

Nexus Shocks Fellowship

Informing decision-making and resilience to nexus shocks: Exploring the findings from the Nexus Shocks project

Dr Candice Howarth
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Summary report to the ESRC Nexus Network

I would like to extend my thanks to the ESRC Nexus Network for funding this work. This summary report includes an overview of the project, summary of outputs and reflections on the project.

Background to the project

The Nexus Shocks project explored how to improve decision-making and resilience related to nexus shocks. The work consisted of two phases and was funded in 2015 by the UK's Economic and Social Research Council's (ESRC) [Nexus Network](#). Phase 1 ran from 2015 to 2016 set up the Nexus Shocks Network and involved a series of workshops to explore key opportunities and challenges to nexus shocks. Phase 2, the Nexus Shocks Fellowship, ran from October 2016 until September 2017 led by Dr Candice Howarth at the University of Surrey with Research Fellows Dr Sian Morse Jones and Dr Katya Brooks, and comprised a desk-based review of the literature (Howarth and Brooks, 2017) and a qualitative study to collect primary data using semi-structured interviews. It took forward the work started in 2015 (Howarth and Monasterolo, 2016 & 2017; Howarth 2016 a & b) by exploring insights from existing evidence and practise on the current picture of decision-making and resilience to nexus shocks in the UK and how this could be improved.

The food-energy-water-environment (FEWE) nexus is an increasing area of interest for decision makers (Wentworth, 2016). The term 'nexus' has become a new buzzword for referring to, looking at and thinking about FEWE resources as a whole. It emphasises the interdependencies, linkages and tensions across sectors that have historically been managed in isolation from one another, uncertainty and security of natural resources. Nexus shocks refer to low probability, high impact events which have significant implications for the energy-food-water-environment resource 'nexus' and related stakeholders (Howarth and Monasterolo, 2016). They are often the result of extreme weather and climate related events, for example, extreme flooding, heatwaves, drought, coastal erosion, sea-level rise and storm surges. At the time of such shocks, different sectors are required to coordinate to resolve urgent issues and to jointly make the most appropriate decisions for society.

To improve effectiveness of those working at the science/policy interface – including academic, policy makers and practitioners – this work explored some of the practical challenges associated with the integrated and transdisciplinary approach required to effectively manage and respond to nexus shocks. With the likelihood of such shocks predicted to increase in the future due to a changing climate, the need for effective, integrated decision-making across sectors, and including a number of stakeholders, will become increasingly important. Reframing the nature of decision-making as a transdisciplinary process involving multiple people, organisations, sectors and strategies, opens opportunities to examine issues within these decision-making processes and to identify ways to improve resilience to shocks.

Building on the UK's Climate Change Risk Assessment (CCRA) 2017, this fellowship focused in particular on heatwaves and flooding, as examples of the two highest risks facing UK. Drawing on findings from Phase 1 of the Nexus Shocks project key areas identified as requiring further investigation included: evidence, communication and co-production, and collaboration.

Aims and Method

The fellowship aimed to **better understand how decision making processes are informed in response to climate and weather related nexus shocks, and to identify pathways to deliver resilience; with a focus on evidence, collaboration and communication.** This was investigated through the following research questions:

1. How is evidence used in decision-making in relation to nexus shocks, and can this be improved?
2. How can evidence be better communicated to more effectively inform nexus shocks decision-making?
3. How can collaboration be harnessed to improve decision-making and resilience to nexus shocks?
4. What pathways exist to better inform and deliver resilience to climate and weather related nexus shocks?

Data was collected from key stakeholders through 27 semi-structured interviews. Key stakeholders were sampled from 3 pre-defined categories (see Howarth & Monasterolo, 2016): (i) Policy communities (involved in formulating policies and decisions on climate change and nexus related issues), (ii) Practitioners (involved in implementing climate solutions or decision making on the ground), and (iii) Academia/Science. Individuals were approached based on their knowledge, expertise and experience of decision-making in relation to climate change and/or nexus related issues. This was assessed based on a literature review of UK organisations and institutions, attendance lists to recent nexus events and project and network contacts. The final interview schedule was structured around 5 themes:

- Roles organisations and individuals play in decision-making processes;
- Evidence used or useful in decision-making processes;
- How evidence is communicated, and what makes effective communication;
- Role of collaboration in decision-making;
- Lessons learnt in managing and responding to heatwaves and flooding.

