Earth Systems and Climate Change Hub

National Environmental Science Programme

CASE STUDY 5.7 REPORT

Input by the Earth Systems and Climate Change Hub into the National Disaster Risk Information Services Capability (NDRISC) Pilot Project

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Introduction

Climate change is driving an increase in extreme weather, which in turn is leading to increased natural hazards and disaster risk across Australia. The National Climate Science Advisory Committee in its 2019 report *Climate Science for Australia's Future* states 'decision makers need climate risk information tailored to their organisations and sectors. A comprehensive climate services capability would enable customers in industry, government and the community to better manage their risks from a variable and changing climate'.

Many approaches to disaster risk reduction, such as design specifications for infrastructure and critical assets, are currently based on historical climate data that may present an inaccurate picture of future natural hazards and risk. Increased information on changes in natural disaster risks due to climate change is needed by all sectors of Australian society, business and government to inform their decision-making and planning.

The first priority of the *National Disaster Risk Reduction Framework* (Nat. Resilience Taskforce, 2018) recognises that improved understanding of our vulnerability is essential to reducing disaster risks and is foundational for a broader integrated approach to disaster risk reduction.

The Earth Systems and Climate Change (ESCC) Hub of the Australian Government's National Environmental Science Program was invited by the CSIRO Climate Science Centre to participate in the pilot project for the National Disaster Risk Information Services Capability (NDRISC), run in 2019 by Emergency Management Australia. The pilot project was undertaken between February and December 2019 to demonstrate the benefits of establishing a national climate and disaster risk information capability for Australia. This was done using three case studies linked to the Freight and Supply Chain Strategy. Specific objectives of the pilot were to:

- Understand and specify the requirements for a national capability;
- Explore and propose a way forward to overcome barriers that inhibit effective access to and use of climate and disaster risk information, including potential pathways to develop a national capability; and
- Present prioritised options for further consideration.

The ESCC Hub's role was to provide expert advice on physical climate risks associated with recent historical extreme weather events as well as potential changes in risks due to climate change, in conjunction with the researchers from the Bureau of Meteorology and CSIRO Land & Water. The main participant from the ESCC Hub was Hub Leader Professor David Karoly.

This report provides a summary of the lessons learnt from this pilot project for NDRISC and some insights that can be applied to the development of a national capability. It provides an overview of the ESCC Hub role in the NDRISC pilot project and is based on the *National Disaster Risk Information Services Capability: Pilot project outcomes report* (2020).

1 Overview

The NDRISC pilot project involved two activities linked to the Freight and Supply Chain Strategy:

- Exploring the use of high-level narrative scenarios to stimulate thinking and frame discussion around climate and disaster risk for freight supply chains; and
- Modelling climate and disaster risks for three selected case studies based on the insights from the narrative exploration process.

Through two workshops, participants from across state and federal government, industry and academia were asked to use several existing narrative scenarios to consider:

- How disaster risks might emerge if the current freight and supply chain system were exposed to and vulnerable to the sorts of climate-related natural hazards anticipated in the next few decades; and
- How disaster risks might emerge in a set of scenarios envisaging extremes of future supply chain systems.

A number of potential vulnerabilities were identified, many of which had not been contemplated prior to engaging in scenario-thinking to test assumptions and generate new ideas. Stakeholders explored and identified interactions among drivers of change and factors likely to influence disaster risk over coming decades.

Informed by the narrative scenario workshops, the second activity aimed to demonstrate the use of existing data and modelling capability to explore climate and natural hazard risk issues identified by the Freight and Supply Chain Taskforce, bringing together strategy developers (users) and the modelling capability providers.

Three cases studies were selected based on these criteria:

- Case study 1 – Flooding of the Bruce Highway south of Townsville (led by Geoscience Australia).
- Case study 2 – Multi-hazard freight impacts surrounding the Victoria-Tasmania transport and freight network (led by the Bushfire and Natural Hazards Cooperative Research Centre by the University of Adelaide).
- Case study 3 – Coastal inundation and subsidence in the Port of Adelaide (led by the University of Adelaide).

