Adaptation Research Issues: Society

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March 2017

Aim of this paper

This paper identifies research that can contribute to better evidenced-based policy development for the second Scottish Climate Change Adaptation Programme (SCCAP). It is based on a review of the *Climate Change Risk Assessment 2017 Evidence Report* (CCRA2017)[1] and *the Independent Assessment of Scotland's Climate Change Adaptation Programme,*[2] interviews with representatives of 21 public, private and third sector organisations [Annex A], and a Quick Scoping Review of the academic and grey literature [Annex B].

Priority research needs

- A scoping study to understand the direct and indirect (particularly the economic) effects of climate change on integrated health and social care provision, including any distributional differences, in order to identify cost effective adaptation options.
- Development of 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.
- An impact assessment that compares and contrasts the approaches and effectiveness of different awareness raising programmes, identifying best practice to improve programme design and deliver outcomes that demonstrably reduce risk.
- A scoping study to look at the potential direct and indirect effects of climate change on Scottish business at different scale in different sectors. In the first instance a high-level assessment could provide a sectoral analysis based on the 21 'Divisions' of the Standard Industry Classification codes. This would provide the foundation for a more detailed analysis in the future of those sectors judged to be most at risk.
- An assessment of the scope and size of the market for adaptation goods and services in Scotland, including a baseline of the current state of the adaptation economy, perhaps based on patent data. Use of the Department of Business, Energy and Industrial Strategy (BEIS) methodology would allow for comparison with previous work.

Key Evidence Gaps

We have found evidence gaps relating to five of the ten Adaptation Priorities defined in the Independent Assessment:

- Adaptation Priority 1: Social care delivery
- Adaptation Priority 3: Recovery from extreme weather events
- Adaptation Priority 6: Public understanding of climate-related risks

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[1] *UK climate change risk assessment 2017 Evidence Report.* Committee on Climate Change, 2016; available at: www.theccc.org.uk/UK-climate-change-risk-assessment-2017/.

[2] *Scottish Climate Change Adaptation Programme: An independent assessment for the Scottish Parliament.* Committee on Climate Change, September 2016; available at: www.theccc.org.uk/wp-content/uploads/2016/09/Scottish-Climate-Change-Adaptation-Programme-An-independent-assessment-CCC-September-2016.pdf

- Adaptation Priority 7: Business impacts from extreme weather
- Adaptation Priority 8: Business opportunities from climate change

Overall these gaps can be summarised as follows:

1. Neither the social care nor business sectors were considered in the Scottish Government's 2014 adaptation programme. The exposure and vulnerability of both will need to be addressed in the second SCCAP.
2. The processes involved in recovery from extreme weather events need to be better understood. The interface with emergency response is not well defined. A lack of longitudinal studies means outcomes remains largely unknown.
3. The effectiveness of our interventions is hard to determine. Impact assessments and on-going evaluation of adaptation programmes are required to establish whether they actually reduce vulnerabilities and are therefore value for money.
4. CCRA2017 advocates a 'systems' framing of risk. We have little experience of translating this type of thinking into implementation and significant research will be required to respond to this challenge

Research Priorities

Adaptation Priority 1: Social care delivery. The Public Bodies (Joint Working) (Scotland) Act 2014, which came into effect on 1 April 2016, will bring together health and social care under one partnership arrangement for each of the 32 Local Authority areas in Scotland. Social care will need to 'catch up' with health care in relation to its understanding of and planning for climate related risks. This will be necessary in the delivery of care itself (Care at Home) as well as in understanding the extent of the risk for social care facilities and the sector's dependencies on different areas of infrastructure, particularly transport and telecommunications.

As a starting point there is a need to assess the extent of the risk and the level and appropriateness of current action. Then, across health *and* social care, we need to understand the indirect impacts of a temporary or permanent loss of health and/or social care services.

Suggested research:

1. An assessment of the current levels of exposure, vulnerability and adaptive capacity of the social care sector, a sector that includes 2,000 public, private and third sector employers - child minders, day care centres, Support Care Services (sheltered housing and accommodation), care homes, nursing homes, care at home and other specialist services - and employs 200,000 staff in Scotland[3] (compared with a little over 162,000 in the NHS[4]).
2. A scoping study to understand the indirect (particularly the economic) effects of climate change on integrated health and social care provision, including distributional differences, in order to identify cost effective adaptation options.