Fellowship reflections

Process of collaboration and transdisciplinary investigation

The findings from the Fellowship are reported in a Working Paper (Howarth, 2017a), an extensive Fellowship report (Howarth 2017b) and I have been invited to write a book on the Fellowship as part of the Palgrave Pivot Book Series (Howarth, in prep). The findings are based on the results of 27 interviews held in May 2017 with practitioners, policymakers and scientists/academia in the United Kingdom. The interviews were recorded and transcribed, and coded and analysed thematically using NVivo 11. Six key thematic areas were identified: (1) contextualising decision-making – roles and processes; (2) assessing the adequacy of the evidence base; (3) communication of evidence; (4) role of collaboration; (5) pathways to better inform and deliver resilience; and (6) nexus challenges. This research identified synergies and common goals/challenges, examples of good (and bad) practise, and opportunities for strengthening decision-making processes. Exploring the transdisciplinary nature of nexus shock decision making is central to contributing to a more resilient society by capturing lessons from social sciences as well as engaging those actually involved in decision making from business, government and not-for-profit organisations right at the start. Understanding on how decision making processes are informed in response to climate and weather related nexus shocks as found to be improved by:

- Reflecting on the different roles currently played by key stakeholders in decision-making processes in managing and responding to heatwaves and flooding;
- Examining what evidence is used by different stakeholders, how well this meets needs and extent to which the Climate Change Risk Assessment, for example, has contributed to decision making
- Explore what different stakeholders consider to be good practise in effective dissemination of evidence, the extent to which they are involved in co-production and whether this is perceived to be a ‘good approach’, and identifying lessons learnt in communicating uncertainty and risk
- Identifying the extent to which stakeholders collaborate, the perceived benefits and challenges, and what works well and what doesn’t work well in collaborations.

Pathways to deliver resilience were identified by considering:

- How the use of evidence in decision-making can be made more effective for example: How scientific/academic research could be made more useful to decision-makers, how research funders might best support this; and, what improvements that could be made to CCRA to maximise uptake
- How the communication of evidence can be made more effective and best ways to share lesson learnt
- Ways to harness collaboration to greater effect and practical steps needed to make this happen

- Lessons learnt, how the policy, practitioner and academic/science communities could better evolve to support decision-makers and the role of research funders
- Identified silver bullets and what is need to make these a reality

A set of recommendations emerged from the fellowship:

- *Contextualisation of warnings* in relation to recent events is useful approach to help people understand the scale of what they are experiencing, and to trigger action to reduce impacts
- *Move away from abstraction of warnings to situational warnings*, which provide a clear message on the situation and required response
- *Clarity on what expected impact and action required are*. It is important to convey how events are expected to impact recipients, to make it relevant so the communication is understood
- *Importance of having structures in place to share and disseminate effectively* through a range of communication channels ensuring correct information is feeding through planning, preparation, responding
- Working with growth in technology for communication during emergency events
- *Digestible and targeted information to audience is needed*, ensuring requirements are being met through effective communication with clear purpose of message, through clear, simple and effective messaging.
- *Need a common language and operating picture* to improve consistency of message
- *Credibility and trust essential*. Lack of trust in organisation can undermine messaging
- *Package information differently* and avoid information that encourages uncertainty of need for action
- *Relationships need to be built on trust and understanding* of the needs of others'
- *Networks should be established* to enable cross-stakeholder collaboration and knowledge exchange around key responses to weather and climate extremes whilst building capacity and knowledge
- *Have clarity of roles*, mechanisms of working and remits of stakeholders engaged in decision making process
- Better systems needed to *recognise the value of collaborative research* where scientists are recognised for their work and the broader research question and its practical value are acknowledged
- *Flexibility and agile processes* needed where contributors are open to doing things differently and sharing, innovatively and in a way that aligns with the needs of communities affected by nexus shocks
- *More active collaboration between policy/practitioners and academic* where they are viewed as partners rather than stakeholders and therefore would have more ability to influence
- *Pro-active and pre-emptive approaches* for shock events with bigger picture in mind
- *Improved constructive conversations* where people talk to each other to stimulate better frameworks for collaboration and accounting for benefits of collaborative projects
- Put in place system to *maintain historical and institutional memory* so that when shock events re-occur, that knowledge and expertise on how to respond is not lost
- *Provide funding mechanisms* whereby policy and practitioners actors are eligible for funding and have more leverage over how Research Councils may spend their money so that it can be more applied

