
Climate research

Introduction



This case study on **climate research** is one of a series that we have developed to support and complement our published report on research and development.

Our examination of climate research focused on arrangements to coordinate the funding of underpinning research to predict future climate change and research to assess the impact of climate change on environmental, human and socio-economic related matters.

Other case studies focus on research relating to:

- advanced materials;
- animal and plant health;
- energy;
- human health; and
- robotics and autonomous systems.

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Summary



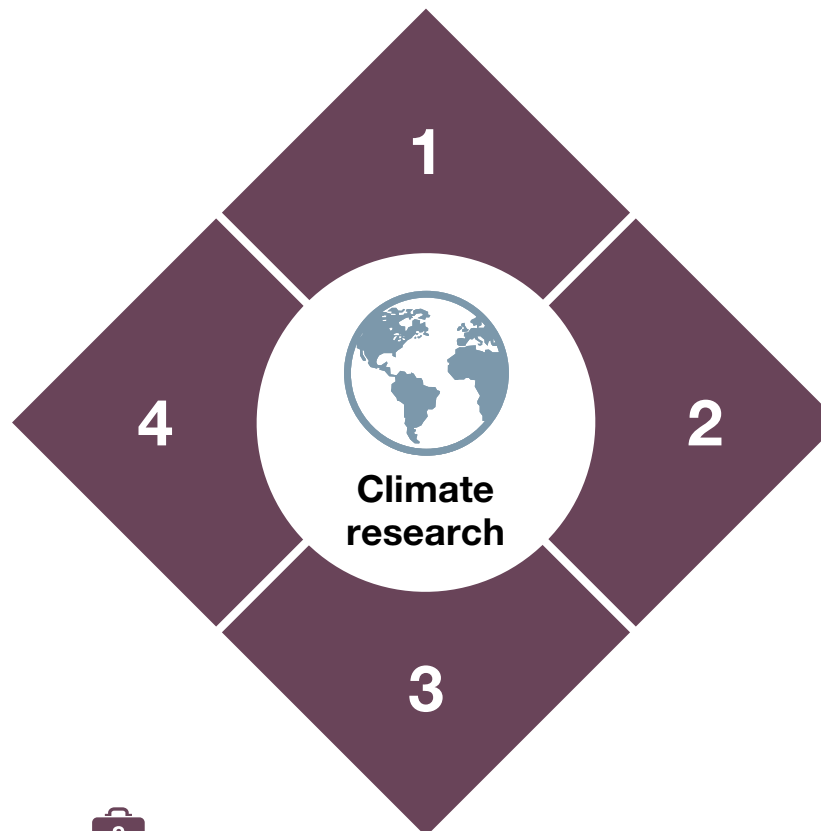
4 What did we find?

- Some evidence of coordination mechanisms in climate change modelling but coordinating research into the impact of climate change is more challenging as there are multiple funders and no single responsible body. This is coupled with an absence of consolidated information to inform decisions and evaluation
- The absence of a strategic approach may have led to gaps in evidence. There is scope for funders of climate science to align strategic priorities
- The Living with Environmental Change Partnership developed a database of funded research; however, it was not used and ultimately not continued because of the challenges of keeping it up to date



1 Who is involved?

Funders, coordinators, researchers, influencers



3 How much is spent?

Government invests more than £90 million each year in climate research



2 What happens?

Stages of research activity

Video ▶

[The real world view:
The work of the Met Office
Hadley Centre](#)

1 Who is involved?



The funders

- UK government departments, including the Department for Environment, Food and Rural Affairs (Defra), the Department for Business, Energy & Industrial Strategy (BEIS) and the Department for International Development (DFID))
- Research councils, including the Natural Environment Research Council (NERC)
- European Union
- Industry



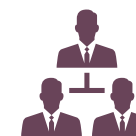
The co-ordinators

- Research and Innovation for our Dynamic Environment (RIDE), hosted by NERC
- Interdepartmental Met Office Strategy Group
- Joint Weather and Climate Research Programme (NERC and Met Office)
- Met Office Hadley Centre Climate Programme Board
- International Climate Fund
- UK Collaborative on Development Sciences Disaster Recovery Group



The researchers

- Met Office
- NERC research institutes
- Universities
- Industry



The influencers

- Policymakers and parliamentarians
- Committee on Climate Change
- Inter-governmental Panel on Climate Change (international body)

2 What happens?



Research aims

Description of research

Basic or fundamental research

Purpose of research

Knowledge expansion – to provide underpinning climate research knowledge and capability that can be used to support more targeted research to help meet specific policy objectives

Research to support government's policy objectives

Research to support:

- understanding the impact of climate change on the UK and action to adapt to and mitigate the effects of climate change;
- action the UK needs to take to meet its international obligations to contribute to reducing global warming;
- understanding the impact of climate change on developing countries and action to adapt to and mitigate the effects.

Funders include

Research councils; higher education funding councils; charities

Defra, DFID, BEIS and research councils

Where the research happens

The Met Office's Hadley Centre, university laboratories, research institutes (including the National Centre for Atmospheric Science, the National Centre for Earth Observation, the British Antarctic Survey, the Centre for Ecology and Hydrology and the National Oceanographic Centre)

Examples of current programmes and projects

Ecologists at the British Antarctic Survey are examining how penguins, seals and other species that make up the Antarctic marine ecosystem are responding to climate change.