Adaptation Priority 3: Recovery from extreme weather events. We need better evidence about the long-term effects on population health of repeated events, dislocation and relocation, and morbidity and mortality due to extreme weather. In contrast to emergency planning and response,[5] the longer-term processes supporting recovery are less well understood, so too the role and effectiveness of the different anchor organisations in community recovery.

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[3] Care Inspectorate, personal communication, February 2017

[4] NHS National Services Scotland, March 2017

[5] The 2015/16 Climate Change Duties (CCD) reports highlight a range of preparedness amongst the Category 1 Responders, not least in the recognition of climate change adaptation responsibilities by some Local Authorities (www.keepscotlandbeautiful.org/sustainability-climate-change/sustainable-scotland-network/major-players-and-climate-change-reports). However, overall, emergency planning is well established and processes are being put in place to support continuous improvement in emergency response. Useful summaries are available in the CCD reports for Scottish Fire and Rescue Service, Police Scotland and the Scottish Ambulance Service.

Suggested research:

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, for example:

    – A baseline assessment of the *FloodRe* scheme – premiums and claims - to support the development of an indicator of insurance accessibility and affordability.
    – A review of the current methods used in the monitoring and surveillance of pathogens and diseases following extreme weather events, with the objective of improving the accuracy and specificity of existing indicators (cf. National Health Service (NHS) Information Services Division (ISD) Scottish Morbidity Record 01 (SMR01)).
    – A review of the existing psycho-social guidance covering extreme weather events against international best practice to support the development of an indicator of mental health outcomes (cf. NHS ISD SMR04).

4. A systematic literature review of the role of public, private and third sector actors in community cohesion and resilience as the basis for potentially broadening the number of and strengthening recommendations on the role of specific agencies in policy delivery.

Adaptation Priority 6: Public understanding of climate-related risks. The focus of the Adaptation Sub-Committee (ASC) is on the uptake and impact of guidance and tools for organisations, businesses and communities. They highlight the resources produced by Adaptation Scotland.[6] However, guidance and tools have also been developed elsewhere. We need better evidence of how effective these resources have been, whether they are actually helping to reduce risk, and are value for money.

Several interviewees highlighted the fact that our current perspective on climate change adaptation is reflective and reactive. This backward looking perspective leads to a preference for persistence ('bounce back'), maintaining the status quo. It also limits our ability to imagine future opportunities

Suggested research:

5. An impact assessment that compares and contrasts the approaches and effectiveness of different awareness raising programmes, identifying best practice to improve programme design and deliver outcomes that demonstrably reduce risk.[7]
6. A systematic literature review of different techniques for scenario planning, 'visioneering' and future-thinking to improve our understanding of methods that can be used to reduce uncertainty in decision-making and start to establish strategies for horizon scanning.

Adaptation Priority 7: Business impacts from extreme weather. Business was not included in the first SCCAP. Policy development in this area was encouraged in the ASC's assessment. The risk to business is prominent in CCRA 2017 and it is noteworthy that no evidence of relevant research on the impacts of climate change on business is cited by the ASC in their gap analysis.[8]

According to the Federation of Small Businesses, the Scottish Chambers of Commerce and Scottish Enterprise, the identification of and response to shorter-term risks defines the agenda for business. Business owners and leaders are interested primarily in topics like economic efficiencies, inward investment, leaving the EU, business rates, energy strategy and the planning review.[9] As a result we have very little evidence on either the exposure or vulnerability of Scottish business to climate-related risks. Where evidence does exist it is available only at UK scale and frequently the interpretation of trends is based on statistically insignificant

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[6] Adaptation Scotland's tools and resources: http://adaptationscotland.org.uk/how-adapt/tools-and-resources
[7] Candidate programmes include those from Adaptation Scotland, Food Standards Scotland, Energy Saving Trust, Climate Challenge Fund, Health Scotland, Health Protection Scotland and Scottish Government's Resilience Division.
[8] CCC Research Conference November 2016 www.theccc.org.uk/uk-climate-change-risk-assessment-2017/review-and-engagement/research-conference
[9] These agencies are themselves at an early stage of their adaptation strategy and planning and typically follow one of Adaptation Scotland's programmes *Adaptation Learning Exchange for Organisations* and *5 Steps to Managing Climate Risks.* The capacity of both Adaptation Scotland the business support agencies will almost certainly become an issue.

samples.[10] Consequently, no analysis of the risk to the Scottish economy is currently possible.

