

Proposed adaptation research priorities 2017-18

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In its independent assessment of the first Scottish Climate Change Adaptation Programme (SCCAP), the Adaptation Sub-Committee of the Climate Change Committee (ASC) described the programme as:

'...a significant first step to bring together existing policies and activities into a more coherent programme. Moving forward, it could be improved in terms of its coverage, governance and impact.'

With this in mind ClimateXChange has prepared the following papers to frame discussions with Scottish Government on priorities for the CXC adaptation research resource:

- Three climate change adaptation research issues papers¹ based on the issues identified in the independent assessment and the UK Climate Change Risk Assessment 2017, literature searches, and stakeholder engagement. The three papers cover the themes in the SCCAP – Natural Environment, Buildings and Infrastructure Networks, and Society, and provide a long-list of possible research to support the development of the second SCCAP due in 2019. Though framed with a view to fit the policy process leading to the second SCCAP, many of the proposed projects are not achievable in the timescale. Some projects would also benefit from the climate information that will be published with the UKCP18.
- A paper looking at monitoring and evaluation in relation to adaptation outcomes at local and national level². This takes in reporting relating to the Climate Change (Scotland) Act from local authorities, Scottish Government and the Committee on Climate Change. Recommendations are also based on international best practice on climate change adaptation M&E.

This summary paper draws together the research that could be delivered through the CXC resource, and through coordinating and initiating research delivered elsewhere. We focus on the evidence gaps where research would help develop indicators (connected to recommendations on monitoring and evaluation), scoping studies, and options for research to develop a systems approach to adaptation policy.

Recent experience has focused minds on flooding but we are conscious of the risk relating to all forms of extreme weather events, and recognise the importance of understanding potential impacts from e.g. drought or storm force winds as specifications are refined.

¹ Papers to be published: *Adaptation Research Issues Natural Environment*, Myroslava Khomik, James Hutton Institute, *Adaptation Research Issues Buildings and Infrastructure Networks*, LUC, and *Adaptation Research Issues Society*, Mike Bonaventura

² Paper to be published: *Developing adaptation monitoring and evaluation in Scotland*, Anna Moss, University of Dundee

Overarching research priorities:

New policy areas that could be included in SCCAP2

The social care and business sectors were not included in the first SCCAP. Our evidence review and the ASC independent assessment have identified these sectors as priorities that should be included in future adaptation policy programmes. We propose short term research (that could be delivered by end March 2018) as a first step towards assessing and addressing the exposure and vulnerability of both sectors. Both projects could be commissioned through CXC.

Social care

1. Using social care service provision as a case study, explore how different models of adaptation might contribute to our understanding of least cost / best value options for adaptation policy-making. The study should cover public, private and third sector actors involved in social care provision, and look at exposure and preparedness across the sector and its capacity to adapt.

Business

2. A scoping study for Scottish business in relation to the likely direct and indirect effects of climate change and current awareness, approaches and risk assessment procedures. This could provide a foundation for a more detailed analysis of 'at risk' sectors. In order to engage the sector as fully as possible we would recommend also assessing the market opportunities for adaptation goods and services.

Post-event recovery

There is a particular challenge in understanding the interface between communities/ infrastructure networks and the emergency response. Research has already begun in Aberdeenshire, Scottish Borders, and elsewhere to understand the community response. The suggested research is likely to fit with the National Centre for Resilience's community resilience work programme and priorities.

3. Develop an indicator set for post-event recovery to improve our understanding of this dimension of community resilience. This should include measures for material reinstatement, and physical and mental health.

Areas in need of immediate research action (evidence gaps)

Developments in flood risk areas

The Adaptation Sub-Committee highlighted a challenge in how we record the rate of developments in flood risk areas. CXC and SEPA have explored a potential indicator and the potential increase in risk and impact, but this has proved a difficult task not least because there have been a range of changing recording and data gathering procedures. CXC adaptation research fellows could develop this work further.

4. Based on the work to date engage stakeholders across planning, flood risk management and the built environment based on the current under-developed indicator. The project would aim to:
 - propose agreed definitions of 'development in the floodplain' and 'development at risk of flooding', identifying key risks and uncertainties for policymakers – and providing clarity for stakeholders; and
 - explore development management practices, including data collection methodologies and management practices in local authorities, and the ability of this data to be collated and used in informing a national indicator on development at risk of flooding.

