




UK Climate Resilience Annual Review 2021





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EXECUTIVE SUMMARY

The UK Climate Resilience programme brings together fragmented climate research and expertise and undertakes robust, multi- and inter-disciplinary climate risk and adaptation research to build UK capacity for resilience to climate variability and change. It will also ensure the UK is well positioned to exploit the opportunities of adaptation and green growth.

The programme is jointly led by UKRI and the Met Office and has £18.6m of funding to achieve three main objectives:

1. Characterising and quantifying climate-related risks
2. Managing climate-related risks through adaptation
3. Co-producing climate services

This review covers the period from April 2020 to March 2021. It is an opportunity to celebrate successes and to ensure continual improvement of the programme and maximise benefits from achieving the objectives.

The initial phase of the UKCR programme has seen considerable development with key milestones.

MAY 2020

- Enhanced Climate Change Risk Assessment Capability Governing Adaptation grants started

JULY 2020

- Monitoring and Evaluation Plan finalised
- First Virtual Fora

AUGUST 2020

- Present & Future Climate Hazard grants started
- Living with Climate Uncertainty grants started

SEPTEMBER 2020

- Embedded Researchers Round 1 grants started

OCTOBER 2020

- 'Is the UK on track to adapt to 3 degrees' conference with National Centre for Atmospheric Science and The Climate Change Committee
- Operational Climate Services grant awarded
- Eurocordex grant awarded

JANUARY 2021

- H+++ grant awarded
- First phase grants completed



The programme's top successes were identified as

- Community building and raising the visibility of the programme
- Project outputs leading to engagement with government, related projects, and the wider scientific community
- Funding of grants at pace and completion of phase 1 grants whilst adapting to virtual working

The key lessons that should be taken into consideration were identified as

- The tight funding timescales and level of resource
- Virtual communications
- Maximising benefits

Overall, the programme management team and the Champions are pleased with how the programme has progressed over the last year. Particularly good progress has been made in building the climate resilience community through virtual communications, such as the webinar series and 'Is the UK on track to adapt to 3 degrees' conference in partnership with NCAS and the CCC. The programme has produced useful evidence, but much of this needs to be translated for specific contexts and applied at a strategic or operational level.





INTRODUCTION

Background and purpose

This document provides a review of the UK Climate Resilience (UKCR) programme, and captures the headlines on successes, lessons learned and progress towards the aims from April 2020 to March 2021.

The UKRI SPF team had previously required all SPF programmes to submit an annual review. This was intended to provide reassurance that the programmes are on track to meet their stated objectives and highlight early successes, which could then be used to promote the value of the SPF fund. While this is no longer a requirement, the need for due diligence and programme monitoring remains. Therefore, the UK Climate Resilience Programme Board (PB) decided that an annual review should still be produced each year.

The purpose of the Annual Review is to help inform the analysis of the UKCR programme to promote accountability, and to provide enough time for lesson learning and course correction throughout the remainder of programme.

Approach

The review is focused on two areas: programme management and the delivery of outcomes and benefits relating to the programme's strategic objectives. The programme was reviewed against evaluation questions, adapted from the end-of-programme evaluation questions, as set out in the Monitoring and Evaluation Plan. The initial research calls were awarded before the [Science Plan](#) and Monitoring and Evaluation Plan were developed, consequently these were not designed to specifically address the programme's legacy items. However, the scores still give a valuable indication of how the programme is progressing. We have used programme documents such as meeting minutes, the risk register and finance reports, and monitoring data from quarterly reporting, monthly dashboards, Researchfish and the Met Office to support the review process.

Audience

This Annual Review is intended mainly for internal use to enable the programme team to learn lessons about the design and management of the programme informing:

- discussions on potential improvements in the management and delivery of the UKCR Programme; and
- the development of similar programme approaches and other interventions in the future.

Sections of this review will be shared with the Steering Committee (SC) to enable them to give advice and guidance on maximising benefits, and extracts may be shared wider with stakeholders or through comms opportunities.