- NERC and DFID have invested in climate models to inform decisions about sustainable resource use and resilience in Africa and Asia.
- Defra has invested in research to assess the level of public investment required to enable UK livestock to adapt to climate change and to safeguard productivity.
- AVOID 2 is a UK research programme funded by the UK government which aims to inform decision-making and international negotiations by providing policy-makers with robust science on climate change and greenhouse gas emissions.

3 How much is spent?



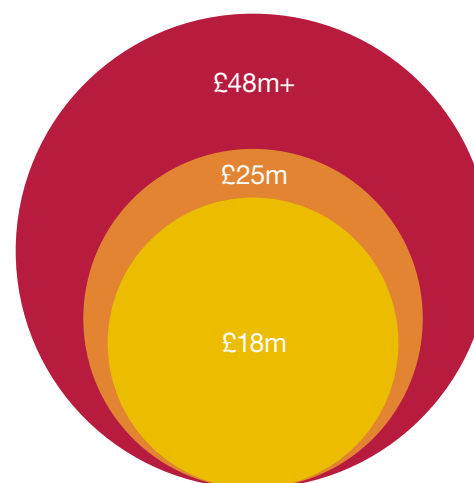
Who are the principal funders?

We estimate that government departments invest more than £90 million each year on climate research. However, total funding for climate science is not reported consistently or in one place.

Additional funding available for climate research:

- **Global Challenges Research Fund** (Official Development Assistance funding; will include some funding for climate science). Includes allocations to the research councils as well as a cross-departmental collective fund. This funding is restricted to support for specific developing countries.
- **The Newton Fund** make funds available to researchers to address climate-related research challenges in partner countries.

Public expenditure on climate science includes:



- NERC funding – around £48 million per annum of climate research is funded through competitive awards to universities and research institutes (£20 million strategic research and £28 million discovery science). NERC also provides national capability funding to its centres, including the British Antarctic Survey and National Centre for Atmospheric Science, that support a significant amount of climate research.
- DFID funding – around £25 million annually on maximising productivity and reducing the impact of weather, disasters and climate change on development and poverty alleviation (Source: DFID, Climate strategy, 2015).
- BEIS and Defra's commitment to the Met Office Hadley Centre climate programme was £18 million in 2015-16 (Source: Met Office Hadley Centre, Joint Department of Energy & Climate Change and Defra climate programme, 2015).

Note

1 The other research councils and the Higher Education Funding Council for England will also fund climate research within universities.

4 What did we find?



The absence of an overarching strategic approach may have led to gaps in evidence. There is scope for funders of climate science to align strategic priorities.

Coordination of climate science is complex, in part because there are multiple public bodies funding research that covers a range of objectives and funders set priorities depending on their area of responsibility. Existing coordination mechanisms do not appear to be sufficiently well developed to provide coherent leadership across UK climate science research. Stakeholders we spoke to raised concerns about the absence of a strategic plan and about gaps in key evidence.

The Committee on Climate Change told us that the lack of an overarching strategy for climate science research may have led to evidence gaps. For example, it concluded that more evidence was needed to understand the risk of flooding and coastal change to communities, businesses and infrastructure, and the risks to health, well-being and productivity from high temperatures. Its 2017 risk assessment identified areas of climate change risk where coordinated action is needed, and some evidence gaps identified in 2012 remain. In February 2017, the committee wrote to the chief executives of the research councils to highlight evidence gaps and to identify ways that the research councils, government departments and the new UK Research and Innovation (UKRI) could work together to inform policy on adapting to climate change. To respond to these findings, Defra is currently working to engage potential research funders (including research councils and academies) to address evidence gaps.

The Met Office considers that there is a need for a strategic core climate science plan which would include understanding which aspects of climate science need to be managed strategically with direction from government, and which areas can be left to market forces.

4 What did we find? *continued*



The Living with Environmental Change Partnership developed a database of funded research. However, it was not used and ultimately not continued because of the challenges of keeping it up to date.

Collecting and sharing coherent information on who funds what is challenging. While there are some shared systems for capturing information about research projects (such as Gateway to Research which includes information on projects the research councils have funded, and Researchfish, a private online facility that brings together information on research results), there is no single database that captures all government-funded research.

In 2010, the Living with Environmental Change partnership, a network of public sector funders and users of environmental research, developed Envirobase. Its aim was to create a single online search tool providing information on what was being done in the UK to understand the natural world, and to help users understand the complex funding and application picture. Envirobase held information on over 29,000 environmental research and observation activities, programmes and data sources provided by public sector funders and voluntary organisations.

However, in 2015 Envirobase was closed because of the challenges in bringing together and maintaining up-to-date data from multiple sources. Resources to maintain research data became more limited in 2016 when the LWEC partnership was replaced with Research and Innovation for Our Dynamic Environment (RIDE). RIDE was established to draw together key funders of research, set priorities and identify inter-disciplinary opportunities but has a smaller secretariat and fewer resources than the LWEC partnership it replaced.

Improving the quality of evidence on the UK's research and innovation landscape was identified as one of the expected benefits of UKRI. We see the potential for UKRI to play an important oversight role in ensuring that funders collect and share sufficiently granular information on what research is being funded, and that there is clear accountability and responsibility among funders, individually and collectively, for assessing skills, capability and infrastructure requirements. Funders should consider approaches that avoid data collection and analysis becoming a resource-intensive exercise that quickly becomes out of date; for example by automating and standardising data collection, or by categorising activities at the point of funding.

