is presented in a linear way, your actual adaptation decision-making may require you to jump back and forth between stages.

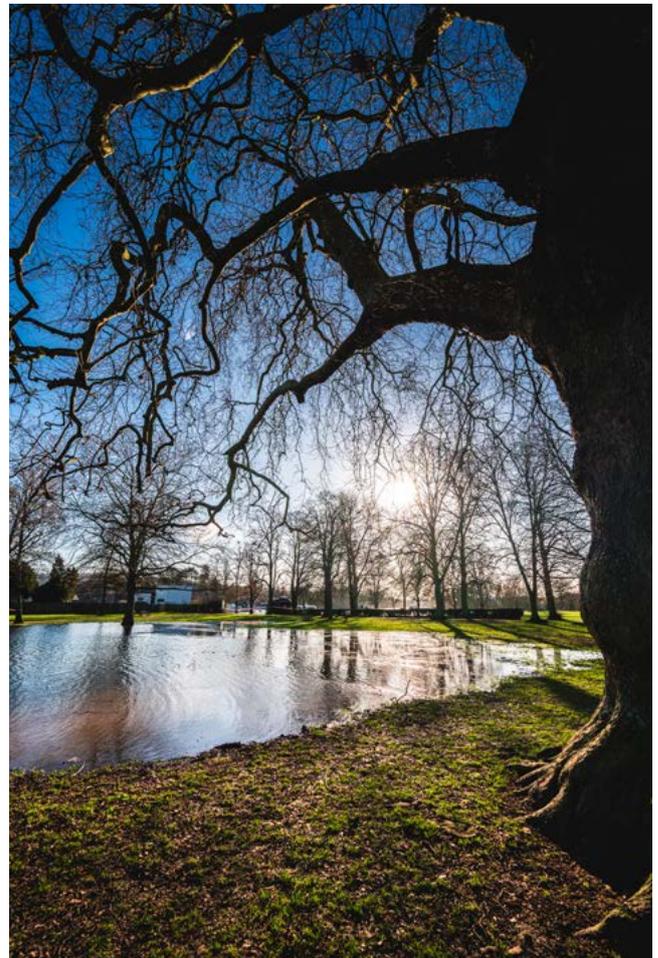
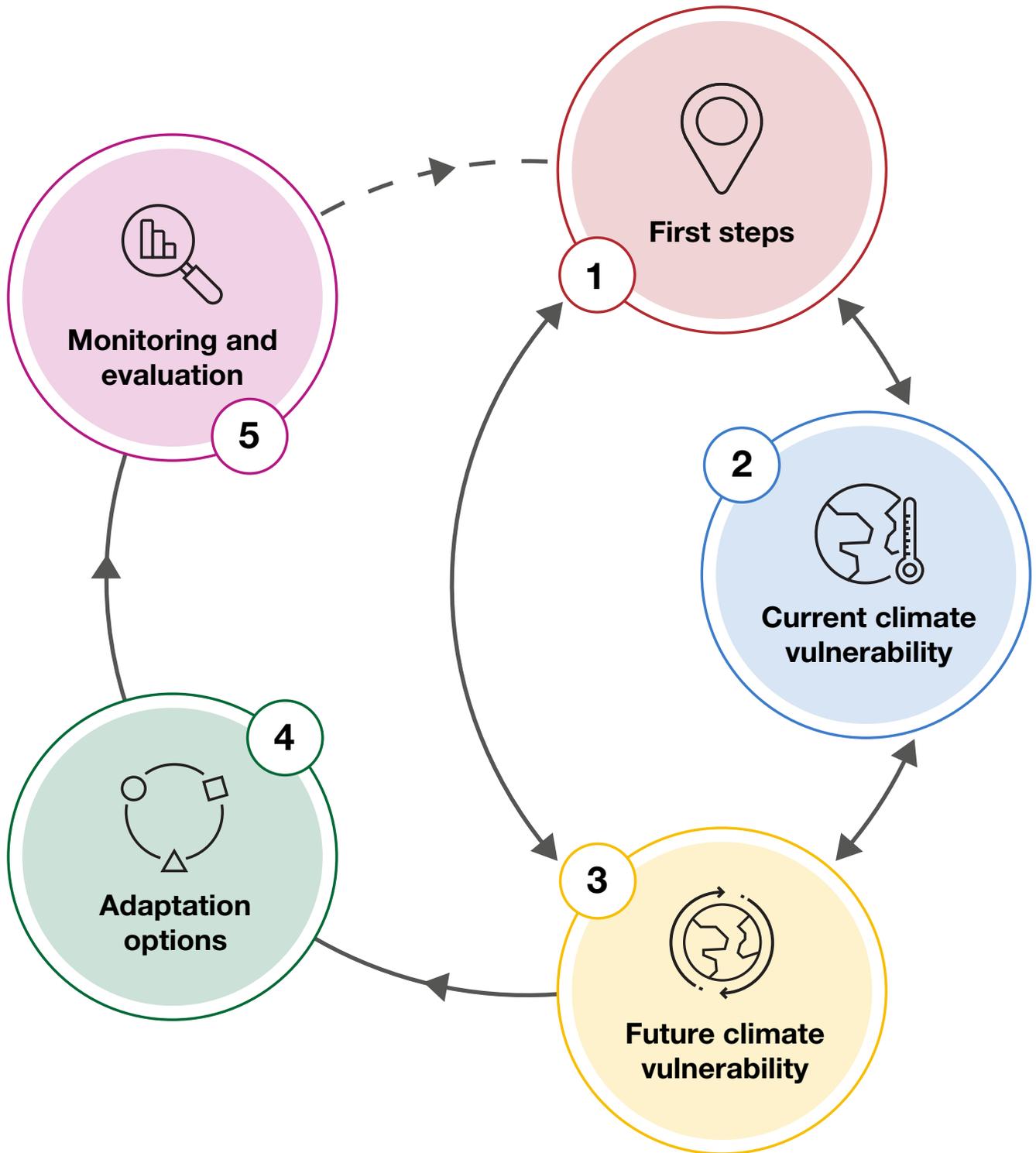