The Annual Review will also enable stakeholders to gain a better understanding of the programme and progress made to date.

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NOTABLE PRESS COVERAGE

Both Met Office and UKRI-owned communication channels have promoted the programme since the launch. The [Met Office](#) and [NERC](#) websites have dedicated sections for the SPF Climate Resilience programme including; latest news and funding opportunities. The dedicated [UKCR website](#) contains project descriptions, links to project outputs such as published articles, and the latest news and events listing. The other main channels utilised are the [Met Office Science](#), [UKRI](#) and [UKCR](#) twitter pages that amplify the messages and news. Events and stakeholder engagement have also been important for promoting the programme and progressing towards the aims.

The most notable press coverage during the review period is listed below.

- Garry *et al.* paper ‘Future climate risk to UK agriculture from compound events.’
 - 2-page article in Farmers Weekly print magazine; in print media by the Daily Telegraph (page 3); and in print media in the iNewspaper.
 - Online content from the press release was used in articles by [Farmers Weekly](#), Farmers Journal Ireland, in the Sun Online weather feed, in the Scotsman, and in Somerset and Dumfries and Galloway local media.
 - A news article written by Freya Garry featured on the SPF UK Climate Resilience website and, locally, on the Connecting the Culm website.
 - Twitter coverage led to total > 84k impressions.
- Wheeler and Lobley paper ‘Managing extreme weather and climate change in UK agriculture: Impacts, attitudes and action among farmers and stakeholders.’
 - Cover online at [EurekAlert!](#) and [AZoCleantech](#).



PROGRAMME SUCCESSES

The programme had many successes and highlights throughout the review period. Below are the key successes identified by the programme team and Champions (in no particular order).

Community building and raising the visibility of the programme

- Webinars have consistently attracted good attendance from a diverse audience and include talks from researchers and non-academic users. Registration figures to March 2021 show that 48% of attendees are from academia and science, while the majority of the remaining 52% are from public agencies, central and local government, and consultancy. Analysis shows that this is a continuation of an upward trend in the diversity of audience profile (Champion's Update, April 2021).
- All research focused webinars include a 'response' from an end user (e.g. government department) which helps to set the research in context, build the wider community and ensures engagement from key end users.
- The virtual forums for the UKCR community had high attendance from project researchers, including early career researchers. The forums have facilitated networking and collaboration between UKCR projects.
- Adapting the UK to a 3°C+ World conference in partnership with the Climate Change Committee and the National Centre for Atmospheric Science raised the visibility of the programme with researchers and other sectors, and therefore further supported the programme in ensuring the research outputs reach a wide and diverse audience.
- Engaging with users throughout the programme has added value.

Project outputs leading to engagement with government, related projects, and the wider scientific community

- Papers have been published in good journals and gained media coverage, and projects have produced useable outputs such as decision support tools which supports the fund level objective of ensuring investment links up effectively with government.
- Multiple projects inputted into the third Climate Change Risk Assessment and the programme provided funding for Richard Bett's time on developing the CCRA3 technical report.
- Project outputs have supported government engagement and are aligning with government priorities.

Funding of grants at pace and completion of phase 1 grants whilst adapting to virtual working

- Grants have been awarded at pace, as required by the Strategic Priorities Fund spend profile, ensuring the programme utilises all available funds.
- Successfully transitioned to virtual communications for launching, reviewing, awarding, and providing ongoing support for grants, minimising disruption to programme delivery and funded research despite the global pandemic.
- Regular engagement with researchers throughout grants has been beneficial, fostering good working relationships and early resolution of issues.
- Phase 1 grants have completed.



PROGRAMME LESSONS

Recording lessons from the review period is an important part of reflecting on progress so far and informing future decisions. Below are the key areas we can take learning from that have been identified by the programme team and Champions (in no particular order).