On the basis of the interviews conducted for this study, tourism, which contributes around £11Bn p.a. to the Scottish economy, appears a particularly vulnerable sector. The agriculture sector is well informed about the risk from a changing climate and has started to adapt. The sector is likely to need additional Government support for the transformational change required in some areas. The situation in other sectors is unknown.

Suggested research:

7. A scoping study to look at the potential direct and indirect effects of climate change on Scottish business at different scale in different sectors. In the first instance, a high-level risk assessment[11] could provide a sectoral analysis based on the 21 'Divisions' of the Standard Industry Classification codes (SIC 2007).[12] Starting with SEPA's Flood Risk Management Strategies (2015) and Local Authorities' Local Flood Risk Management Plans, the study would provide an early opportunity to work with the Met Office's UKCP18 projections to evaluate potential changes in risk to business over time. This would provide the foundation for a more detailed analysis in the future of those sectors judged to be most at risk.
8. A study of infrastructure dependencies by industry sector would start the process of understanding the interaction of risks across what CCRA2017 calls *systems of receptors*.[13] Many sectors are particularly vulnerable to supply chain disruption: some of these, like the food value-chain, are part of the critical national infrastructure.

Adaptation Priority 8: Business opportunities from climate change. As noted above, several interviewees commented that the backward-looking nature of our adaptation policy-making might be limiting our ability to imagine the opportunities presented by climate change. This exacerbates the lack of engagement by the business community. Business opportunities here are the 'adaptation goods and services' arising from sectors which include tourism, primary production, financial services, water, transport and consultancy. The global market was valued at £66Bn by K-matrix in a 2011 report for the UK Government's Department of Business, Innovation and Skills (BIS), £2Bn of which was in the UK.[14]

There is no formal plan that focuses on the specific opportunities for Scottish business, which in itself has been identified in the CCRA17 as a barrier to effective action. There are though some examples of early initiatives. *Hydro Nation*[15] is one of the most advanced of these with ambition to develop the value of Scotland's water resources as they become scarcer elsewhere. Innovation is also apparent in primary production, although at the moment merchants and advisors promoting crop selection and researchers with interests in animal health and welfare control the agenda in this sector

Suggested research:

9. An assessment of the scope and size of the market for adaptation goods and services in Scotland, including a baseline of the current state of the adaptation economy, perhaps based on patent data. The use of the BIS methodology would allow for comparison with previous work.
10. Develop a targeted awareness-raising programme to stimulate business engagement and build commercial capacity to respond to the opportunities for adaptation goods and services identified above.

Cross-Cutting Issues: one of the most significant changes that will need to be addressed by SCCAP2 is the CCRA's framing of climate-related risk. It suggests that a systematic approach to risk is more likely to result in achieving the desired outcomes at least cost while avoiding unintended consequences. The CCC recognises that organising the risk assessment in this way will

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[10] See for example, FSB (2015) *Severe Weather. A more resilient business community; available at:* www.fsb.org.uk/docs/default-source/fsb-org-uk/pressroom/fsb-severe-weather-report-final.pdf

[11] See for example the BACLIAT Vulnerability Assessment from UKCIP: http://www.ukcip.org.uk/wizard/future-climate-vulnerability/bacliat

[12] Standard Industry Classification Codes (SICC): https://www.gov.uk/government/publications/standard-industrial-classification-of-economic-activities-sic

[13] **receptors** are geographic areas, people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets that are exposed to climate drivers (of change). The key receptors for Scottish society are discussed in Chapters 5 through 7 of the CCRA 2017 - *People & Buildings*, *Business,* and *International Dimensions* - and in Chapter 8 - *Cross-Cutting Issues*.

