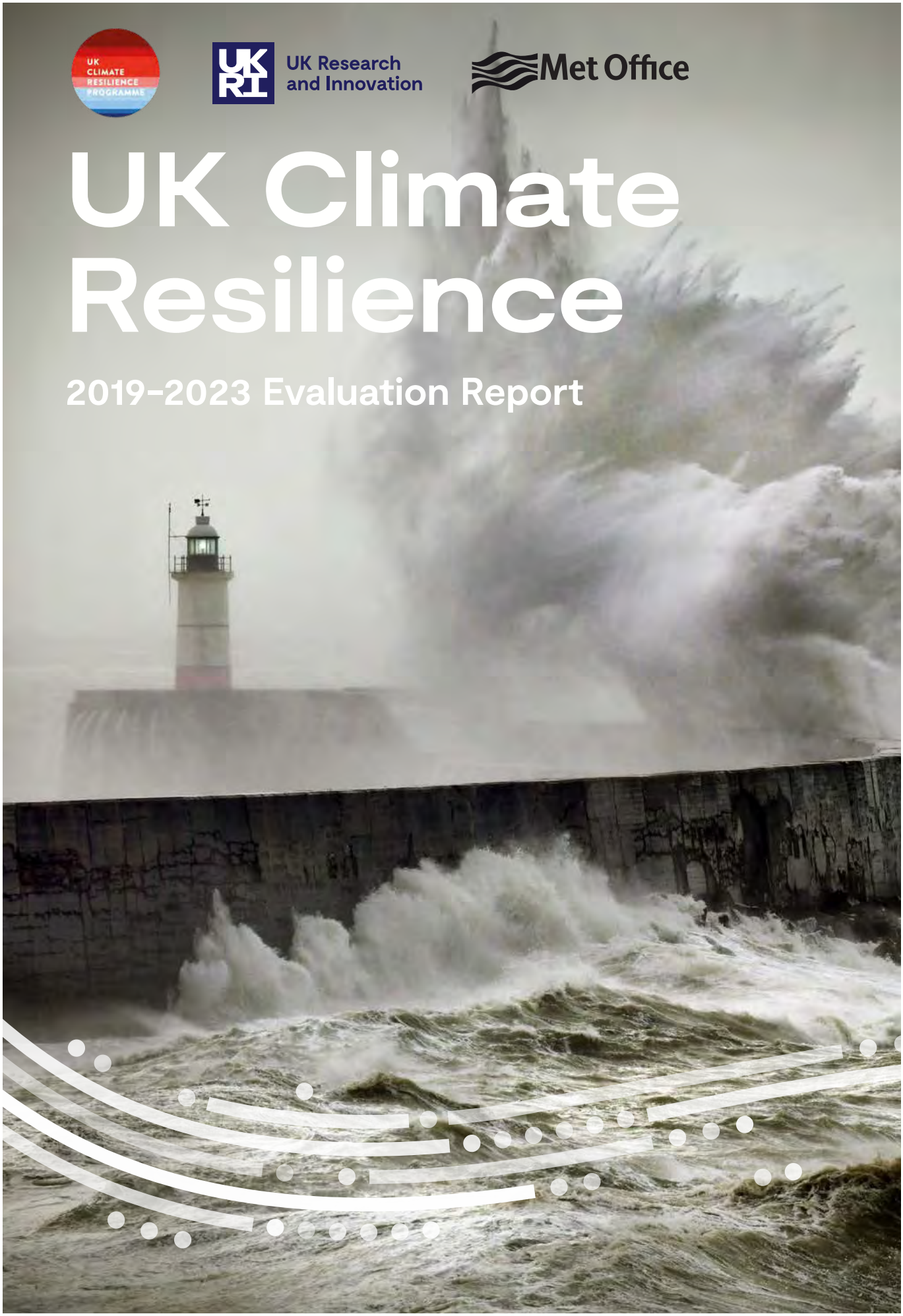
UK
CLIMATE
RESILIENCE
PROGRAMME
UK Research
and Innovation
Met Office
UK Climate
Resilience
2019–2023 Evaluation Report

CONTENTS

EXECUTIVE SUMMARY

Purpose and methods

This report presents the findings of the UK Climate Resilience (UKCR) programme evaluation. The evaluation was conducted by an independent evaluation panel in December 2022 and is based on evidence supplied by UKRI and the Met Office. The non-funded evaluation was designed to be a light touch assessment of the programme against its aims and objectives. Evaluating success offers an opportunity to demonstrate how well the programme has performed, to identify areas that could be developed or enhanced, and to identify lessons that can benefit programmes and delivery teams in the future.

Each evaluation question was rated against a 4-point scale from "Very Good" to "Unacceptable". Scoring was made by referring to the evaluation rubric found in annex A.

The independent evaluation panel agreed to score the questions to the decimal point, as they felt that it would give a more detailed reflection of their findings. Therefore, the following rating bands were agreed:

- 3.5 and above would be classed as good to very good
- 3 to 3.4 would be good
- 2.5 to 2.9 would be acceptable
- 2 to 2.4 would be less than acceptable to acceptable
- Lower than 2 would be unacceptable

	Evaluation Question	Score	Evaluation Rating
EQ1	Have the programme's vision, objectives and legacy been addressed through the activities?	2.8*	Acceptable
EQ2	Has the programme produced excellent research?	3.1*	Good
EQ3	How and to what extent has the programme taken account of the concerns, insights and needs of the relevant stakeholders and brought them into the research process to ensure the scope of the research is fit for user's purpose?	2.8*	Acceptable
EQ4	What is the relevance, importance and value to key intended users of the knowledge and understanding generated by the research?	2.9*	Acceptable
EQ5	How usable are the outputs of the programme for target audiences and wider users?	2.3*	Less than acceptable to acceptable
EQ6	What has been the contribution of the programme to bringing about a vibrant climate resilience research community?	2.9	Acceptable
EQ7	Have the programme's vision, objectives and legacy been addressed through the activities?	2.8*	Acceptable
		Overall	Acceptable

*Indicates evaluation questions where the independent evaluation panel felt that there was insufficient evidence provided in the evidence pack.

Recommendations

Evaluation activities

- The planning of evaluation activities should be carried out at the same time as the design of the intervention.
- For meaningful evaluation to be carried out appropriate consideration of resource allocation for the relevant evaluation activity should be planned during intervention design.
- Meaningful evaluation planning should aim to continue beyond the lifetime of the intervention's funding period.
- Careful consideration should be given to the quantity and type of evidence supplied to evaluators and the time/workload expectations, and should be identified as early on as possible.
- Evidence should be clearly linked to the impact it is supporting, with effective signposting for evaluators.
- The use of insight papers has value, but better communication of their role and intended audience would help evaluators assess their impact better.
- Where possible, evaluations should plan to use specific case studies as forms of evidence of impact and legacy.

Intervention development and design

- Where possible, longer periods of time should be allowed for grant bid development for those calls where interdisciplinarity, co-design and co-development are key elements of the objectives.
- Intervention design with interdisciplinarity as a key objective should aim to include elements similar to the Embedded Researcher scheme.
- Establishing a science plan has significant value where multiple funders are part of the intervention design.
- Time should be devoted to establishing a common lexicon to establish a common understanding across the intervention, its governance structures and its evaluators.
- Interventions should be encouraged to produce a communications plan from its inception, to include plans for internal communications where multiple simultaneous projects are anticipated.
- Early planning on mechanisms that support ECRs within the intervention and activities that support their networking and career development is beneficial.
- Robust monitoring, evaluation and learning structures should be built into the intervention from the beginning.
- Future interventions should look at ways of being more agile to changing levels of general public interest and build in mechanisms that help to identify current and future "hot topics".
- Interventions that are large, complex and/or have multiple parts benefit greatly from more sustainable and agile funding mechanisms such as the Champions role.
- Elements of intervention design that provide opportunities for ECRs should be included.
- Identification and recognition of excellence in interdisciplinarity and providing clear career pathways in interdisciplinary research needs attention in order to ensure growth in interdisciplinary capability and capacity beyond the lifetime of the intervention

Acknowledgements

UKRI and the Met Office would like to thank the independent chair and the independent evaluation panel for providing their expertise and time for this evaluation; their considered, constructive, and expert opinions have been extremely useful. Lessons learned from this evaluation will be used to improve future programme design and management. Our gratitude is also extended to the stakeholders who completed the stakeholder survey which formed part of the evaluation evidence pack.

INTRODUCTION

This report presents the findings of the Strategic Priorities Fund (SPF) UK Climate Resilience programme evaluation. The evaluation was conducted by an independent evaluation panel in December 2022 and was based on evidence supplied by UK Research and Innovation (UKRI) and the Met Office. The evaluation focusses on the seven key evaluation questions which were set out in the Monitoring and Evaluation (M&E) plan dated July 2020.

This report is structured around five main sections:

- Introduction – context of the evaluation
- Methods – outlining the evaluation planning and the approaches taken
- Findings – the main body of the report where findings are presented and discussed
- Recommendations – actions that are recommended to respond to the evaluation findings
- Next steps

Purpose and scope of the evaluation

The purpose of this activity was to provide an independent evaluation of the SPF UK Climate Resilience programme against its key objectives. The non-funded evaluation was designed to be a light touch assessment of the programme against its aims and objectives. The aim of the evaluation was to answer the following key questions:

- Have the programme's vision, objectives, and legacy been addressed through the activities?
- Has the programme produced excellent research?
- How and to what extent has the programme taken account of the concerns, insights and needs of relevant stakeholders and brought them into the research process to ensure the scope of the research is fit for user's purpose?
- What is the relevance, importance and value to key intended users of the knowledge and understanding generated by the research?
- How usable are the outputs of the programme for target audiences and wider users?
- What has been the contribution of the programme to bringing about a vibrant climate resilience research community?
- Have the programme's vision, objectives, and legacy been addressed through the activities?

The evaluation focussed on the programme outputs and outcomes and, therefore, this evaluation does not evaluate UKRI and Met Office management processes.

Audience

The audience for this report includes:

- UKRI Councils, particularly those involved in this programme:
    - Natural Environment Research Council (NERC)
    - Arts and Humanities Research Council (AHRC)
    - Engineering and Physical Science Research Council (EPSRC)
    - Economic and Social Research Council (ESRC)

- Met Office
- Programme Champions at the University of Leeds
- Programme Steering Committee
- Programme Board
- The former Department for Business, Energy and Industrial Strategy (BEIS), now the Department for Science, Innovation and Technology (DSIT) and the Department for Energy Security and Net Zero (DESNZ), who funded this programme.

The UK Climate Resilience Programme

The four-year SPF UK Climate Resilience programme was jointly funded by UKRI and the Met Office, through the Strategic Priorities Fund, with the intention of enhancing the UK's resilience to climate change. This was to be achieved through cutting edge interdisciplinary research and innovation on climate risk, adaptation, and services. Crucially the research generated from this programme was developed through close engagement with stakeholders and end-users such as policy makers, government advisors and industrial partners, ensuring that outputs were salient and tailored to end-user requirements. The programme's projects have covered a broad range of disciplines, including the natural sciences, social sciences, engineering, and the arts and humanities.