Funding and resource

- There have been missed engagement opportunities through resource and time constraints within the Champions team.
- The split between funding for grants and synthesis could be better balanced with more resource for synthesis to bring outputs and findings together as one programme rather than many fragmented pieces of research. Though note, this would have reduced the amount of research funding available and there are already unfunded excellent proposals due to financial constraints.
- Feedback from the scientific community indicated that compressed timescales for funding calls limited the ability of researchers to develop collaborative projects that will have useful and useable outputs.
- AHRC leading the Living with Climate Uncertainty call worked well; however, we could have missed similar opportunities for other calls by not considering the impact of other councils leading calls early enough.
- Not being able to issue shared calls between delivery partners has been a barrier to collaboration; for example, a call where climate services are advanced within a project that also incorporates research into climate risk.

Virtual communications

- The non-academic community has engaged well with virtual communications and events. For example, over 50% of registrations for the fortnightly webinar series have been from non-academics, Champions' Update April 2021. Therefore, we should consider continuing with a mixed model of online and in-person when planning future events.
- Working together and collaborating with others virtually has been effective and removed barriers of location and travel.
- Moving to virtual communications has been a trial-and-error process and as a result the Champions have built knowledge and skills in facilitating Virtual Fora, online workshops, hosting discussions and webinars, and encouraging more informal connections.
- Although virtual communications have removed some barriers, there is still more to be done to build better connections with and between researchers and the climate resilience community; for example, getting informal conversations going is still a challenge.

Maximising benefits

- The role of the Steering Committee in shaping calls was useful but now needs to adapt with the programme to focus on maximising benefits.
- Success of some research in community engagement needs to be built on to consider effective upscaling of research and outputs.
- The programme outputs need to be synthesised effectively to enable us to maximise benefits and we need to think strategically about this, given the existing capped resource.
- The programme is effective at providing evidence, but not distilling what this means to translate this into action. For example, the programme is not well-placed to support a future NAP process.





PROGRAMME CASE STUDIES

This selection of case studies highlights successful areas of the programme and illustrates the breadth of good stories there are to tell.

Exploring co-production for the UKCR programme

Co-production is a much-used phrase in the context of developing climate services and building climate resilience, and thus an underpinning concept for the UKCR programme. Given that a critical feature of the SPF is supporting multi- and inter-disciplinary research leading to improved linkages between researchers and policy makers, it makes sense that this should feature as a central component in the research process. Co-production was chosen as the focus of the third Virtual Forum for funded PIs and CoIs, with presentations from three contrasting projects. The key challenges and opportunities of co-production from the Virtual Forum are summarised in the full case study which is available on request.

CCRA3

Although the programme had not been expected to support the Third Climate Change Risk Assessment (CCRA3), it put forward the maximum possible amount of research evidence for the technical evidence report. This was supported by the special issue of Climate Risk Management, guest edited by Hayley Fowler, Suraje Dessai, Dann Mitchell and Jim Hall, that enabled the research to get timely peer review. This was also helped by the role Richard Betts plays, partially funded by the UKCR programme, to bring research into the Technical chapters. A summary of the input provided is available on request.

Building the community during COVID-19

One of the legacy items in the programme's Science Plan is concerned with 'building the community' around UK climate resilience research. COVID-19 and the national lockdowns have meant that physical events have not been possible throughout the last year, necessitating a rapid move to virtual communications and engagement to achieve this legacy item. A summary of how the programme has successfully continued building the community during COVID-19 is available on request.



ANNUAL PROGRAMME EVALUATION

The annual programme evaluation scores and narrative against legacy items indicate how the programme team and Champions feel the programme has progressed towards the aims within the review period. The annual evaluation questions were developed so as to have direct links to the programme legacy items. The programme legacy items can be found in the Monitoring and Evaluation Framework.

What has been the progress of the research towards bringing about a step change in climate change risk assessment capability?

The first tranche of projects has finished and laid seeds to create change. The second phase of projects have been designed to further strengthen this, but it is too early to expect to see the step change yet.