The pilot project was resourced primarily through in-kind contributions from organisations providing data and modelling capability (Geoscience Australia, CSIRO, the Bureau of Meteorology, the University of Adelaide and the Bushfire and Natural Hazards Cooperative Research Centre).

The case studies demonstrated the value of applying existing knowledge and risk modelling capability to address specific needs and demonstrated the value of modelling to support climate and disaster risk assessments. They highlighted a set of considerations that a national capability would need to address.

2 Lessons learnt from the pilot project

The NDRIS pilot study provided useful insights into the climate and disaster risks affecting the supply chain and freight sector. These include:

- the need for a more holistic understanding of supply chains and their operating capacity under stress;
- design tolerances of the physical infrastructure;
- impacts of shocks on consumer supply and demand, and cross-dependencies with other critical infrastructure and networks; and
- the need for a range of information products that are integrated to enable assessment of risk.

Several key themes emerged that highlight the limits of information to describe and model a complex system, the nature of values and attitudes of stakeholders in decision-making and the complexity of multi-stakeholder and cross-scale risk management and investment decision-making.

With the adoption of the National Disaster Risk Reduction Framework describing the importance of a whole-of-government, industry and society approach to disaster risk reduction, and the recognition of the climate drivers for increased natural hazard, there is a critical need for a national capability to bridge current disaster management information communities and those attempting to address longer-term climate risk. A national disaster risk capability would represent a foundational element for evidence-based systemic climate and disaster risk reduction and decision-making. Such a national disaster risk capability would also ensure decision-makers have access to the best information needed to make risk-informed decisions to improve our future resilience.

Continued co-design between providers and end users is critical throughout the entire risk assessment process and should form a critical element of any monitoring and evaluation framework for disaster risk reduction activities

Disaster risk data is generated at a variety of scales with different extents ranging from low resolution national-scale products often produced through satellite imagery and modelling, to state and local-scale data generation using field-based techniques, remote sensing and modelling. This results in inconsistent data. Specific sectors and jurisdictions are addressing aspects of these challenges resulting in consistent national data products.

An example is the industry-led Climate Measurement Standards Initiative (CMSI), which has provided scenario analysis of climate-related physical risks for buildings and infrastructure. The financial services sector led this initiative in 2019-2020, with support from the ESCC Hub. Two reports, the Climate Science Guidance (ESCC Hub, 2020) and the Financial Disclosure Guidelines (Climate-KIC Aust., 2020) were released in September this year.

The pilot project also noted the importance of the NCSAC Climate Services study (ESCC Hub 2021a) and the Next Generation Regional Climate Projections study (ESCC Hub 2021b), being prepared by the ESCC Hub, as part of the planning for a national disaster risk information capability.

The report on the outcomes from the pilot study (NDRISC, 2020) includes a number of recommendations on the design of a national climate and disaster risk capability. These recommendations are much broader than just provision of information on climate-related hazards and risk information, or the ESCC Hub's role in the pilot project.

3 Next steps

The extreme weather events in many parts of Australia during the Black Summer of 2019-2020 - the bushfires, hailstorms and heat waves - demonstrated again the importance of a national climate and natural disaster risk information capability, such as proposed through NDRISC.

Among the 80 recommendations from the Final Report of the Royal Commission into National Natural Disaster Arrangements, delivered in October 2020, is recommendation 4.3 that ‘Australian, state and territory governments should support the implementation of the National Disaster Risk Information Services Capability and aligned climate adaptation initiatives’.

The Commonwealth response to this recommendation in November (Commonwealth of Aust., 2020) is that ‘The Commonwealth will establish ‘Resilience Services’ at the federal level, based on findings of the National Climate and Disaster Risk Information and Services Capability pilot and aligned climate adaptation initiatives. Resilience Services will better connect and leverage the Commonwealth’s extensive data, information and capabilities to manage climate and disaster risk, including those of the Bureau of Meteorology, the CSIRO, Geoscience Australia and the Australian Bureau of Statistics’.

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