The programme's three main objectives have been to:

1. **Characterise and quantify climate-related risks** – Combining hazards with vulnerability and exposure to produce risk estimates.
2. **Manage climate-related risks through adaptation** – Societal responses to climate risks.
3. **Co-produce climate services** – Working with private and public sector organisations to provide climate information and tools that will aid future planning, decision making and support in the face of climate change.

The programme has also focussed on seven legacy items which were developed jointly by UKRI, the Met Office, and the programme Champions, in agreement with the Steering Committee and Programme Board. The legacy items are:

1. **A step change in Climate Change Risk Assessment (CCRA) capability**, including 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.
3. **Grow the community** of interacting researchers, practitioners, and policymakers in climate resilience
4. **Updated national guidance standards, regulations, and good practice** using programme findings.
5. **UK roadmap for the future development and implementation of climate services** addressing the roles of public and private sectors.
6. **Consistent set of UK socio-economic scenarios** for national, regional and local risk planning research.
7. **Strengthened understanding of adaption in practice** - incentives, barriers and avoiding maladaptation

Evaluation governance

The UK Climate Resilience evaluation process was agreed by UK Climate Resilience Programme Board (made up of UKRI and Met Office members) at Programme Board meeting #14. An evaluation workshop with UKRI and MO personnel was held in person with the Champions from the University of Leeds on 7 July 2022 at UKRI Head Office, Swindon. It was agreed that UKRI would facilitate the independent evaluation panel. Personnel from both UKRI and Met Office would gather evidence which would be used to inform the independent evaluation panel.

This evaluation was conducted by an independent evaluation panel of experts who provided a breadth of expertise and insight. All panellists were free of major conflicting interests as set out in the NERC Conflict of Interest policy.

The evaluation working group provided the panellists with a matrix document to be used to record their scores and observations, plus guidance on how to award those scores. Panellists were invited to attend a briefing meeting in the week commencing 7 November 2022 to discuss the evaluation process. The evidence pack for review was made available to the evaluation panel from mid-November, with the evaluation meeting scheduled for the 16 December. Discussion boards were made available over this interval for the independent evaluation panel to discuss the evidence prior to the meeting. At the panel meeting panellists discussed their views and scores, coming to a consensus rating and providing their collective feedback.

METHODS

Measuring programme success

Success in the UKCR programme is related to the achievement of the overarching objectives, which in turn relies on achieving the identified legacy items for the programme (see Section 3.1). Successful achievement of the legacy items is underpinned by the assumptions stated in the business case i.e.:

Partnership

The UK Climate Resilience programme is delivered in partnership which relies upon:

- A successful working relationship between the delivery partners and UK researchers.
- Shared understanding of objectives of the programme and agreed mechanism for allocation, e.g. by work package.
- Engagement with key stakeholders.

Research excellence

The anticipated impact for the UK Climate Resilience programme research relies on the delivery of excellent research to generate cutting edge, multidisciplinary knowledge.

Strategic impact

- The use of monitoring data will help shape the UK Climate Resilience research strategy and is dependent on the quality of evaluation and the usefulness of the evidence.
- The link to governmental department priorities is important for the delivery of the strategic impact. There is an assumption that these priorities will not change significantly during the lifecycle of the programme, and where priorities alter this programme is agile enough to respond appropriately and in a timely fashion.
- The evidence generated by the UK Climate Resilience programme will be used by policy makers to inform policy decisions.

To evaluate the programme success, the objectives and legacy items outlined in the science plan (annex B) have been brought together under six evaluation outcomes:

- Research excellence, which considers the technical quality, appropriateness and rigour of the design and execution of the research as judged in terms of commonly accepted standards for such work and specific methods, and as reflected in research project documents and in selected research outputs.
- Partnership and co-production, which considers the extent to which research results have been produced by a process that took account of the concerns, insights and needs of relevant stakeholders; how information was produced, vetted and disseminated and working relationships built during the research process.
- Research importance, which considers the relevance, importance and value to key intended users of the knowledge and understanding generated by the research, in terms of the perceived relevance of research processes and products to the needs and priorities of potential users, and the contribution of the research to theory and/or practice.
- Positioning for use refers to the extent to which the research process has been set up and managed and the outputs prepared so that they enhance the likelihood that findings will be used, be impactful and influential. This includes e.g. awareness of/ attention to user context; timeliness and accessibility of products and platforms; dissemination processes that are fit for purpose; development of key relationships before/ during/ after the research; strategies

to bring users into the research process.

- Building a coherent climate resilience research community which considers the development of successful working relationships e.g. between the delivery partners and UK researchers, academic and non-academic partners in the research and research teams and wider users of the research, and the identification of a common research agenda.
- Programme impact refers to the real difference that the programme has made and considers the temporal and geographical spread of this impact as well as how far reaching it is e.g. uptake by extended stakeholders.

Evaluation Questions

Activities and the funded projects undertaken by the UKCR programme can relate to multiple objectives and legacy items. Therefore, the Programme Board agreed the following evaluation questions, which are used to illustrate the progress towards the programme's goals. These evaluation questions were rated by the independent evaluation panel against a rubric found in annex A.

Question 1	**Have the programme's vision, objectives, and legacy been addressed through the activities?**
Question 2	**Has the programme produced excellent research?**
Question 3	**How and to what extent has the programme taken account of the concerns, insights and needs of relevant stakeholders and brought them into the research process to ensure the scope of the research is fit for user's purpose?**
Question 4	**What is the relevance, importance and value to key intended users of the knowledge and understanding generated by the research?**
Question 5	**How usable are the outputs of the programme for target audiences and wider users?**
Question 6	**What has been the contribution of the programme to bringing about a vibrant climate resilience research community?**
Question 7	**What real difference has the programme made with target groups, at policy levels and in terms of access to usable knowledge and developed capacity?**

In addition to the broad overarching questions above, the review panel would be asked to assess whether the programme has successfully fulfilled its key outputs and legacy objectives as outlined in the programme's Science Plan (annex B).

Independent evaluation panel

A broad spectrum of experts was approached to take part in the independent evaluation. These experts included both academics, practitioners, government department representatives and industrial partners. However, due to time constraints and the availability of panel members, we were unable to secure a wider demographic for the evaluation panel. Therefore, the independent evaluation panel was represented by the academic community, with stakeholder feedback supplied as evidence in the form of a stakeholder survey.

Evaluation process

The independent panel were asked to review an evidence pack which was made available to them. For each of the evaluation questions the independent evaluation panel assigned a score of 1-4 using the rubric provided (annex A). To facilitate the evaluation, each panellist had access to discussion boards, and they were also given scoring templates to populate prior to the evaluation meeting. The completed scoring sheets were collated and redistributed to the panel prior to the evaluation meeting and were used to aid the final discussions. During the evaluation meeting the independent panel agreed a score for each evaluation question.

UK Climate Resilience evidence pack

The independent panel was supplied with the following documents:

- Two programme insight papers randomly allocated from 11 (maximum of 3,000 words each)
- One programme annual review report randomly allocated from three (6,000 words)
- One stakeholder survey report
- The programme impact log
- UK Climate Resilience Science Plan (4,000 words)

Additional materials available to the panel included:

- All programme annual review reports
- The remaining programme insight papers
- Programme output log
- Programme publication statistics
- UK Climate Resilience website

EVALUATION FINDINGS

This section presents the collated ratings, strengths and areas for development identified by the independent peer review panel (referred to from here as "the panel") for each of the evaluation questions. The original anonymised response sheets can be found in annex C.

Evaluation question 1

Have the programme's vision, objectives, and legacy been addressed through the activities?

Rating		Rating Justification (rubric)
2.8		Some evidence that the programme is notable on a national scale, but most uptake has been regional. Key stakeholders are incorporating findings or referencing the programme in decision making. There is some media coverage, and likely of the funded research rather than the programme as a whole. It is likely that the programme, and its research, will continue to be utilised for the near to medium future.
	3.5 <	Good to very good
	3–3.4	Good
X	2.5–2.9	Acceptable
	2–2.4	Less than acceptable to acceptable
	< 2	Unacceptable

> "The work of the programme is cutting edge and its scientific merit is without question.

Strengths

Quality of the academic outputs

The work of the programme is cutting edge and its scientific merit is without question. Through the programme itself and the multiple projects that have been funded there is evidence of exceptional thoroughness in the research designs and all phases of research execution.

The breadth of research projects certainly show that the programme has created a vision and legacy of what was envisioned at the start of the programme. The quality of the programme outputs is good and some of the work is already being mainstreamed and being adopted by end users. There is evidence of efforts to meet methodological standards and accepted methodologies. Individual projects which are named in the insight papers such as 'Catchment Erosion Resilience' and eFlag are based on strong scientific background research and projects such as City maps are expected to enhance public understanding of the challenges and improve risk management.

Embedded Researcher scheme

The panel thought that the Embedded Researcher scheme was a particularly novel and impactful method of interdisciplinary working, and it enhances understanding of how academic methodologies can be used effectively in the non-academic setting and vice versa. There is interdisciplinarity in some of the projects and also in the engagement with the end users, although its impact is unknown currently.

> “The programme is filling an important gap in the climate governance landscape, bringing together key players working on climate resilience. Its work has also started to help establish a network of researchers in this field.

Mobilisation of existing knowledge

The programme has had an important impact in terms of mobilising existing knowledge and expertise on climate resilience across the UK. The programme is filling an important gap in the climate governance landscape, bringing together key players working on climate resilience. Its work has also started to help establish a network of researchers in this field. The programme has funded and generated new and relevant evidence which will increase the UK’s climate change risk assessment capability. However, this is also dependent on how the evidence is used and disseminated to the target audience and those working on the next UK CCRA.

Weaknesses

Interdisciplinary engagement

The panel suggested that the programme failed to fully create the intended inclusive inter-/multi-disciplinary approach. Some findings show a lack of engagement with broader disciplines such as disaster scholarship, sociology and political sciences. Whilst some projects have been interdisciplinary, their focus appeared to be on outcomes and not interdisciplinary engagement from the start. An example of this can be seen in the Hazard to Risk paper which demonstrated a lack of engagement with the disaster scholarship, which may lead to a scenario of “re-inventing the wheel”.

Although the projects cover different disciplines, there is very little evidence of interdisciplinary research in the evidence provided. The panel would have like to have seen more evidence of who and what disciplines had been involved in the programme. This information would have provided insight into what capacity and to what extent this involvement was part of the co-creation process and was this reflected in the programme outputs. It was felt that although several funded projects brought together different disciplines, the way in which these disciplines worked and interacted together in the design and delivery of the project was not clear. This is particularly crucial as it is emphasised as one of the programme key objectives. The need for further collaboration between disciplines is also highlighted in the last sentence of the third insight paper; “Data from CPM (and other) models needs to be fed into hydrological (and other) models on a national scale, requiring a much better understanding of vulnerability and exposure, and improved collaboration between different disciplines”.

Lack of tangible evidence of a step change in Climate Change Risk Assessment

The programme was intended to provide a step change to the Climate Change Risk Assessment cycle, the questions and answers session with the Champions confirmed there has been a step forward in this regard; however, there is little tangible evidence to support change as opposed to a step forward. Although several datasets and insights and evidence have resulted from the programme it is not clear how specifically these have been taken up or informed the CCRA cycle. This does not mean this impact has not occurred. The Champions are encouraged to share concrete evidence of the direct impact and uptake from the programme findings which have influence the CCRA cycle (or intended routes through which this will occur).