Many UKRI and MO projects have contributed to this or will continue to do so over time, for example, the OpenCLIM¹ integrated assessment model, Freya Gary's work on compound hazards², and Dan Bernie's work on moving from hazard to risk³. OpenCLIM needs to continue to work closely with government departments and other key audiences to ensure expectations of the outputs are realistic and that, as far as possible, the outputs are relevant and usable.

As the need is vast, there will always be gaps in our risk assessment capability. However, overall progress made in this year of the programme has been good considering the resource available; good projects have been funded and resulting papers are in high quality journals.

What has been the progress of the programme towards bringing about a developing and maturing climate service enterprise?

The programme is currently undertaking research to explore the appetite for and potential nature of a climate services roadmap. The MO has funded a specific project⁴ to develop this through discussions with key actors involved in climate service co-development, co-delivery and use. It is early in the process and developing the scope for the work has so far been slow as buy in from government has not been strong. New approaches for persuading government to play a bigger role in this are being thought through.

There is learning from climate services about upscaling projects and making a greater number of people aware. More could be done to develop thinking on upscaling, which links to discussions on the National Framework for Climate Services.


This work will also consider how awareness of the availability of climate services can be increased and how prototype climate services can be scaled up for wider use.

1. OpenCLIM NERC grant ref: NE/T0139321/1

2. **Project title:** Assessment of joint probability of multiple stressor variables using UKCP18 and consideration of spatial extent and possibility of repeat events **Principal Investigator:** Dan Bernie Co-investigator Freya Garry

3. **Project title:** Preliminary implementation of risk assessment framework **Principal Investigator:** Dan Bernie Co-investigator Emily Fennell

4. **Project title:** The National Framework for Climate Services roadmap **Principal Investigator:** Mark Harrison Co-investigator Louise Wilson and Nicola Golding



What has been the progress of the programme towards bringing about a vibrant climate resilience research community with better integration between academic and non-academic partners and research users?

Encouraging this is something the Champion team has been putting considerable thought into over the year. Community building has benefited from the way that UKCR research has been designed, implemented, evaluated and communicated, for example, the requirement for non-academic partners to be directly involved in shaping, implementing and evaluating the research and participating on project steering groups. Over the last year the webinar series has been successful in bringing many parts of the community together virtually, to hear from researchers and end-users. Getting both an academic and a non-academic perspective on the research through the webinars has been effective. There are still some researchers in the community who the programme has not reached; the Champions have been collecting metrics on this and plan to do a stocktake of who is and who is not being reached, compared with what was anticipated at the start of the programme.

What has been the progress of the programme towards bringing about more effective mainstreaming of climate research findings into updated guidance and standards?

The programme has produced useful evidence, but much of this has yet to be translated for specific contexts and applied at a strategic or operational level. Outputs from several projects have potential to feed into standards, codes of practice, and guidance, but have yet to do so and there is still work to do here to connect the research to the relevant industry bodies. Examples of projects are: Hayley Fowler's work feeding into uplift factors⁵; erosion of critical infrastructure⁶; JBA project providing recommendations on starting points for standards⁷; Climacare having potential to influence design of care buildings⁸; and E-flag⁹ and UKSSP¹⁰ aiming to become a standard dataset.

What has been the progress of the research towards improving decision making in national planning processes e.g. CCRA, NAP?

Although the programme had not been expected to support CCRA3, it put forward the maximum possible amount of research evidence for the technical evidence report. This was supported by the special issue of Climate Risk Management, guest edited by Hayley Fowler, Suraje Dessai, Dann Mitchell and Jim Hall, that enabled the research to get timely peer review. This was also helped by the role Richard Betts plays, partially funded by the UKCR programme, to bring research into the Technical chapters. There was a misalignment of timing with project outputs mostly being in draft at the time and were not as relevant or useful as they could have been. With more time and resource, the research being put forward could have been tailored. There has not been a NAP process since the programme began. It is acknowledged that the programme is better suited to support the CCRA than the NAP. Future research should be focussed towards improving the NAP and the NAP process wherever possible.