Figure 5: Five-step Process. Adapted from the Adaptation Toolkit, Local Partnerships



Putting the toolkit into practice

It is unlikely that a council will be at a standing start on climate risk and adaptation – the first steps of the toolkit encourage users to explore how their services have already responded and coped with severe weather impacts – recent flooding and heatwaves will have impacted all service areas either directly or indirectly. Local Partnerships has supported local authorities with use of the toolkit, facilitating discussion for individual councils or groups of councils across an area looking to collaborate and share best practice. Giving officers and, importantly, senior managers space to think about these impacts, and draw on past learning, can be hugely beneficial at the start of this process.

A recent engagement with senior service managers at a unitary council provided a wide range of specific examples of service disruption and impacts on workforce and communities. It also highlighted adaptive activity that is already underway – some of this was framed as climate risk or adaptation, some was not. This approach of engaging at a senior level gave a strong mandate and framing to set up detailed officer workshops to: explore and identify service risks; develop a climate risk register and initiate an adaptation plan for the council.

The toolkit has been used by groups of councils, across a city region or through a regional climate change partnership to share knowledge on risk, opportunities for collaboration and knowledge share for implementation of joined up activity and communication.



Make it active

If you are in a Local Authority setting and have not done so already, why not check the Adaptation Toolkit out?

If you work in another organisational setting, you may wish to consider how the Toolkit's learning points, action processes and team activities could have transferable benefits for adaptation action in your context.



Rachel holds an MSc in Climate Change and Sustainable Development and has nine years Local Authority experience. She has responsibility for the organisation's national **Re:fit** and **Climate Response** programmes. For more information and contact details, please see the **Local Partnerships website**.