Ensuring legacy after programme end

The programme has brought together a climate resilience research community with enhanced collaboration between academic and non-academic partners and research users. The collaboration is evident, but it is too early to tell whether there has been true integration of the programme’s findings into non-academic practice. The programme website indicates there is an ‘Impact Translation Officer’ on the team. However, it is unclear the extent to which this role will be able to ensure the integration of existing and upcoming UK climate resilience policy processes at this current time. This role will be particularly important going forward (especially as the officer has not been in post from the outset of the programme) to ensure the programme outputs are taken up and used to update policy, guidance and standards.

Programme activities

The types of activities conducted through the programme (including webinars, events, papers, blogs, etc.) mainly consist of knowledge exchange. It would have been good to have seen more evidence of direct engagement with policy through briefing to government departments and ministers, and influencing the framing of tenders/government programmes etc. In the Joint UKRI & Met Office Science Plan, one of four main activities identified was coordination and networking activities. However, little evidence was provided in the evaluation evidence pack that such an environment was created. The panel felt that at times many of the collaborations may have already existed prior to the projects and may not have necessarily been new. The programme Impact logs reported 34 domestic collaborations on the publications and 45 international collaborations. Although international collaborations are welcome, domestic collaborations could be much stronger if a vibrant climate resilience research community is to be created.

The interpretation of co-production

The panel questioned the definition of co-production that was given in the insight papers. The panel suggested that co-production means working out of discipline with other stakeholders you would not ordinarily work with. There is sporadic evidence of this in various insight papers and the insight paper on co-production (Golding et al.) is excellent, but it only covers the projects that are more focussed on the social sciences. The panel feel that more work needs to be conducted by the authors of the more technical insight papers, on co-production, in relation to how it can be used to help make the CCRA process and climate services more rigorous in terms of incorporating co-production, qualitative, place-based understanding of risk and resilience. More work could be undertaken to link the programme more explicitly to the UK CCRA process.

Over ambitious scope

Some of the panel felt that the programme may have been over ambitious with its proposed aims, objectives, and legacy wish list. The timing of the programme also coincided with the COVID-19 pandemic and the panel acknowledge that this event has hindered programme activities and networking events. The programme length was not deemed long enough to fully realise these objectives and for a vibrant community to be built. It was also recognised that funding for over fifty projects may have been too broad, and a smaller more focussed set of projects may have been more beneficial.

“The programme has showcased many of its outputs through webinars, a showcase, reports that are available on the programme website providing a one-stop-shop should decision-makers require them.

Evidence for findings

The programme has led to a series of outputs that will further the UK’s understanding as to how to best adapt to and enhance resilience to climate risks. Several outputs stand out in particular, such as the new standard for climate services, a national framework for climate services, outputs from the UK-SSP project among others.

The programme has showcased many of its outputs through webinars, a showcase, reports that are available on the programme website providing a one-stop-shop should decision-makers require them.

The programme has also produced several academic outputs and tools which have been published and made available to users. The programme has some evidence of policy engagement; however, more evidence is needed to understand what impact the programme has had and how it has influenced the CCRA cycle.

Some of the panel felt that the insight papers, annual reports and the website were very generic and did not provide enough evidence to score the programme any higher than what was agreed. The panel noted that quality of the insight papers varied significantly and the examples of interdisciplinarity provided in the insight papers were not always enacted in practice.

Areas outstanding due to lack of evidence

It is not possible to accurately assess the uptake of the programmes outputs and/ if they have been directly used to inform policy or action relating to climate resilience in the UK.

The Monitoring, Evaluation and Learning Framework has gaps in terms of providing quantifiable/ tangible impacts and outputs that will directly link to the programme's overarching objectives linked to informing ongoing policy process on adaptation and resilience.

The papers assigned to the panel did not provide evidence on whether 'More effective mainstreaming of climate research findings into updated guidance and standards, and Improving decision making in national planning processes e.g. Climate Change Risk Assessment, National Adaptation Programme?' have been achieved. It was also not clear whether decision making has been changed as a result of the programme, even in the organisations where embedded researchers and non-academic champions were placed.

> "A larger number of external stakeholders was needed for this piece of evidence to be used more effectively.

The stakeholder survey was very limited with only seven responses, most of which were by the embedded researchers. A larger number of external stakeholders was needed for this piece of evidence to be used more effectively.

The panel found it hard to answer this question because the research vigour was not clear from the insight papers or the annual reports. Both pieces of evidence appear to rely on the same, clearly good projects, but this is not representative of the overall programme. More examples from a broad range of the projects needed to be highlighted.

Recommendations

- The programme to consider how its outputs/ outcomes will directly impact and influence the current CCRA cycle and provide metrics to assess that impact.
- The programme to provide information as to whether it has identified or explored alternative sources of funding to continue the programme.
- More detailed results need to be presented with case study examples which relate and feed into the legacy wish list.
- The panel also suggested that UKRI and the Met Office should continue some sort of funding of this field, as the UK Climate Resilience programme has spent years forming and nurturing an expert network on this issue. The programme needs to conduct evidence building, making sure that its impact informs ongoing policy on climate resilience. A more sustainable funding mechanism would be useful, with the potential for rotating Climate Resilience Champions with a team supporting this.
- Longer duration projects could lead to further interdisciplinary research projects and could also facilitate the development of a more vibrant and inclusive community.
- The insight paper findings (e.g. place-based and co-production insight papers) should be relayed to CCRA authorship and Committee on Climate Change (CCC) stakeholders in order to embed this type of softer, qualitative assessment of adaptation into future CCRAs. Social and political risks emanating from a sense of place need to be embedded within the CCRA process as part of its methodology.
- The panel recommends that the co-authors of the technical projects read the insight reports on place-based research and co-production.

Evaluation question 2

Has the programme produced excellent research?

Rating		Rating Justification (rubric)
3.1		Accepted methodological standards in the design and execution of the research are met. The research breaks new ground and demonstrates innovation. Evidence of good multidisciplinary working across the research team.
	3.5 <	Good to very good
X	3–3.4	Good
	2.5–2.9	Acceptable
	2–2.4	Less than acceptable to acceptable
	< 2	Unacceptable

> “The programme has encouraged academic and non-academic collaboration such as the embedded researchers programme which will hopefully lead to further innovation in the field.

Strengths

Innovative approach with quality research

The panel felt that the programme had been innovative in its approach and some of the findings such has the UKCP database was of particular merit. The programme has encouraged academic and non-academic collaboration such as the embedded researchers programme which will hopefully lead to further innovation in the field. This approach has nurtured less traditional forms of engagement and this approach often leads to innovation.

Another aspect of the programme that the panel commended was the fact that the programme highlighted the move from reductive understandings of adaptation in terms of risk probabilities to a more qualitative and sensitive appreciation of the effect of place-based adaptation. This approach considers the complex cultural, social and political settings that cannot be reduced to urgency scores and/ or probabilities. This type of adaptation measurement has dominated previous CCRAs.

Diverse set of research projects

The panel felt that the programme has funded a diverse set of high calibre research projects, which show evidence and potential for research excellence. Some of the projects have delivered ground-breaking research and have demonstrated innovation and interdisciplinarity. The panel acknowledge that 71 out of 99 papers listed on the programme impact log were published in journals with the highest citation impact (Q1 journal citation impact merit). In addition to this the Category Normalised Citation Impact for the papers is 1.94. Papers by UKCR projects are almost twice as impactful as an average paper in the same field.

Weaknesses

Interdisciplinarity and collaboration

Much of the produced research (that at least is highlighted in the insight papers) is multi or even single disciplinary, rather than interdisciplinary. An example of this is the hazard data sets which certainly refine our understanding of a hazard, but it does not push interdisciplinary boundaries. Increased interdisciplinarity would increase inclusivity and collaboration.

The panel felt that many of the projects shared links, but collaboration between the projects was underutilised. Research undertaken by the programme has been in general very good, but connectivity between projects could have been better. The panel highlighted the groundwater levels and flows in eFlag which could have been used in other projects, but there was no clear evidence that this had been actioned.

The panel also highlighted that many of the funded projects are led/ co-led by the Met Office which is one of the programme's overarching partners. These projects have produced new science, but this type of funding strays away from the innovation of research co-production with multiple stakeholders that the programme was designed to achieve.

Assessment of impact

The panel felt that many of the more technical projects and insight papers have not fully assessed output impact. Where models and tools have been produced, the panel felt that the researchers should consider how the model/ tool could be applied in practice, taking into consideration end user feedback. Nigel Arnell's work produced excellent research and an interactive tool but little or no assessment of the impact of the tool has been undertaken. How will the tool impact climate risk assessment in the future? The linking of tools and services to the CCRA process would be key in influencing the NAP and generating a wider impact for the programme's outputs.

Lack of broad climate governance research

Due to the nature of the programme, the panel would have expected that a certain number of funded projects look more closely at the broader issue of climate governance in the UK. The panel felt that research into the mechanisms across local/ regional/ national scales, identifying and working with key players, challenges and opportunities, and the possibility of establishing a national framework for adaptation to climate change should have been addressed more thoroughly. However, there is limited evidence of this being a focus of the programme.

> "Much of the research was produced for academic, expert, or informed audiences, with little research targeted at a less informed (e.g., public) audience.

Target audience

The panel felt that much of the research was produced for academic, expert, or informed audiences, with little research targeted at a less informed (e.g., public) audience. The panel feels this was a missed opportunity as climate change is a current and pressing issue with all members of society.

Breadth of research

The panel wanted to highlight the fact that it is difficult to judge scientific excellence across the programme as there are over 50 projects. This number of projects meant that it is impossible to assess all research in this evaluation. The insight papers produced also reflect this issue as findings are often generic and not enlightening to the reader.

Evidence for findings

The types of projects and the themes for investigation show good diversity of teams and ideas. However, interdisciplinarity is not always obvious.

The insight papers that will be included in the programme's book, although considerable effort has been made relating to the language, it is not clear as to how non-expert audiences will engage with these types of outputs. Some of the insight papers are too general and give only a brief overview of the individual projects. In some cases, the papers highlight administrative problems rather than the research.

Areas outstanding due to lack of evidence

It was extremely hard to judge the level of innovation from the conversations with the Champions, the insight papers and the annual reports.

The number of projects makes it difficult to assess the level of research excellence across the entire programme.

Recommendations

- Greater analysis of the impact of programme outputs such as models and tools is needed.
- Closer focus on climate governance is recommended for future programmes in this space.
- The use of insight papers/pivot books in the future should focus on research findings and less on general overviews.
- Further engagement with the research community around the key research disciplines, for instance assessment of socio-economic impacts or various hazards simulation would be beneficial for future programmes.
- The insight papers highlight barriers to research excellence such as trust, lack of time and funding to co-produce outputs; these factors need to be addressed in future programmes.

> “The Embedded Researchers scheme was commended by the panel as it is a particularly innovative and effective mechanism for engaging with non-academic partners.

Evaluation question 3

How and to what extent has the programme taken account of the concerns, insights and needs of relevant stakeholders and brought them into the research process to ensure the scope of the research is fit for user's purpose?