5. NERC grant refs: NE/S017348/1 and NE/V004166/1


6. NERC grant ref: NE/S01697X/1

7. **Project title:** Review of climate resilience mainstreaming into regulatory and voluntary standards, national guidance, and other sectoral/industry codes of practice (DN420232) **Principal Investigator:** Murray Dale

8. NERC grant ref: NE/S016767/1

9. **Project title:** Climate Service prototype development: enhancing the resilience of the water sector to drought events (DN420192) **Principal investigator:** Jamie Hannaford

10. **Project title:** Development and provision of UK socioeconomic scenarios for climate vulnerability, impact, adaptation and services research and policy (DN420214) **Principal investigator:** Jon Stenning



What has been the progress of the programme towards ensuring that it is easier to bring climate risks into decision making for public, private and third sector decision makers as they have access to relevant, accurate, timely and tailored information?

This is the fundamental work of the programme and has been more successful for some audiences than others. Given the limits of the resource, the main focus has been on government and CCC priorities, and the programme has had some success in providing usable outputs for this audience, e.g. on risk indicators and socio-economic scenarios. However, further work to synthesise and put the information into an accessible format is still needed even for this audience.

Communication of climate risks with other public, private and third sector organisations has been fairly good through the newsletters, Twitter and webinars, considering limitations of resource as there is a large need which cannot be covered in entirety with knowledge-brokering tailored communications. Programme communications, for example the infographics and the October Adaptation Conference in partnership with NCAS and the CCC, have been effective in helping communicate climate uncertainty to a broad audience.

Overall

Overall, the programme management team and the Champions are pleased with how the programme has progressed over the last year. Particularly good progress has been made in building the climate resilience community through virtual communications, such as the webinar series and 'Is the UK on track to adapt to 3 degrees' conference in partnership with NCAS and CCC. The programme has produced useful evidence, but much of this needs to be translated for specific contexts and applied at a strategic or operational level.

LEGACY ITEMS

1. A step change in future Climate Change Risk Assessment capability, including, through improved UK spatial modelling of climate-related risks, characterisation of interdependent risks and representation of adaptation strategies in integrated assessment models of impact and adaptation.
2. Enhanced capability and understanding of climate hazard and risk, through consideration of past, present day and future risks to the UK, including understanding robustness of methods, single and multi-hazard events, and producing high-end scenarios for national stress testing. This will enhance the UK's current decision relevant climate scenarios from other sources such as UKCP18 and CMIP6.
3. Strengthened understanding of how people, organisations and policy scales are adapting and how system scale interactions can act to incentivise adaptive behaviour, remove barriers, and avoid maladaptation.
4. Consistent set of UK socio-economic scenarios for national, regional, and local risk planning and research.
5. UK roadmap for the future development and implementation of climate services addressing the roles of public and private sectors. This provides the UK response to the Global Framework for Climate Services.
6. Grow the community of interacting researchers, practitioners and policy-makers in climate resilience.
7. Synthesis of findings across the programme to provide updated national guidance standards, policy regulations and good practice.



FORWARD LOOK

- A call for the second round of the Embedded Researcher scheme will be run early in the (financial) year, with the assessment of applications taking place later in the year, and a target of three placements of up to 12 months each being funded from November 2021.
- Embedded Researchers round 1 projects will continue to be delivered.
- Stakeholder mapping and management will streamline our work with others e.g. working more closely with Defra and other target groups to develop their own Embedded Researcher scheme, on adaptation indicators, and to inform the CCRA board and government risk holders on the work of the programme and how to connect.
- Helping to shape the NAP to contribute to legacy item 5.
- The programme will contribute to Road to COP26 activities and COP26 itself, e.g. supporting the design and delivery of the Adaptation and Resilience Day.
- The webinar series will continue.
- Synthesis workshops e.g. on indicators, climate information, co-production.
- Synthesis funding – monitoring of where this has gone and what it will achieve.
- Online launch of UK Climate Risk Independent Assessment 2021, planned for 16 June.
- Project promotion for SSP indicators will run during the week of 21 June.





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