Lessons learned, obstacles and limitations

- An important barrier was limited funding to explore the findings in more depth. Ideally the Fellowship would have been able to employ a further full time Research Fellow for the duration of the project in order to further analyse the interviews and run follow up workshops and/or roundtable discussions with key decision makers to explore the applicability of findings in practice
- Adopting a 'nexus' frame was valuable in the first phase of the project to encapsulate many of the concepts that are integral in understanding the energy food water environment sectors and shocks, including complexity and interconnectedness. In Phase 2, whilst the frame was adopted in part to help recruit interviewees, the interview scripts excluded the term as much as possible based on feedback from the pilot stage. As we were investigating decision making processes in response to nexus shocks, it was acknowledged that the term 'nexus' may not be used by key stakeholders and, therefore, in order to minimise attrition and maximise engagement to the project other terms such as energy-food-water-environment were used
- Categorisation of interviewees as practitioner, policy or science/academic was based on individual roles, more than organisation level, although these mostly align. However, it is noted that categories may overlap as individuals roles may fall across more than one category; and individuals may have previous experience in other roles that they may be drawing upon.
- The interviews took place during pre-election purdah which meant the sample may be biased by excluded policymaker that may have had different views and experiences – at least one invitee decline on this basis.
- It is assumed that questions were understood in the intended way, used of supplementary information guide to explain consistent definitions, but they may have been cases where it wasn't clear that the interviewees had

understood questions or phrases in an unintended way. Risk of interviewee inadvertently given cues to the interviewee which may have influenced responses.

- It is assumed that the transcription of the audio file accurately represents the interviewee responses, which may not always be the case. eg misheard or unclear words etc. Fifth, the files were transcribed as 'Intelligent verbatim transcription with/without slang', which may omit important cues regarding responses, for example, emphasis from false starts/repeated words. The analysis was predominantly based on the transcriptions and we are aware that reliance on transcript for reliance, can result in the neglect of significant non-verbal cues (Silver & Lewins, 2017). In addition, there is an inherent risk that analysis has understood and interpreted interviewee comments in unintended way which can lead to lost or misunderstood messages.

The following areas of further work were identified

The study reported here covered a broad set of topics with the interviews, however further analysis is needed to examine how these findings differ between the different categories which offers the potential to identify further opportunities to better support the interdisciplinary work needed for nexus thinking, for example:

- Re-examine the categorisation of individuals
- How perspectives on adequacy of evidence differ between practitioners, policy and academia. How perceptions at the front end of decision-making e.g. practitioners and to an extent policy, compare with those of science?
- How do perspectives differ on adequacy of communication? Do practitioner find more problems compared with policy or science (i.e. the producers vs users?)
- Opportunities for evolution, through comparing synergies across stakeholder groups
- More detailed exploration of how 'pathways forward' differ between stakeholder groups
- In-depth analysis to synthesis the recurring themes to distil clear set of recommendation for policy, practitioner and academic/science community on next steps

Outputs

Journal articles and Working papers

- Howarth, C. (2017) Nexus Shocks project: Summary of findings, University of Surrey & Nexus Network Working Paper. September 2017
- Howarth, C. & Monasterolo, I. (2017) Opportunities for knowledge co-production across the energy-food-water nexus: Making interdisciplinary approaches work for better climate decision making. *Env. Science & Pol*
- Brooks, K. & Howarth, C. (2017) Local level decision-making on climate change and building resilience to nexus shocks – implications for collaboration and communication. *Sustainability*, **9**(838)
- Howarth, C. & Monasterolo, I. (2016) Understanding barriers to decision making in the UK energy-food-water nexus: The added value of interdisciplinary approaches. *Env. Science & Policy*, **61**, 53-60.

Books

- Howarth, C. (in prep) *Nexus shocks: Informing decision making and responses*. Palgrave Pivot
- Howarth, C. (2016) *What we've learnt so far: findings from the Nexus Shocks Network*. Nexus Network, available online at <http://www.thenexusnetwork.org/the-nexus-shocks-network-what-are-we-learning/>

Presentations

- Howarth, C. (2017) The role of expert knowledge in decision making on climate change: insights from two case studies. RGS-IBG Conference, London.
- Howarth, C. and Brooks, K (2017) Improving decision making on disaster risk reduction: exploring results from the Nexus Shocks project, UKADR conference, UK
- Howarth, C. (2016) Overcoming barriers to decision making in response to climate and weather related shocks: findings from the Nexus Shocks Network, RGS-IBG Conference, London

Blogs/Briefing Note

- Howarth, C. (2016) [Responding to extreme weather events](#). ESRC Evidence Briefing
- Howarth, C. (2016) [Informing decision making in response to nexus shocks](#). LWEC Policy Practice Note
- Howarth, C. (2016) [Introducing the Nexus Shocks Network](#) GSI So What? Issue 7
- Howarth, C., Jones, A., Philip, G., Hogbin, J-A. (2015) *Nexus Shocks network: Decision making on nexus shocks*. Summaries of workshop discussions.