Rating		Rating Justification (rubric)
2.8		Target audience contexts and engagement have been considered during the research process, but some weaknesses remain related to how research needs and questions were identified, target audiences were engaged, relevant knowledge systems considered, co-production achieved and/or benefits from the research process assured.
	3.5 <	Good to very good
	3–3.4	Good
X	2.5–2.9	Acceptable
	2–2.4	Less than acceptable to acceptable
	< 2	Unacceptable

Strengths

Development of partnerships

The development of partnerships has been a particular strength of this programme. These partnerships have been both in terms of the support from the Champions and the individual partnerships that have been made by the actual projects. The Embedded Researchers scheme was commended by the panel as it is a particularly innovative and effective mechanism for engaging with non-academic partners. The embedded research scheme has provided various

engagement activities as well as opportunities for cooperation. This aspect of the programme highlights the importance of partnerships and co-production when delivering programme objectives.

Co-design with stakeholders and end users

Many of the projects have stakeholders and end users involved in their co-design or as participants in activities. The Embedded Researchers scheme has been a great conduit for co-design and partnership creation as mentioned above.

The programme has taken both science- and user-led approaches in developing digital support tools which highlights collaboration with stakeholders. Furthermore, some projects have provided industry and stakeholders with valuable information. A good example of this has been the outcomes from 'FUTURE-DRAINAGE' which have been used as the industry standard for all UK flood risk studies and assessments. These outputs have been used by the Environment Agency and the Scottish Environment Protection Agency to develop peak rainfall climate change allowances. Although there is no evidence of co-production as such, these outcomes could not be achieved without considering target audience contexts and engagement.

Stakeholder engagement at various geographical scales

Target audience context and engagement have been a key focus in many of the insight papers. Many of the insight papers offer different forms of evidence at various geographical scales from neighbourhoods to regional examples of stakeholder involvement. There is also evidence of inter- and trans-disciplinarity use with a variety of stakeholders to co-produce research outcomes beneficial to the end user. The programme Champions have clearly shown this through their annual reports.

Weaknesses

Lack of evidence to support co-production

The panel felt that it was not clear to what extent the outputs of the projects were co-produced with the partners as the focus of the reports and insight papers was largely on academic outputs. The insight papers continually highlighted the lack of time to make meaningful connections and co-production. The panel mentioned one of the insight papers which highlighted a workshop, where no non-academics attended, which does not suggest that strong and meaningful co-production was undertaken for that project. The majority of the co-production highlighted in the insight papers was with government departments and industrial partners do not feature as highly. Furthermore, the panel reiterated the point that little, or no collaboration was conducted with the general public, which could have been beneficial.

Uptake of findings

The panel highlighted the need for co-production and end user engagement to ensure the effective uptake of project outputs. The panel suggested that projects which require non-academic and academic partnerships should be given precedence on future programmes as these projects are more likely to result in the uptake of findings and have a higher possibility of contributing to ongoing policy developments.

Members of the panel would have liked to have seen an insight paper written by someone from the UK Climate Change Committee (CCC) or the Met Office, detailing how the programme's findings are being used and applied to the CCRA process.

The panel have also suggested that the programme has not directly targeted end users and stakeholders who are not currently thinking or considering their role in delivering action relating to climate resilience. Such stakeholders may not have considered climate impacts so far.

> “Co-production can only be truly meaningful if enough time is given pre-submission and post grant reward to enable true co-production to occur organically.

Barriers to co-production

The panel feels that co-production can only be truly meaningful if enough time is given pre-submission and post grant reward to enable true co-production to occur organically. Whilst short timeframes may be sufficient for existing collaborations, this perhaps was a main hindrance for new partnerships. From the stakeholder survey, some of the researchers' comments suggested that the scheme did not quite deliver what was expected. These issues included problems with the host organisation, communication issues and limitations to the uptake of findings. The researchers may have needed more mentoring to help negotiate problems that arose.

Evidence for findings

The evidence for the panel's findings were based on the annual reports and the insight papers. The role of the Champions and the engagement with non-academic organisations was also supported by the question-and-answer session with the programme Champions.

Areas outstanding due to lack of evidence

The panel thought that it was not clear to what extent co-creation was achieved. It was also unclear what pathways were used to identify the concerns, insights and needs of the relevant stakeholders. The stakeholder survey included few responses and the feedback contained was mixed.

Further metrics on the co-production of the projects such as the level of partnership investment could have been useful.

Recommendations

- Significant increase in timeframes to allow to co-creation/ co-production (perhaps even funded time).
- More focus/ funding on embedded researchers as these schemes may have to overcome more collaboration challenges.
- The insight reports need concrete examples of stakeholder involvement from project case studies.
- Further metrics needed on co-production and partnership investment.

Evaluation question 4

What is the relevance, importance and value to key intended users of the knowledge and understanding generated by the research?

Rating		Rating Justification (rubric)
2.9		There is good evidence that the research might contribute to an important target audience priority, a key development policy or strategy, or an emerging area of some significance that might demand solutions in the near future. A focus on this area of work at this time has been well justified.
	3.5 <	Good to very good
	3–3.4	Good
X	2.5–2.9	Acceptable
	2–2.4	Less than acceptable to acceptable
	< 2	Unacceptable

> “The findings from this project are already being used by the Environment Agency and the Scottish Environment Protection Agency to develop peak rainfall climate change allowances.

Strengths

Relevance of the research

The panel felt that the programme's research had provided an excellent step towards further understanding of climate risks and this was evident from the types of projects conducted and the research questions asked. Several of the projects have had a significant impact on their intended end-users. The city packs are proving a valuable product to the public and policymakers, providing local bespoke climate information. The eFLaG project has developed a high-quality enhanced future flows database of future river flows, groundwater levels and recharge, which can be used to coordinate a national approach to providing resilience to drought conditions and the security of UK water resources as the climate changes. This project is delivering a valuable service for end-users. As previously mentioned, the Future Drainage project is being used as an industry standard for all UK flood risk studies and assessments. The findings from this project are already being used by the Environment Agency and the Scottish Environment Protection Agency to develop peak rainfall climate change allowances.

Research informing the CCRA cycle

Many of the insight reports show that project findings can be used to help influence the CCRA process, and therefore policy. The research funded by this programme is directly relevant to the wider landscape of thinking and action on adaptation and resilience in the UK. Published research is already being shared and is informing the CCRA3 process. Funding calls have been informed by the programme Champions and the Steering Committee, ensuring that research is addressing the most topical issues. The panel feel that this is key to the programme producing tangible impacts across the UK. One of the panellists suggested that if the programme is informing the CCRA process, then communities are more likely to become involved with local projects as they may see clear pathways to policy impact and they will feel they are part of the process.

> “The programme’s international profile and engagement has been limited but the programme’s main focus was designed to be on a national scale.

Weaknesses

Programme visibility

The panel felt that the programme’s profile was not widely known by academics outside of the immediate and well-established community. The programme has had some success in its engagement with the media and high-level platforms such as COP. It has also published its outputs in high-ranking journals, demonstrating its importance. The programme’s international profile and engagement has been limited but the programme’s main focus was designed to be on a national scale. The programme largely speaks to an already engaged community and those who are not actively involved with the programme are not engaged. The programme’s work has largely been conducted by the key players in climate science, but it may have been beneficial to have funded new academics who are working on the periphery of this space.

Policy influence

From the evidence presented to the panel, national policy influence appears to have been limited. Many of the projects are place based and have local impact which makes it difficult to inform policy at a national level.

Delivery of outputs

The programme’s emphasis has appeared to have been on publications and academic journals rather than delivering the tools and models to the community. The panel suggested that there needed to be more focus on project case studies and what has been achieved in the insight papers. The papers highlight the eFLaG project as a successor to the Future Flows and Groundwater Levels (FFGWL) dataset, which is widely used within the water industry. It is unclear how services will be updated with the new projections without further investment. The insight papers also state Climacare has the potential to influence the design of care buildings; and the UKSSPs are aiming to become a standard dataset, but do not explain how this will happen.

Funding timeframes

The panel suggested that more flexible project timeframes would have been beneficial to delivering engagement to the wider community and also to building and nurturing partnerships. However, this may not be easily actioned in the current UK funding landscape.

Evidence for findings

The programme’s research outputs are clearly good (using the standard metric). The descriptions of the projects in the insight papers and annual reports helped to inform the rating of the programme.

Areas outstanding due to lack of evidence

The panel found it hard to understand the overall influence of the programme; some projects had more impact than others (which is expected) but it is hard to understand from the insight papers provided why certain projects were highlighted while others were not.

It was also unclear from the evidence presented the specific ways in which the research findings have been taken up and used to support practice. Such as whether the findings have been influential in shaping policy and how the outputs have been taken up by end-users. The panel acknowledges that the absence of evidence does not necessarily mean that this has not happened, nor that it will not happen in the future as impact may not be immediate.

Recommendations

- The gaps and barriers outlined in the insight papers are critical for enhancing the relevance further.
- Future programmes should look to build in more flexibility into project timeframes to accommodate stakeholder engagement strategy.
- Insight papers and annual reviews should contain more details on practical achievements and project case studies.

Evaluation question 5

How usable are the outputs of the programme for target audiences and wider users?

Rating		Rating Justification (rubric)
2.25		There is evidence that some analysis of the user setting was undertaken; however, consideration of this is incomplete and, furthermore, the analysis is not accompanied by discussion of actual strategies or plans to move the knowledge to policy or practice.
	3.5 <	Good to very good
	3–3.4	Good
	2.5–2.9	Acceptable
X	2–2.4	Less than acceptable to acceptable
	< 2	Unacceptable

> “Arts and humanities projects have demonstrated varying approaches and possibilities to give agency and urgency to different stakeholders through which to act and inform future resilience building strategies.

Strengths

User accessibility to outputs and outcomes

The programme has generated a rich range of outputs and outcomes and many of the projects have been co-produced which will facilitate a straight-forward dissemination of the outputs to different audiences and users. The panel found the programme website particularly accessible, and it provides an up-to-date repository of project information, outputs and outcomes, and for this it was commended.

The panel felt that the project outputs were generally usable and have the scope to be applied to different scenarios using the same methodology. The outcomes will be different because of the place-based nature of climate adaptation. Notable projects which are already being used by end-users are eFLaG, Future Drainage and the City packs.

Arts and humanities projects have demonstrated varying approaches and possibilities to give agency and urgency to different stakeholders through which to act and inform future resilience building strategies.

Weaknesses

Communication and engagement strategy

The programme's communication strategy was not clear considering the scope and budget of the programme. The outputs of the programme appear to be principally targeted at an informed (mostly specialist/academic) audience. This is understandable due to the complex nature of some of the science produced; however, at times this can limit accessibility. Particularly when an overarching aim of the programme is to influence end users and policy, who may not have a background in (climate) science.

> "Performance of social media activities would be expected to be stronger for such a high-profile programme.

Use of social media

This is a high-profile programme, and its media coverage does not reflect this. The piece of media coverage with the highest engagement was a negative story around the Shared Socio-economic Pathways (SSPs). This is rather disappointing as a programme of this size should have stronger publicity and successes should have equal coverage. Performance of social media activities would be expected to be stronger for such a high-profile programme and considering the programme's interaction with major events such as COP26.