[14] K-Matrix (2012) *Adaptation and Resilience (Climate Change). Report for 2010/11.* BIS; available at: www.gov.uk/government/uploads/system/uploads/attachment_data/file/31721/12-p144-adaptation-and-resilience-climate-change-2010-11.pdf

[15] Scotland the Hydro Nation: www.gov.scot/Topics/Business-Industry/waterindustryscot/ScotlandtheHydroNation

create a challenge for policymakers but "[it] conveys a better appreciation of the interconnectedness of risks and opportunities from climate change" (CCRA2017, p.24). We have little experience of this type of policy-making and there is scant evidence of how we might monitor and evaluate outcomes.[16]

Furthermore, the monitoring of actions and evaluation of progress against plans (M&E) is inadequate and does not provide any meaningful insight into the extent to which our vulnerability to climate-related hazards is being managed or our risk being reduced. As the 2017 CCRA notes "[...] There is no systematic assessment and collection of the data that would be needed to assess whether policies are effective in achieving their objectives" (Chapter 8, p.43)

To gain experience of developing a systematic approach, we would recommend focusing initially on the resilience of just one area that will need to be sufficiently complex to be useful for illustrative purposes. Social care provision (see Adaptation Priority 1 above) would be timely, meaningful and an ideal candidate for the reasons elaborated in the suggestions below.

Suggested research:

11. Develop a demonstrator project to assess the feasibility of developing adaptation policy across disciplinary and Government Directorate boundaries. The project would model the interaction of climate-related risks across different *systems of receptors*, and highlight the co-benefits that can be expected from adopting this type of approach.

    - Social care provision would directly engage 3 Directorates (Health and Social Care, Communities and Economy) as well as several external agencies (NHS Scotland, Care Inspectorate, Coalition of Care and Support Providers) in understanding the interaction of risks across at least two systems of receptors (People and Buildings, and Infrastructure).
    - The indirect impacts of extreme weather events could be used to future-proof the business case for integrated service delivery, a service that involves public, private and third sector actors.   There are clear cross -cutting issues here too. Distributional differences exist in both geographical and socio-economic dimensions. Institutional barriers are also likely to become apparent since as far as we know the Joint Integrated Boards delegated to deliver integrated care currently have no plans that cover the resilience of social care provision.
    - Finally, monitoring and evaluation criteria could be established in policy design here at the outset to track progress on the resilience of the service, providing a case study of M&E best practice.

12. A framework for systematic monitoring and evaluation is required. It needs to include a data architecture, build on existing measures such as the ClimateXChange Adaptation Indicators project,[17] and be extensible to include the M&E of complex adaptive systems. The M&E criteria established for social care provision above could be used to validate this framework as it is being developed.

13. Using social care service provision as a case study, develop cost benefit analyses of different models of adaptation,[18] contributing to our understanding of least cost / best value options for adaptation policy-making, while recognising that policy may frequently need to include more than one model.

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[16] Only 41 papers were identified in a scoping review of peer-reviewed journals covering the 27 years since 1990.

[17] ClimateXChange Indicators and Trends: www.climatexchange.org.uk/adapting-to-climate-change/indicators-and-trends

[18] persistence (engineering resilience, 'bounce back'), adaptability (ecological resilience, 'bounce forward') and transformation (evolutionary resilience)

ANNEX A: List of representatives of organisations consulted during the course this review