Sustainable soil management

The ASC also identified a particular challenge relating to sustainable soil management. This is an issue that can exacerbate flooding impacts, impact water quality and quantity, and lead to reductions in soil carbon storage. The studies could be taken forward through CXC member institutions.

5. A comparative analysis of soil erosion data for agricultural and peat soils in Scotland, against conservation measures that could be delivered through voluntary and/ or regulatory land management systems
6. A study to evaluate the costs and benefits of turning marginal lands to forest versus agriculture use, taking into account a range of ecosystem services provided by these lands.

Cross cutting issues

Water management and the potential for natural flood management

Across all the themes in the SCCAP we find there is a need for research into the interdependencies relating to land use, infrastructure vulnerability and service delivery. This relates to both flooding, and water quantity and quality. However, for research on a timeline for the second SCCAP we propose a project focused on flooding. The work would need to be coordinated with CREW's programme.

7. Using data from 'Storm Frank' in December 2015, and building on the existing network of research projects, develop a multi-layer case study that could:
 - assess the likely impact of the 'rural multiplier effect' on climate change impacts, interdependencies and the costs of recovery;
 - model the susceptibility of local road and rail infrastructure to flooding and coastal erosion, taking into account the presence of local flood defences and including higher probability / lower magnitude events and, where possible, the influence of wind and storm-surge; and
 - examine the overall effectiveness of Natural Flood Management (NFM) schemes at a catchment scale; and how such schemes may influence the magnitude and severity of more extreme floods (for example, 1-in-50 or 1-in-100 year events).

Cascading failure and a systems approach (interdependence, resilience and critical 'nodes')

The UK Climate Risk Assessment 2017 takes a systems approach to reducing the risks from climate change. Both research and policy development has thus far worked on an issue basis. CXC has extensive experience in managing cross-cutting research projects, and taking this approach is in line with our recommendations for monitoring and evaluating the second SCCAP, see below. Developing the second SCCAP offers an opportunity to look across policy areas and outcomes to assess risks, opportunities and impacts.

8. Scoping a systems approach to adaptation policy based on a sector that is dependent on evidence from a range of disciplines and where local and national level are involved in governance and policy development. Social care, linking to research priority 1 above, or food production and distribution would be suitable policy areas.

Monitoring and evaluation

The aim of all policies under the SCCAP framework is to reduce Scotland's vulnerability to the impacts of climate change and make the most of the opportunities that a changing climate offers. To assess the impact of policy interventions there needs to be a framework for systematic monitoring and evaluation.

Our analysis considers developments in adaptation M&E theory resulting from practical experience in a growing number of countries, comparing Scotland's existing system to this 'best practice'. This identifies strength in the Scottish approach which need to be built on, and suggests improvements going forward.

The study has looked at:

- **Context-** How does M&E of adaptation relate to policy and the existing M&E environment? What is the specific purpose of the M&E and how will it be used?
- **Process-** How will M&E be established? How will M&E be implemented? Who will be responsible?
- **Content-** What will be monitored and at what scale? What type of data will be used?
- **Output-** How and when will information be presented? Do the products respond to the purpose of the M&E?

There are clear strengths to the Scottish M&E framework as set out in:

- Scottish Climate Change Adaptation Programme (SCCAP)³ and progress reports;
- Climate Change Adaptation indicators;
- Independent assessment by the ASC; and
- Public Sector Climate Change Reporting.

The framework makes use of a range of data sources, provides a cycle of review and response and creates a clear focus on both implementation and process. However, 'ownership' of the outcomes is not clearly defined and it is not clear how monitoring progress on climate change adaptation relates to the Scottish Government's National Performance Framework Scotland Performs, which assesses overall policy outcomes across national and local government.

9. Recommended research through the CXC adaptation resource:

- Scope how adaptation M&E can be aligned in overall assessments of progress against national outcomes for example through the Public Bodies Duties, Scotland Performs and the Sustainable Development Goals, including the 'ownership' of the outcomes.
- Develop a standard reporting form which prompts/ requires identification of targets and milestones, sets out a time table for delivery, assesses risks to non-achievement and actions to remedy, and identifies linkages and multiple dependencies across SCCAP objectives.
- Update relevant indicators and develop targeted indicator sets based on identified knowledge gaps and linked to national outcomes.

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³ <http://www.gov.scot/Publications/2014/05/4669>