The statistics around tweets are much lower than expected and points to a failure in engaging with end users and the scientific community. From the evidence supplied promotion of legacy is not sufficient and the programme website will become static at the end of the programme. This question may be too premature to comment on at this stage, as the programme still has a few months to run still.

The YouTube channel is a good source of information but mainly focusses on webinars and there is a limited selection of videos explaining the science, which may have been more engaging to different audiences. The ambition was there but it was a missed opportunity to connect with a diverse range of audiences.

Lack of engagement with stakeholder survey

The stakeholder survey response rate was very low, which made it hard to see whether users have been engaged. A very small sample of stakeholder feedback was made available and provided little insight into the usability of the programme outputs. Interdisciplinarity is noted but the evidence is not presented clearly, and therefore it was difficult to evaluate to what extent institutional, political, social or economic contingencies were considered.

Evidence for findings

Little evidence was provided to answer this question. The limited response to the stakeholder survey may make feedback unrepresentative. The panel also felt that more detailed examples of success should have been supplied.

Areas outstanding due to lack of evidence

- It is not possible to assess a Communications and Impact Plan of the project as this was not found on the website or in the evaluation outputs to assess.
- It is not possible to assess the usability of all outputs of the programme at this stage as some outputs may become usable after completion of the programme.
- More evidence of successes is needed.
- There was an overall lack of evidence presented in the evidence pack and insight papers.

Recommendations

- There should have been better management and clear communication of the expectations from the stakeholders' community from the start.
- More evaluation work needs to be done into the ways in which the programme has, for example, utilised qualitative adaptation research to inform future CCRA process, thus leading to more inclusive and equitable adaptation policy across the UK, at relevant scales of governance/policy.
- Future programme could consider producing a small set of outputs aimed specifically at a non-expert audience (e.g. Explainers, videos etc).

Evaluation question 6

What has been the contribution of the programme to bringing about a vibrant climate resilience research community?

Rating		Rating Justification (rubric)
2.9		Some evidence of ongoing activity (dialogues, research, joint working) that crosses research discipline boundaries and policy, practice, academia divides. Some sense of the ongoing research agenda on climate resilience in the UK. Some evidence that the programme has stimulated new initiatives and interest in how to build climate resilience in the UK.
	3.5 <	Good to very good
	3–3.4	Good
X	2.5–2.9	Acceptable
	2–2.4	Less than acceptable to acceptable
	< 2	Unacceptable

> "With COVID-19 occurring during the core years of the programme it is impressive that the programme has maintained momentum in engaging the community.

Strengths

Bringing the community together

A big strength of the programme has been its ability to galvanise and bring together many members of the community who have expertise in climate adaptation and resilience. With COVID-19 occurring during the core years of the programme it is impressive that the programme has maintained momentum in engaging the community.

The programme has enabled and enhanced sustained partnerships and a range of multi and interdisciplinary teams as well as bringing academic and non-academic partners together. The programme has had both domestic and international collaborations and a good range of projects from different disciplines. The legacy of this programme will probably be proved in 5-10 years' time.

The programme has also engaged with a wider audience through its activities at COP26 and through its series of webinars.

> The programme has highlighted the need to understand place-based adaptation in different and nuanced ways.

Place based research

The programme has highlighted the need to understand place-based adaptation in different and nuanced ways. The programme has encouraged multi-disciplinary project methods that move beyond reductive assessments of risk, and consider complex cultural, social and political settings. This approach leads to more higher community engagement.

Lesson learned for future programmes

The programme's insight papers have identified important lessons which can be applied to future programmes. These include:

- The need for flexible funding and project timeframes that will help facilitate community engagement.
- The language used to inform all stakeholders should be accessible and tailored to the target audience.
- The programme has acknowledged the constraints and benefits of virtual engagements.

The complexity of adaptation being place-based needs further acknowledgement across relevant funding bodies, and the academics undertaking research on adaptation. External reviewers (and this includes CCRA stakeholders/authors) do not always understand social science methods (and what co-production actually means in practice) as they have been trained in hard sciences, and therefore often prioritise epistemological approaches that reductively measure adaptation.

Weaknesses

Opportunities to establish new partnerships

While the programme has led to the establishment of a climate resilience research community, this has been almost exclusively aimed at the community directly funded by the programme or those working closely with it. There is little evidence of the programme actively attempting to engage with different disciplinary perspectives and early career researchers (ECRs).
The programme appears to have focussed on sustaining existing partnerships and funding projects by established academics in the field rather than targeting a diversity of new and less established voices. This approach may have limited the little opportunity to forge new connections and partnerships. To sustain a vibrant community, other disciplines and new researchers need to be incorporated, otherwise the community will only reflect the established players which are already prominent in the climate change community. This insular approach will also limit innovation and the agenda-pushing dimension of the programme.

Unclear if community can be sustained

There are no plans for funding post March 2023, so whether this community is sustainable is not known. It is not clear how the community will be maintained after the programme's end, as there is little evidence of a post programme strategy to support the community.

Lack of networking opportunities

Building a vibrant community during the COVID-19 pandemic must have been challenging as a lot of work had to be conducted online. That said, the panel would have liked to have seen more virtual networking events for projects and beneficiaries. Programme workshops and webinars showcased the programme's outputs but did not necessarily help build a stronger and diverse community. From the resources made available to the panel there was little evidence that programme events brought researchers together to discuss policy or consultations.

The panel suggested that the evidence pack could have included a database of who was involved in each of the projects. This database could help the panel understand the demographics of the community, such as academics, stakeholders and community groups. The audience statistics for the webinars would also be useful for this evaluation.

Evidence for findings

The programme has organised a range of activities and has contributed to various high-profile events. These activities and events are detailed in the annual reviews, the programme impact log and the insight papers.

Areas outstanding due to lack of evidence

The panel felt it would have been useful to have been provided metrics on the actions related to creating a vibrant climate resilience research community, such as number of unique and non-programme affiliated people attending the events or being engaged with the project.

> “Climate resilience programmes should be considering carefully how they will engage with stakeholders that are not actively thinking about climate resilience.

Recommendations

- More of this type of research needs to be funded by UKRI and statutory bodies like the CCC. Government departments such as DEFRA and BEIS need to acknowledge the need for such research where the methodological journey and co-production is as important as the tangible outputs.
- Climate resilience programmes should be considering carefully how they will engage with stakeholders that are not actively thinking about climate resilience but who will need to think about it in the near/ medium future
- Future programmes need to engage with the research community beyond the common collaborators which routinely work with the Met Office and must include resilience researchers.

Evaluation question 7

What real difference has the programme made with target groups, at policy levels and in terms of access to usable knowledge and developed capacity?

Rating		Rating Justification (rubric)
2.8		Some evidence that the programme is notable on a national scale, but most uptake has been regional. Key stakeholders are incorporating findings or referencing the programme in decision making. There is some media coverage, and likely of the funded research rather than the programme as a whole. It is likely that the programme, and its research, will continue to be utilised for the near to medium future.
	3.5 <	Good to very good
	3–3.4	Good
X	2.5–2.9	Acceptable
	2–2.4	Less than acceptable to acceptable
	< 2	Unacceptable

Strengths

Programme outputs and new knowledge

The panel felt that many of the funded projects have produced new and accessible knowledge which has addressed the programme's science plan objectives. The programme provides a pathway for informing the UK climate adaptation agenda; however, it is not clear to what extent the programme has been taken into account at policy level. The legacy items which were outlined have been very well written, but some panellists felt that it was not clear if these items had been met. The panel would have liked to have seen more evidence of this.

Some of the outputs produced by the programme have now become valuable sources for target groups such as industry and regulatory authorities, such as the Environment Agency. Noted outputs include FUTURE DRAINAGE's uplift factors, eFLaG's flows database of future river flows, groundwater and recharge and Climacare's potential to influence the design of care buildings.

The programme has contributed to the CCRA process through activities such as the journal special issue and the UKCR presentation to CCRA project board. The City Packs have also had significant influence on local governments across the country.

Regional impact

The programme has demonstrated success and impact at regional level. One of the projects which has had particular influence has been the City Packs which have been taken up by many cities around the UK. These packs are bespoke and have been tailored to each city's requirements and climate risks. Many of the programme's legacy items are aimed at a national scale; however, many of the projects have been at a regional level. Some of the panel felt that more work could have been undertaken to improve engagement with the community, international colleagues and also the general public.

The Embedded Researcher scheme

The Embedded Researchers scheme is highly commended by the panel as it demonstrated a novel and innovative way of working and engaging with non-academic partners, ensuring the co-production, collaboration and uptake of project outputs. One of the panellists stated that the Embedded Researchers scheme was a standout highlight of the programme and it had given the programme a lot of scope for legacy. The panel felt that the Embedded Researchers scheme could have potentially been developed further to help the UKCR programme deliver on its vision and objectives.

> "The panel recognised that the Champions of the programme had worked hard to engage with policymakers, and they have strived to highlight how the programme's impact and findings could be used to inform policy.

The programme Champions

The panel recognised that the Champions of the programme had worked hard to engage with policymakers, and they have strived to highlight how the programme's impact and findings could be used to inform policy. The Champions have also co-authored a special paper which contributed to the CCRA process.

Weaknesses

National level impact and policy influence

Although the programme has demonstrated some national success, most of the take up of findings has been at a regional level. Engagement with policymakers at the national level is difficult and the panel highlighted that research gatekeepers such as the CCRA stakeholders are more likely to favour epistemological quantitative frameworks than more qualitative place-based research. The panel thought that this may have been a missed opportunity, as the UK Climate Resilience programme could have played a stronger role in making the case for the important role of qualitative research. CCRA stakeholders inform the CCC, who recommend policy changes to the government through the National Adaptation Programme (NAP). Further, engagement with the policymakers, beyond CCRA, and regulatory authorities could enhance UK resilience to climate change and more work could have been undertaken on informing the

> “The programme’s vision, legacy and objectives have been framed around a bottom-up co-production process, which is aimed at relating to policymakers.

NAP. UKCR researchers cannot really do much more to facilitate changes in national policy on adaptation/ risk because the science-policy framework is geared up to position certain types of research as more legitimate than others (just like the IPCC for example). The programme’s vision, legacy and objectives have been framed around a bottom-up co-production process, which is aimed at relating to policymakers. This is not an issue with the programme, but the issue is how the government is structured nationally.

Some of the panellists felt that the programme had produced a lot of evidence, but it was not clear how or whether these outputs have or will be translated or acted upon at policy level. However, the projects have created an excellent foundation to create step change, and this now needs to be supported further by its non-academic partners. The current climate policy timelines and landscape could have been influenced by the programme, but this was not evident from the evidence given to the evaluation panel. One of the key aspects of the programme was to engage with end users and to look at how the findings could be taken up to inform policy; however, it is also worth noting that although the evidence is not clear, it does not necessarily mean that the programme has not had influence, but it is difficult to demonstrate this.

Engagement with the wider climate resilience community

Some of the panel felt that the programme was very good at bringing together those who were already working in the climate sciences, but beyond the initial sphere of influence, the programme’s reach was limited. Those working in the climate resilience space are mainly aware of the programme, but one panellist expressed that apart from the occasional newsletter about the programme, they rarely heard about the programme directly or via community contacts and networks. Another panellist would have liked to have seen more community engagement with other research communities such as the disaster community, as many themes overlap and there is a tendency to “re-invent the wheel”, particularly from an inter/trans disciplinarity point of view with engagement with social sciences, non-academic communities etc.