Resources

Learning to Adapt: Transferrable lessons

Transferable lessons on stakeholder engagement

Source	Lesson
<p>Adaptation actions in the natural environment – what works? Report of Research Findings</p>	<p>Early and comprehensive stakeholder engagement is important...early and thoughtfully planned communication strategy was identified as a success factor. Taking on board the experiences and insights of stakeholders – not just at a practical or operational level but as a source of conceptual thought, analysis and ideas about how adaptation actions should be designed and appraised – is important in securing their continued buy-in.</p>
<p>Best practices and lessons learned in addressing adaptation in least developed countries: Volume 2</p>	<p>Another area of investment in improving inclusiveness is the meaningful integration of traditional knowledge and the know-how of indigenous peoples into climate knowledge systems and NAP processes, to identify key risks and adaptation options. p5</p>
<p>Promoting Adaptation to Changing Coasts A Practical Guide. p92-95</p>	<p>Never stop engaging with the local community and stakeholders on your project... Capturing stakeholder feedback is an essential activity to check how they feel, what they understand and to identify knowledge gaps or concerns. Put yourself in their shoes.</p>
<p>Turning up the heat</p> <p>Learning from the summer 2022 heatwaves in England to inform UK policy on extreme heat</p>	<p>Local knowledge and lived experience need greater acknowledgment...peer-reviewed science and formal sources of data and evidence... need to be enriched by the lived experience and knowledge of those who are most vulnerable to impacts.</p>

Transferable lessons on practical project planning and delivery

Source	Lesson
Natural Flood Management Programme: Interim Lessons Learnt	[NFM] ...projects need to be adaptable in their approach and should not be seen as fixed before practicalities have been agreed with local people. Give project teams enough flexibility to work with partners to agree designs and costs and have an approved business case before fixing the details of a timetable for delivery. p27
Best practices and lessons learned in addressing adaptation in least developed countries: Volume 3	Identifying how existing programmes can contribute to the process will ensure early success, help achieve a coherent adaptation response for the country and inform how individual efforts can best be scaled up to national level. p23
Climate Change 2022: Impacts, Adaptation, and Vulnerability	C4.4 To minimize maladaptation, multi-sectoral, multi-actor and inclusive planning with flexible pathways encourages low-regret ⁴⁷ and timely actions that keep options open, ensure benefits in multiple sectors and systems and indicate the available solution space for adapting to long-term climate change (very high confidence).

Transferable lessons on monitoring and evaluation

Source	Lesson
Climate Change 2022: Impacts, Adaptation, and Vulnerability. p.28	M&E facilitates learning on successful and effective adaptation measures, and signals when and where additional action may be needed. M&E systems are most effective when supported by capacities and resources and embedded in enabling governance systems (high confidence).
Promoting Adaptation to Changing Coasts A Practical Guide	Setting up a monitoring and evaluation system at the beginning [of the project] is essential to establishing a baseline in adaptation needs against which progress can be measured over time. p77
Best practices and lessons learned in addressing adaptation in least developed countries: Volume 3	Prioritise monitoring activities based on available budget... your monitoring plan will help ensure you are collecting the right types of data for the right purpose.

Transferable lessons on integrated governance

Source	Lesson
Best practices and lessons learned in addressing adaptation in least developed countries: Volume 3. p.52	Building on existing institutional arrangements enables the smooth integration of adaptation measures. Given the medium to long-term nature of adaptation, as well as the involvement of all parts of government, effective institutional arrangements are necessary to ensure a holistic and sustainable approach to adaptation.
Adaptation actions in the natural environment and cities: what works? p.21	Projects are more likely to move forward if high-level support can be secured from the outset either through backing by elected officials, or through championing the project at an executive level (or both).
Climate Change 2022: Impacts, Adaptation, and Vulnerability. p.28 (C.5.6)	Inclusive governance that prioritises equity and justice in adaptation planning and implementation leads to more effective and sustainable adaptation outcomes (high confidence).

Transferable lessons on economic challenges

Source	Lesson
Government Resilience to Extreme Weather Summary Report	Coordinated and prioritised approach to investment (in climate/managing risks/extreme weather impacts) to ensure cost effectiveness and maximise benefits.
Climate Change 2022: Impacts, Adaptation, and Vulnerability	Conventional cost benefit modelling does not always suit adaptation programmes.
National Adaptation Planning: Emerging Lessons Learned From UNEP Projects	Data and research are needed to capture the [indirect] economic returns on investment (such as enterprise opportunities and jobs) that can be unlocked from adaptation actions.
Climate Change 2022: Impacts, Adaptation, and Vulnerability	While it will not be the right model for all circumstances, pooling the small discrete budgets of partner organisations can generate more adaptation progress than if these budgets are spent separately. p6