1. *Fleur Ruckley, Project Director, 2020 Climate Group: www.2020climategroup.org.uk
2. *Anna Beswick, Programme Manager, Adaptation Scotland: www.adaptationscotland.org.uk
3. Rami Okasha, Executive Director Strategy & Improvement, Care Inspectorate: www.careinspectorate.com
4. Silke Isbrand, Policy Manager (Waste, Carbon and Climate Change), Confederation of Scottish Local Authorities (CoSLA): www.cosla.gov.uk
5. Laura McKelvie, Policy and Public Affairs, Federation of Small Businesses: www.fsb.org.uk
6. Dr. Jacqui McElhiney, Head of Food Protection Science and Surveillance Branch, Food Standards Scotland www.foodstandards.gov.scot
7. Dr. Joanna Teuton, Public Health Advisor, Health Scotland: www.healthscotland.scot
8. Dr. Colin Ramsey, Consultant Epidemiologist, Environmental Public Health, Health Protection Scotland: www.hps.scot.nhs.uk
9. Dr. Tony Hodgson, Head of Research, International Futures Forum: www.internationalfuturesforum.com
10. *Dr. Carol Hill, Principal Investigator, National Centre for Resilience: www.readyscotland.org/ready-government/ncr
11. Andrew Bauer, Deputy Director of Policy - Agriculture and Climate Change, National Farmers Union Scotland: nfus.org.uk
12. Garry Clarke, Economic Development Intelligence Unit, Scottish Chambers of Commerce: www.scottishchambers.org.uk
13. Lesley Frostick, Strategy Partner, Scottish Enterprise: www.scottish-enterprise.com
14. *Dr. Kate Anderson, Policy Officer in Community Resilience, Scottish Government Resilience Division: www.readyscotland.org/ready-government/resilience-division
15. * Alessia Morris, Head of Natural Hazards Policy, Scottish Government Resilience Division: www.readyscotland.org/ready-government/resilience-division
16. Nicola Gilray, Head of Strategic Communications, Scottish Social Services Council: www.sssc.uk.com
17. Denise Connelly, Sustainability Manager, Scottish Tourism Alliance: scottishtourismalliance.co.uk
18. Ruchir Shah, Head of Policy, Scottish Council of Voluntary Organisations: www.scvo.org.uk
19. * Martyn Emberson, Chief Inspector, HM Fire Service Inspectorate, Scottish Fire and Rescue Service: www.firescotland.gov.uk
20. * Ruth Wolstenholme, Managing Director, SNIFFER: www.sniffer.org.uk
21. Chris Wood-Gee, Chair, Sustainable Scotland Network: www.keepscotlandbeautiful.org/sustainability-climate-change/sustainable-scotland-network
22. * Janie Neumann, Sustainability Lead, Visit Scotland: www.visitscotland.org

Face-to-face interviews are highlighted with an asterisk (*); the remainder were conducted over the phone.

There are 22 representatives of 21 public, private and third sector organisations. The interview with Scottish Government's Resilience Division included representatives of both the natural hazards and community resilience policy areas.

Interviewees also referred the following organisations and people:

- Chief Officers: Health & Social Care Integration www.gov.scot/Topics/Health/Policy/Adult-Health-SocialCare-Integration/Implementation/ChiefOfficers

- Geoff Huggins, Scottish Government Director, Health and Social Care Integration
- Annie Gunnar Logan, Director, Coalition of Care and Support Providers, Scotland www.ccpscotland.org
- Jane Levine, Director, Social Work Scotland www.socialworkscotland.com
- Vivian Maeda, Business in the Community www.bitc.org.uk
- James Scott, Business Resilience Lead, Scottish Business Resilience Centre www.sbcc.org.uk

Annex B: Quick Scoping Review

B1. Search Protocol

Keywords were selected from the recommendations for each of the Adaptation Priorities made in the ASC's independent assessment, the risks identified in the CCRA, and research priorities raised during the interviews. They were used individually and in meaningful combinations as search terms against the databases identified below.

B2. Sources

1. Scopus: www.scopus.com
2. Web of Science: https://apps.webofknowledge.com
3. Open Grey: www.opengrey.eu
4. Adaptation Sub-Committee CCRA Evidence Gaps spreadsheet www.theccc.org.uk/uk-climate-change-risk-assessment-2017/review-and-engagement/research-conference

B3. Research Overview

include papers by Adaptation Priority :: principal journals :: principal themes :: CCRA Evidence Gaps analysis

[TO BE COMPLETED]

B4. Scottish Centres of Expertise research

* ClimateXChange: Assessment of Building Overheating Risk in Buildings Housing Vulnerable People in Scotland
* CREW: impacts of flooding on people and communities www.crew.ac.uk/project/assessing-impacts-flooding-people-and-communities