The panel also highlighted that the programme’s media footprint, including social media could have been much stronger and this would have helped engage more people with the programme. The programme newsletter as previously mentioned is not circulated often and is only received by those who have subscribed. A more comprehensive communications strategy would have helped boost engagement.

Evidence to support the achievement of the legacy items

One of the panellists felt that there was little evidence provided to support whether the programme’s legacy items had been met. They felt that the programme had been overly ambitious at achieving the legacy items with the time available, and this may also have been hindered by the COVID-19 pandemic.

Evidence for findings

The panel used the annual reports, insight papers and a questions and answers session with the programme Champions to inform their feedback on this evaluation question. The evidence presented in the insight papers and the annual reports focusses on regional scale research and how users have gained knowledge and developed capacity. The place-based nature of some of the projects has meant that national policy change is limited. Technical projects are often favoured by policymakers as opposed to qualitative, narrative led adaptation work.

Areas outstanding due to lack of evidence

One panellist would have liked more case studies of the programme’s work and more specific evidence that the programme was meeting its legacy items. As they felt that this question was hard to answer without further evidence and it was therefore unclear if the programme had actually met any of the legacy items.

Recommendations

- More consideration should be placed on how to engage with those not directly engaged in the climate resilience space and to engage with other communities such as disaster and hazard researchers.
- A more comprehensive media and communications plan, using social media more effectively to reach all audiences.
- Programme activities and scope should consider the general public and not just the scientific community to ensure all stakeholders are considered as this topic area is currently a high priority globally.
- A more comprehensive evaluation plan to be implemented at programme inception. Evaluation to include more detailed case studies of programme successes.

RECOMMENDATIONS

Based on the findings presented in the previous section, including the initial recommendations considered for each of the evaluation questions, the following core recommendations were suggested by the independent evaluation panel. These recommendations are made by the panel to aid UKRI and Met Office achieve success in future research programmes.

Programme scope

- The panel felt that the programme's vision may have been too ambitious for the number of projects funded and the time given. The programme has funded over fifty diverse projects with many valuable outputs. However, the panel felt that the programme may have had a greater impact on the climate resilience community if a smaller number of projects were funded with higher grants and longer timeframes which may have enabled stronger partnerships and stakeholder relations to have been developed and sustained. An emphasis on quality over quantity of the projects funded would have been beneficial, as it would help maximise the impact and legacy of the programme. If this had been the case this evaluation panel would have scored the programme higher.
- The embedded researcher scheme is highly commended by the panel for its innovative approach to co-production and partnership building. The panel felt that the embedded researcher projects would have benefited from longer embedding timeframes between the researcher and their host organisation. This would have enabled the researcher to become more thoroughly integrated with the organisation and for valuable relationships to be nurtured and developed. The 12-month placement of the researchers with their hosts, was deemed too short for any long-term relationships to be sustained.
- The panel would have also recommended that a specific funding stream for early career researchers (ECRs) could have been implemented. At a programme level it is difficult to compare Professor-level research with ECR-level research. The panel felt that the lack of ECR funding within the UKCR programme was a missed opportunity as this would have been a more innovative and inclusive approach. The inclusion of ECRs would have also made the climate resilience community more diverse and vibrant.
- One of the panellists suggested that future programmes focus more heavily on climate governance and how outputs and outcomes can directly feed into the CCRA and NAP cycles.

> "Global climate change and the UK's ability to adapt to changing climate are high priority topics with all levels of society.

Programme stakeholder engagement

- The panel recommends that future programmes of this size should have a public and policy engagement body. This body would investigate ways of engaging different stakeholders which are currently not engaged in the climate resilience space.
- The panel suggested that future programmes should develop activities which consider both the scientific community and the general public. Global climate change and the UK's ability to adapt to changing climate are high priority topics with all levels of society. The panel felt that the programme's focus on the academic community, decision makers and policymakers, could have been enriched by the addition of public consultation and interaction. The Arts and Humanities Research Council (AHRC) grants demonstrated good engagement with local communities.
- The panel thought that future programmes could have a more comprehensive media and communications plan. Social media usage such as Twitter and YouTube could have been more effective, especially for a programme funded by UKRI and the Met Office. The panel also suggested that a strategy be put in place at a programme's inception, detailing how the programme's website content will be maintained after the end of the programme.

> “Research that contributes and influences the UK CCRA process needs to be prioritised if findings are to have greatest impact and influence on policy.

UKRI and Met Office future funding recommendations

- The panel recommends that projects are designed to be implemented over longer timeframes with more flexibility, allowing researchers to cultivate strong working partnerships and to facilitate stakeholder engagement, interdisciplinary research, and co-production.
- UKRI should continue to fund activities such as the embedded researcher scheme which was innovative. The panel recommends that these schemes be given longer grant timeframes for the researchers to become fully embedded and for relationships and trust to be built with their host organisations.
- More research needs to be funded by UKRI and statutory bodies like the Climate Change Committee (CCC). Government departments such as DEFRA and BEIS need to acknowledge the need for such research where the methodological journey and co-production is as important as the tangible outputs. Research that contributes and influences the UK CCRA process needs to be prioritised if findings are to have greatest impact and influence on policy.
- Future climate resilience programmes should consider carefully how they will engage with stakeholders that are not actively thinking about climate resilience. Programmes should also look to engage with stakeholders and the wider research community from the programme’s inception.
- Future programmes need to consider engaging with the research community beyond the common collaborators which routinely work with the Met Office and UKRI, and must include resilience researchers from other disciplines.
- Future programmes need to fund more adaptation research as this has previously been overlooked in favour of mitigation research.

LESSONS LEARNED

Programme insight papers

- The panel felt that it was not clear why the insight papers were commissioned and what they hoped to achieve. The generalised nature of the insight papers was not necessarily informative, and it was not clear why certain themes had been selected for the chapters. The panel suggest the addition of specific recommendations and more detail on how the programme findings and tools are being used and taken up by stakeholders and policymakers.
- The language in the insight papers is not accessible enough for decision makers and practitioners. The panel acknowledges that work has been undertaken to make the language more accessible. However, the wording is in-between academic and non-academic, making the papers still inaccessible to non-academic audiences.
- If the insight papers are designed to inform policy and be used to brief ministers, the length of the papers needs to be shorter and should be 2 pages maximum.
- In general, the papers were summaries of the projects, but a greater emphasis needs to be placed on the research findings, tools, models and services. The papers should also use case studies to demonstrate the impact of the programme outputs and how they are being adopted by end-users.
- One of the panellists recommended that researchers from the technical projects read the insight paper on place-based research and co-production, so that they can think about how their work can incorporate co-production with different end-users which have not been previously considered.

Programme stakeholder engagement

- The panel felt that the programme should engage further with the research community especially key research disciplines such as those associated with socio-economic and hazard impacts as this may stimulate further research outcomes and bring together fragmented research with similar scope. The programme could have scored higher if interdisciplinarity had been increased, as this would have increased inclusivity and collaborations.

RESPONSE

Programme Board response

The Programme Board recognises that the independent evaluation panel could only comment on the materials they were provided with in the evidence pack, and that this is turn has been impacted by the timing of the evaluation, and available resources. In future a more focussed and considered selection of materials may be needed but it is likely that the biggest factor in improving the diversity and availability of evidence is evaluation timing. The evaluation working group attempted to balance the quantity of information that the independent evaluation panel were asked to review with the wealth of the programme outputs. This balance may have resulted in a lack of sufficient evidence in many cases. Realistic expectations of the time required to review the evidence pack was also an important consideration. The additional evidence that the panel suggested will be considered for future evaluations, but in this instance, it was not possible with limited resources to supply this information. As a result, some of the conclusions that the panel arrived at are at odds with the view of the Programme Board. More detail on the specific points is provided below, **but this is an area of learning that will be used to inform the planning and execution of future evaluations to ensure better collation and signposting towards evidence for evaluators.** The Programme Board also recognises that the timing of the evaluation did not allow for the inclusion of evidence of those impacts that materialise beyond the lifetime of the programme. **This learning point will also be taken forward to be considered in the design of future programmes and their associated evaluations.**

> “Much of this partnership building activity was carried out during the COVID-19 pandemic, which had a significant impact on the type of engagement activities that could be held, and in some cases delayed programme outputs.

UK Climate Resilience was the first programme of its type that brought such a diverse group of researchers together. A wide base of activity was envisioned which would provide insight into areas of research that needed further investigation. The Programme Board are pleased that the independent evaluation panel has recognised the excellent and innovative work of the programme, and that it has created a network of researchers through the programme's projects that have enabled partnerships and collaborations to be made that will go on and be productive. However, the Programme Board agrees **there is a balance between quality and quantity, and this learning can be taken into the design of future programmes.** The Programme Board would also like to highlight that much of this partnership building activity was carried out during the COVID-19 pandemic, which had a significant impact on the type of engagement activities that could be held, and in some cases delayed programme outputs. Under such difficult circumstances, the Programme Board feels that the research community achieved excellent levels of engagement and participation.

The independent evaluation panel have raised concerns over the level of co-production and co-design within the evidence submitted to them. The Programme Board feels that this is inaccurate and may be linked to differences in interpretation of the terms co-production and co-design. The Programme Board considers the definition of co-production to be 'working with end-users to design and produce outputs', and believes that under this definition the levels achieved by the programme were more than satisfactory, particularly within the context of the COVID-19 pandemic. The Programme Board is also confident that those engaged in co-design and co-production were fully representative of the intended users. To avoid confusion in **future evaluations, particularly those that include significant levels of interdisciplinary working, co-production and co-design, time should be devoted to establishing a lexicon for the programme community, governance structures and evaluators so that there is common understanding of key terms from the beginning.**

The SPF funding mechanism is coming to an end, but UKRI is still committed to funding inter- and cross-disciplinary work. Analysis of the NERC portfolio for 20/21 (NERC Portfolio Analysis dashboard) shows that climate science, including mitigation and adaptation, is second only to geosciences in terms of overall levels of funding spend, and remains an area of high strategic

importance. Discussions on the best way to build upon the work of the UKCR programme through future funding options are in progress. Various issues such as the identification of mechanisms that support the achievement of interdisciplinarity, ways to evidence interdisciplinarity and what excellence looks like are all complex challenges that the research landscape is facing, with significant work still to be done. To expect one programme to provide answers to these challenges over a 4-year period is unrealistic; however, the Programme Board are pleased to see the independent evaluation panel's recognition of the significant progress that the programme has made towards this (Ref EQ1, EQ2 and EQ5). As part of the programme's legacy and benefit pathways it is anticipated that the expertise in interdisciplinary working will continue to grow, with the resultant increase in collaborations, inclusivity, stakeholder diversity and engagement that the panel have highlighted in their comments. **Those aspects of the programme's design that have been identified as being key in supporting interdisciplinary working are already being incorporated into the delivery of inflight investments and will be used in the design of future programmes with similar objectives in capability and capacity building.**

> "The programme Champions have worked tirelessly over the 4 years of the programme, bringing researchers, policymakers, practitioners and the wider community together. In particular, they have had to find innovative solutions in often very short time spans and in circumstances never previously experienced due to the COVID-19 pandemic.