Further reading: Devolved national adaptation plans and resource

A helpful overview of adaptation approaches across the Devolved Administrations is available on pages 120-125 of the NAP3: **The Third National Adaptation Programme (NAP3)** and the **Fourth Strategy for Climate Adaptation Reporting** (publishing.service.gov.uk). Links to NAP in

Northern Ireland

- **Northern Ireland Climate Change Adaptation Programme (NICCAP2)** is available from <https://www.daera-ni.gov.uk/publications/northern-ireland-climate-change-adaptation-programme-2019-2024>
- **NI Adapts – Planning Toolkit:** The NI Adapts toolkit was developed by Climate Northern Ireland to support the first phase of climate adaptation planning in local councils. However, the information included may also be relevant to other organisations. The five-step adaptation planning tool was developed based on international good practice. For more information visit **Home – Climate Northern Ireland** (niadapt.org.uk)

Scotland

- **Scottish Government:** The climate change adaptation programme in Scotland is called **Climate Ready Scotland (2019-2024)**. This publication can be accessed at: **Climate Ready Scotland: climate change adaptation programme 2019-2024 – gov.scot** (www.gov.scot)

Wales

- **Welsh Government:** The Welsh Government's current 5-year national adaptation plan, **Prosperity for All: A Climate Conscious Wales**, was published in December 2019. This publication can be accessed at: **Prosperity for all: a climate conscious Wales | GOV.WALES**
- **Wellbeing of Future Generations Act 2015** Adaptation planning in Wales is supported by the **Wellbeing of Future Generations Act 2015**.
- **The Environment (Wales) Act 2016** also includes provisions for the sustainable management of natural resources and flood and coastal erosion management.

Topical Reports

- **Intergovernmental Panel on Climate Change:** IPCC is the United Nations body for assessing the science related to climate change. All latest news and reports are **available online**
- **Climate Change Committee:** Latest news and publications from the CCC can be accessed **here**. Further evidence, research and analysis which informs the UK Climate Change Risk Assessment has been collated on the independent website www.climaterisk.org
- **Environment Agency:** The Environment Agency's third adaptation report under the Climate Change Act. '**Living better with a changing climate Report to Ministers under the Climate Change Act**' is available online. It sets out how the impacts of climate change affect the work of the EA, and how they are

preparing for those impacts Living better with a changing climate Report to Ministers

- **UK Health Security Agency:** UKHSA recently released a new report on the **Health Effects of Climate Change (HECC) in the UK – State of the evidence 2023**. This provides an authoritative summary of the scientific evidence on the health effects of climate change, potential implications for public health, and gaps in evidence.
- **Local Government Association:** The LGA have a range of **climate change resources** on their website for Local Authorities, including a **climate emergency knowledge hub**, **sustainability bulletin** and a searchable **database of sustainability and climate change case studies**.

Wider Lessons and Learning

- **UK Government Resilience Framework:** the 2023 Implementation Update provides an update on progress this year in making the UK more resilient to risks.
- **Covid-19 Inquiry:** The UK Covid-19 Inquiry has been set up to examine the UK's response to and impact of the Covid-19 pandemic and learn lessons for the future. The Inquiry's work is guided by its Terms of Reference. All latest news and documentation to date can be found on the Inquiry's **website**.
- **Thematic update on progress against the Grenfell Tower Inquiry Phase 1 recommendations** The latest document providing updates on the progress that has been made to implement the recommendations from the **Grenfell Tower Inquiry Phase 1 report**, was published in February 2024.
- **JESIP Joint Organisational Learning:** Information on the lessons captured through **Joint Organisational Learning** including details on processes and governance structures can be found online. ResilienceDirect users can access recently published lessons via **JOL Online**.
- **Rail Accident Investigation Branch (RAIB):** Reports, summaries of learning, safety digests, bulletins and recommendations can be found on the **RAIB pages** of the gov.uk website.
- **Air Accident Investigation Branch (AAIB):** Current air accident investigations, guidance documents and learning from AAIB reports can be found on the **AAIB pages** of the gov.uk website.
- **Marine Accident Investigation Branch (MAIB):** Current marine accident investigations, along with investigation reports and safety bulletins can be found on the **MAIB pages** of the gov.uk website.

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