The programme Champions have worked tirelessly over the 4 years of the programme, bringing researchers, policymakers, practitioners and the wider community together. In particular, they have had to find innovative solutions in often very short time spans and in circumstances never previously experienced due to the COVID-19 pandemic, and we are very pleased that this work has been recognised in this evaluation. Much of the programme's communications, events and engagement activities have been designed and initiated by the Champions and their support team. The Programme Board along with the Champions recognise that **a more comprehensive communications plan is needed for future programmes and should ideally be in place at programme inception.**

The Embedded Researcher scheme, which was also commended by the independent evaluation panel, has highlighted the need for problem-based research in co-productive secondments. One of the major legacies of the programme so far has been the adoption of similar schemes within government departments such as DEFRA and the Environment Agency. These organisations are now undertaking schemes which have been directly informed and influenced by the UKCR Embedded Researcher scheme. The Programme Board will ensure that this aspect of the programme's design will be **disseminated as an example of best practice in programme design** where there are similar objectives.

The programme's intended audience has always been key producers and users of climate services for the use in climate risk and impact mitigation and adaptation purposes and was not designed to be used by the general public. However, the Programme Board recognises that the general public's interest in climate change has increased more than anticipated since the start of the programme. It will be **useful for future programmes to be more agile to reflect changing levels of general public interest**. Future programmes should build in more awareness of current "hot topics" and what may become "hot topics of the future. This learning point also ties in with the development of a communications plan at the inception of any programme.

As part of UKRI's diversity and inclusion initiatives, **consideration of Early Career Researchers (ECRs) and their career paths has already been built into subsequent programme design**, such as the NERC Changing the Environment Programme, where UKRI and academic institutions are looking at ways to promote and increase the amount of research opportunities for ECRs. UKRI are also looking at how research topics and innovative approaches will benefit ECR career progression. However, **more work is needed to provide clearer guidelines on how those taking an interdisciplinary route are rewarded, and how their career paths can be supported.**

The programme has secured additional leveraged funding from the private sector and this final data and information is collected through ResearchFish. The final programme results are due to be released in May 2023. This relates back to the timing of an evaluation in order to provide the full range of evidence to evaluators.

The observations made by the panel on the programme insight papers are valuable for future programme design where policy documentation is being created, and as such will be dealt with as lessons learned. **The Programme Board recognises that the use of insight papers has been valuable to the programme but could be improved upon.**

Champion's response

The UKRI funded champions and Met Office senior supplier (together referred to in this section as the Champions) would like to thank the evaluation panel for their work, and note the difficulties reported by the panel in many areas on the limited evidence they had available to work with. Indeed, we note several areas where the evaluation panel noted a lack of evidence, but where the Champions can point to relevant evidence. In particular, we also have concerns around the overuse of insight articles, which were but one type of output, and some inconsistencies within the evaluation, for instance around the consideration of engagement and influence with the CCRA process (contrast the discussions in EQ1 and EQ4). However, despite these limitations there are also some clear lessons that the evaluation has highlighted, which we would very much agree with. These include:

- It is likely that more could have been achieved with fewer smaller projects early on, and more emphasis on larger focused projects starting later. Using a large fraction of the funding at a very early stage before the science plan was fully developed is not recommended for future programmes. Furthermore, we agree with the panel that **sufficient time is needed for project start up, especially when they are highly interdisciplinary and involve a number of complex stakeholders** to enable new transdisciplinary connections to be made and relationships built.
- Good communications are an essential part of ensuring research outputs are usable and although the champion team (including the Met Office) was able to bring in excellent communication specialists, the importance of this role was only recognised later on. Developing a written communication plan for the programme at the start would have helped to clarify the needs of key audiences and identify the most effective channels to reach them. **A formal communication strategy and a clear plan for delivering this is an essential part of future programmes of this nature.**
- **A key learning for future programmes is to look for more interaction and flow of knowledge between projects within the programme.** Whilst this did happen in many cases, such as from research on understanding hazard in regional and local climate models being used in the urban climate service, there was scope to do more.
- **The commendation given to the embedded researcher scheme is appreciated and the Champion Team agree that it has proved very effective in creating fit for purpose outputs, building capacity in the host organisation, support career development of the researcher and good value for money.** We agree also that it is an approach that can be used more widely, and UKCR provided valuable lessons on what makes this work in practice. It is interesting to note the extent to which government departments increasingly following a similar model, particularly in support of the Third National Adaptation Programme (NAP3).

There are several areas of the evaluation where we feel it is **useful to highlight further evidence and offer alternative perspectives:**

- The levels of influence of the programme have been considerable, and almost certainly beyond that seen in the limited materials available to the review panel. The timing of the evaluation will not have helped here as the impacts are inevitably linked to policy cycles. In particular, **knowledge was used in the CCRA3 process; datasets such as eFLaG are being used in applications by organisations and projects beyond UKCR; and is likely to be used in CCRA4.** Furthermore, there are other aspects of influence and application that are apparent to the champions, including: a **strong input to DEFRA thinking on risk and**

adaptation; input to the CARIB/CARIF development; input to shaping the approach to CCRA4 e.g. through a dedicated workshop bringing together UKCR funded researchers with the CCC; the **ongoing influence of the embedded researcher scheme in supporting NAP3 through government secondments** e.g. in Ministry of Justice, Department of Education, DEFRA, Department of Transport; and **linkages made by researchers including the Met Office to a range of government departments based on UKCR advances** (e.g. the use of the CLIMADA set up with DfE). The programme has also had a **major influence on the direction of planning around developing future climate information beyond UKCP18.**

- Whilst the panel questioned the adequacy of **co-production it was evident to the champion team that co-production was widely deployed within the programme**. It was also apparent that as the programme ranged from underpinning hazard and risk science through to applications then several different types of co-production would be needed, with different levels of engagement being appropriate. It was also evident that many projects in the second phase of funding (which often included researchers from the earlier funding round) drew on and used learning about stakeholders from the first phase of shorter projects.
- Whilst not all projects were interdisciplinary (many were), the programme took a wider view noting that **multiple disciplines worked together where the vision and aims needed it** (e.g. Resil-Risk and ClimaCare). Furthermore, it was important to note that sometimes the interdisciplinary aspects were brought out during integration of multiple projects.
- From 2021-22, **the Champion team oversaw creation of an ECR informal network**. All known ECRs and all PIs were emailed with an invite for ECRs to join the network resulting in a group of 15 ECRs. Members of this group met every few months in an informal capacity, partly to discuss current UKCR-funded work but also to discuss the experience of being ECRs in academia and in consultancy. Through their participation in the network the ECRs were also kept better informed about other programme activity, e.g. several of them later became co-ordinating lead authors for the end of programme book.
- Additionally, **many of the embedded researchers were at relatively early stages in their careers.** The scheme supported their ongoing development and funded researchers have taken up new roles in the CCC, consultancy and academia. We would recommend that a future programme expands the focus on training for researchers and practitioners at all stages of their careers.

> “ The programme produced new learning on scaling results from individual demonstrators or pilots to larger-scale deployment.

There are some aspects not emphasised in the review where we believe there are some **additional lessons for future programmes.**

- The value of the **shared science plan**, with buy-in from the champions, steering committee, UKRI and the Met Office was significant. This set a clear vision for the programme, including clear legacy targets. Future research programmes should allow time early on to develop such a plan.
- The programme produced **new learning on scaling results from individual demonstrators or pilots to larger-scale deployment**. This will be a vital ingredient to making the UK more resilient and should be considered within future programmes. UKCR developed a tool kit and used several climate services as learning labs (e.g. urban climate services and eFLaG) to test and refine approaches to scaling results and services.
- **Transdisciplinary and interdisciplinary research takes time** – especially where there is a need to develop new teams and build new relationships. **This must be allowed for in the bidding time scales**. Funding non-academic partners would also help. It was hard for some non-academic partners to make the case for participating in the research and attending programme events.

Finally, we would like to take this opportunity to voice concerns about the limitations of the evaluation in capturing the impact and outcomes of the programme given its size and complexity. The scores of 'acceptable' and even 'less than acceptable' are misleading as they are based on an unrepresentative set of evidence for the whole programme. This is due to:

- **Funding available for the evaluation:** OECD suggests that 3-5% of programme budgets should be put towards programme evaluation. For a programme such as UKCR this would represent a budget of £570-£950k. We believe that the resource made available was inadequate for a programme of this nature. There was not sufficient time or staff capacity to put together an adequate set of evidence that could represent the programme at the time the evaluation was done. The panel thus had to make judgements about the whole programme based on a small and unrepresentative sample.
- **Evaluation Timing:** the evaluation took place during the final year of the programme when many of the projects still had many months to run (due to covid extensions) and the Insight papers were still in development and before the final programme conference in London. Much of the influence of the programme is, quite rightly given the nature of SPF funded work) linked to policy cycles. The CCRA4 process is now being shaped and the programme has been influential on that and bodies like CARIB – tasked with shaping the research agenda for the NAP. Requests for our input to these initiatives (one of the Champions reviewed the draft infrastructure section of the forthcoming NAP3) and secondment of one of the Champions to support the NAP3 M&E development suggest that the programme has been very influential on policy processes. None of this has been captured in the evaluation.
- **Evaluation Scope:** There are several comments in the evaluation referencing the lack of public engagement suggesting the Evaluation Team had not been made aware of the scope of the UKCRP. As a Strategic Priority Funded programme the UKCRP was focussed on government priorities and thus had, from the outset, a target audience made up of DEFRA Evidence and Policy teams, other government departments, devolved administrations and arm's length government bodies e.g. Environment Agency, Scottish Environment Protection Agency, Natural Resource Wales etc. Wherever possible through webinars, events, newsletters etc we brought in wider audiences. The programme would have been set up very differently if the wider public had been the focus.
- Monitoring evaluation and learning (MEL) was used in the programme, but this could have been deployed on a larger scale. **Future programmes should design a suitable MEL early on and have this running through the entire programme**. Furthermore, **it is recommended that a process be put in place by funders to revisit the outcomes and update the lessons once the programme has finished**, perhaps 1 year, 3 years and 5 years after the programme. Surveys of small numbers of stakeholders should be treated with caution.

> "Future programmes should design a suitable MEL early on and have this running through the entire programme.

In addition to the evaluators report, we note the Programme Board response and endorse much of their response to the evaluation. We thank the Programme Board for their ongoing support during the project, and for their significant contribution to making it a success. We also thank the steering committee for their considerable effort and guidance, including in helping to shape the research calls.

In summary, the champions believe there is evidence that the programme performed above the "adequate" level. A deeper, better resourced evaluation, performed a year or more after completion of this complex programme, would be better able to demonstrate this. At the final conference we recommended that what is needed now is work focused on moving beyond risk to support identification of adaptation action and delivery, including the national adaptation programme. This would draw on and expand the resilience community developed in UKCR and apply the science at a large-scale. Such a programme should be led by the challenges identified in practitioner communities, and support more effective national coordination and governance of adaptation to ensure that significant progress on climate adaptation and resilience is made.

> “Careful consideration should be given to the quantity and type of evidence supplied to evaluators and the time/workload expectations, and ideally should be identified as early on as possible so that evaluators can be briefed accordingly regarding time and workload expectations.

Learning points (combined from panel recommendations, Programme Board and Champion’s Team reflections)

Evaluation activities

- The planning of evaluation activities should be carried out at the same time as the design of the intervention. This would allow the design of the intervention to accommodate issues such as the timing of evaluation activities, data gathering and availability, and aspects of the intervention to be designed to better support legacy, uptake of findings and impact.
- For meaningful evaluation to be carried out appropriate consideration of resource allocation for the relevant evaluation activity should also be planned during intervention design.
- Meaningful evaluation planning should aim to continue beyond the lifetime of the intervention’s funding period as many of the impacts are realised after the funding period is over.
- Careful consideration should be given to the quantity and type of evidence supplied to evaluators and the time/workload expectations, and ideally should be identified as early on as possible so that evaluators can be briefed accordingly regarding time and workload expectations.
- Evidence should be clearly linked to the impact it is supporting, with effective signposting for evaluators.
- The use of insight papers has value, but better communication of their role and intended audience would help evaluators assess their impact better.
- Where possible, evaluations should plan to use specific case studies as forms of evidence of impact and legacy.

Intervention development and design

- Where possible, longer periods of time should be allowed for grant bid development for those calls where interdisciplinarity, co-design and co-development are key elements of the objectives.
- Intervention design with interdisciplinarity as a key objective should aim to include elements similar to the Embedded Researcher scheme.
- Establishing a science plan has significant value where multiple funders are part of the intervention design.
- Time should be devoted to establishing a common lexicon to establish a common understanding across the intervention, its governance structures, and its evaluators.
- Interventions should be encouraged to produce a communications plan from its inception, and update regularly according to the broader context of the intervention. Where intervention design includes multiple projects working simultaneously, plans for how internal communications occur across the projects are also valuable.
- Early planning on mechanisms that support ECRs within the intervention and activities that support their networking and career development is beneficial.
- Robust monitoring, evaluation and learning structures should be built into the intervention from the beginning.
- Future interventions should look at ways of being more agile to changing levels of general public interest and build in mechanisms that help to identify current and future “hot topics”.
- Interventions that are large, complex and/or have multiple parts benefit greatly from more sustainable and agile funding mechanisms such as the Champions role.

- Elements of intervention design that provide opportunities for ECRs should be included.
- Identification and recognition of excellence in interdisciplinarity and providing clear career pathways in interdisciplinary research needs attention to ensure growth in interdisciplinary capability and capacity beyond the lifetime of the intervention.

ANNEX A

UK Climate Resilience Evaluation Framework

Evaluation Outcomes	Evaluation Questions (EQ)	Unacceptable (1)	Less Than Acceptable (2)	Acceptable to Good (3)	Very Good (4)
Research excellence: High quality and innovative research relevant to the vision/ goals of the UK Climate Resilience Programme.	**EQ1:** Have the programme's vision, goals, and legacy been addressed through the activities. **EQ2:** Has the programme produced excellent research?	The research has little to no scientific merit. The defensibility of the approach is questionable. There are severe lapses in methodological rigour of literature review, data collection and data analysis. There is no, or very limited evidence of multidisciplinary working across the research team.	There is evidence of efforts to meet methodological standards, but the efforts do not fully succeed. There are major shortcomings in the justification for the choice of research design and methods. Limited evidence of multidisciplinary working across the research team.	Accepted methodological standards in the design and execution of the research are met. The research breaks new ground and demonstrates innovation. Evidence of good multidisciplinary working across the research team.	The research is cutting edge and its scientific merit is without question. There is evidence of exceptional thoroughness in the research design and all phases of research execution. There is clear evidence of strong multidisciplinary working. The project could serve as an exemplar of what it means to achieve this criterion.
Partnership and co-production in the development of the funded research.	**EQ3:** How and to what extent has the programme taken account of the concerns, insights and needs of relevant stakeholders and brought them into the research process to ensure the scope of the research is fit for user's purpose?	The nature of the research is such that target audience (e.g. end users) and wider stakeholder's knowledge and engagement do not need to be taken into account.	Engagement with target audiences and wider stakeholders has been neglected during the research process. Several major weaknesses can be found, related to how research needs and questions were identified, stakeholders engaged, target audience contexts and knowledge systems considered, and benefits from the research process assured.	Target audience contexts and engagement have been considered during the research process, but some weaknesses remain related to how research needs and questions were identified, target audiences were engaged, relevant knowledge systems considered, co-production achieved and/or benefits from the research process assured.	Target audience context and engagement have been a key focus in the research process. Few, if any, minor weaknesses remain related to how research needs and questions were identified, target audience and wider stakeholders engaged, relevant knowledge systems considered, co-production achieved and benefits from the research process assured.
Research importance to intended target audiences and wider users.	**EQ4:** What is the relevance, importance and value to key intended users of the knowledge and understanding generated by the research? **Sub-questions:** **EQ4a:** In what ways are research findings taken up and used to support practice? **EQ4b:** In what ways have they been influential in shaping policy? **EQ4c:** In what ways have these been taken up and built upon by scientific users?	There is little or no evidence that the research might contribute to a target audience priority, a key development policy or strategy, or an emerging area that might demand solutions in the foresee-able future. Needs assessments and justification for the work are absent or unconvincing.	There is some evidence that the research might contribute to a target audience priority, a key development policy or an emerging area that might demand solutions in the foreseeable future. A focus on this area of work at this time appears sufficiently justified.	There is good evidence that the re¬search might contribute to an important target audience priority, a key development policy or strategy, or an emerging area of some significance that might demand solutions in the near future. A focus on this area of work at this time has been well justified.	There is good evidence that the research is already recognized as having the potential to address a critical target audience priority, a key development policy or strategy, or an important emerging area that is highly likely to demand solutions in the near future. A focus on this area of work at this time puts the researchers at the cutting edge of an active and/or important field of work.
Positioning for use by target audiences and wider users.	**EQ5:** How usable are the outputs of the programme for target audiences and wider users?	There is little or no evidence that any analysis of relevant user environment was undertaken and that institutional, political, social, or economic contingences were considered.	There is evidence that some analysis of the user setting was under undertaken; however, consideration of is incomplete and, furthermore, the analysis is not accompanied by discussion of actual strategies or plans to move the knowledge to policy or practice.	There is evidence that the user environment and major contingencies have been examined and reflected upon and connected to strategies and plans for moving the research into policy or practice in a timely manner.	The analysis of the user environment and contingencies is exceptionally thorough and well-documented or articulated. There is evidence of careful prospective appraisal of the likelihood of success of strategies designed to address contingencies.

Evaluation Outcomes	Evaluation Questions (EQ)	Unacceptable (1)	Less Than Acceptable (2)	Acceptable to Good (3)	Very Good (4)
A coherent climate resilience research community	**EQ6:** What has been the contribution of the programme to bringing about a vibrant climate resilience research community? **Sub-questions:** **EQ6a:** In what ways and to what extent has the funding led to new, sustained and productive multi- and interdisciplinary partnerships? **EQ6b:** Is the programme producing multi- and interdisciplinary outputs? **EQ6c:** What has been learnt about the role of multi-disciplinary, user engaged research for complex issues and what do we know about how is this valued by funders, users, researchers?	No evidence of ongoing connections having built across funded research teams (including academic and non-academic partners) or ongoing collective activity or dialogues. No evidence/ motivation for ongoing activity and dialogue with target audiences and wider users of research. No evidence of shared meaning making or collective learning across the programme.	Little evidence of shared meaning making or collective learning across the funded research or more widely with users and target audiences. Little evidence of ongoing connections or activities having been built across the research teams. Little sense of a coherent future research agenda on climate resilience.	Some evidence of ongoing activity, (dialogues, research, joint working) that crosses research discipline boundaries and policy, practice, academia divides. Some sense of the ongoing research agenda on climate resilience in the UK. Some evidence that the programme has stimulated new initiatives and interest in how to build climate resilience in the UK	Substantial evidence of ongoing activity, (dialogues, research, joint working) that crosses research discipline boundaries and policy, practice, academia divides. Strong evidence that the programme has stimulated new initiatives and interest in how to build climate resilience in the UK with target groups and more widely. Evidence of a clearer research agenda on UK climate resilience.
Programme impact: funded research has demonstrable impact.	**EQ7:** What real difference has the programme made with target groups, at policy levels and in terms of access to usable knowledge and developed capacity?	There is little or no evidence of the programme, or its funded research, being used by key stakeholders. Awareness of the programme is limited to only key stakeholders.	There is evidence of knowledge of the programme by key stakeholders, with limited knowledge within the wider stakeholders. The programme, and its findings, are not featuring widely in decision making, but may be making limited appearances, usually at limited scale. The programme will likely not feature in decision making beyond the immediate future.	Some evidence that the programme is notable on a national scale, but most uptake has been regional. Key stakeholders are incorporating findings or referencing the programme in decision making. There is some media coverage, and likely of the funded research rather than the programme as a whole. It is likely that the programme, and its research, will continue to be utilised for the near to medium future.	The programme is being noticed internationally by extended stakeholders and might be making international media appearances. The programme, or its funded research, is featuring heavily in relevant government policy and feeding into decisions of extended stakeholders. It is likely that he programme, and its research, will continue to be referenced and utilised for the medium to long term.

ANNEX B

UK Climate Resilience Programme Science Plan

UKRI and Met Office science climate resilience programme – a plan for the four-year, £18.6 million joint programme to enhance the UK's resilience to climate change through interdisciplinary research and innovation.

ANNEX C

Glossary, acronyms and abbreviations

Champions	The Champions for the UK Climate Resilience Programme are Professor Suraje Dessai and Dr Kate Lonsdale at the University of Leeds. The Champions responsibilities include: · research alignment across the portfolio · promotion of knowledge exchange · linking the user community, policymakers and international research · data management and reporting · providing advice and recommendations to the Programme Board regarding the scope of funding calls
Embedded Researchers scheme	Researchers undertake 12-month placements within a non-academic host organisation to work closely and co-produce climate research. The scheme allows researchers to engage with key stakeholders such as decision makers and practitioners to work collaboratively and gather relevant data and information.
Insight papers	A set of 11 papers which discuss the main themes and learnings of the programme. Each paper forms a chapter of the programme pivot book. These papers are designed to advise informed audiences such as policy makers and government departments.

AHRC	Arts and Humanities Research Council
BEIS	Department for Business, Energy and Industrial Strategy
CCC	Committee for Climate Change
CCRA	Climate Change Risk Assessment
COP	Conference of the Parties
DESNZ	Department for Energy Security and Net Zero
DSIT	Department for Science, Innovation and Technology
ECRs	Early Career Researchers
EPSRC	Engineering and Physical Science Research Council
ESRC	Economic and Social Research Council
FFGWL	Future Flows and Groundwater Levels
IPCC	Intergovernmental Panel on Climate Change
M&E	Monitoring and evaluation
MO	Met Office
NAP	National Adaptation Plan
NERC	Natural Environment Research Council
SPF	Strategic Priorities Fund
UKCP	UK Climate Projections
UKCR	UK Climate Resilience programme
UKRI	UK Research and Innovation
UKSSPs	UK Shared Socioeconomic Pathways

UK Climate Resilience SPF Programme

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