Climate change adaptation actions being undertaken by local authorities in Canterbury

A companion report to the Canterbury Climate Change Risk Screening Interim Report

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Table of contents

List of Figures

List of Tables

1 Introduction

The Canterbury Climate Change Risk Screening aims to develop a shared understanding of the key climate change risks and opportunities to the Canterbury region, with a focus on local government responsibilities and existing risk management strategies. The risk screening is a high-level, qualitative screening of the priority climate change risks to Canterbury based on existing knowledge.

The Interim Report on the Canterbury Climate Change Risk Screening lists priority climate change risks to Canterbury's natural environment, built environment, human, economic, governance and cultural domains. Of the climate change risks identified in the Interim Report, local government are responsible for managing most of the risks to the natural and built environments at regional and local community scales.

The purpose of this companion report is to capture existing climate change adaptation actions, by local government in Canterbury, to answer two key questions.

1. For which priority climate change risks to the natural and built environment domains are there existing adaptation actions?

2. What types of adaptation actions are being carried out?

2 Method

Canterbury local authorities provided information on existing actions they are undertaking to adapt to climate change risks (to natural and built environments) identified in the Interim Report. Due to COVID-19 lockdown and resourcing seven of the eleven authorities could respond. Results were aggregated to provide regional-level information and align with the Interim Report.

Adaptation actions are usually implemented jointly across various categories including structural, institutional and social. Moreover, actions are often interrelated. For example, natural hazard assessments are used to inform development and land use zoning decisions.

This report categorises adaptation actions using categories from the Intergovernmental Panel on Climate Change (Noble et al. 2014) to understand the types of actions being undertaken by local government in Canterbury (Appendix 1).

This report does not assess the effectiveness or adequacy of these actions. This will be carried out in the next stage of work – a Canterbury Climate Change Risk Assessment.

3 Results

3.1 Climate change risks and existing adaptation actions

More adaptation actions are being undertaken in relation to climate change risks to the built than natural environment (Table 3-1). Adaptation actions are being undertaken for 10 of the 11 priority climate change risks to Canterbury's built environment (Table 3-1).

No adaptation actions were captured for climate change risks to airports. However, this was due to the focus on local government actions and responsibilities. Private sector organisations, including council-controlled trading organisations, were not included in this work.

Adaptation actions are being undertaken for 10 of the 13 priority climate change risks to Canterbury's natural environment (Table 3-1). No adaptation actions were captured for 5 of the priority climate

change risks to the natural environment, including Alpine and high country; Native marine biodiversity; Terrestrial, freshwater and marine pests and animal/plant-related diseases.

Table 3-1: Priority climate change risks for which existing adaptation actions were captured.

	Existing adaptation actions captured	**No existing adaptation actions captured**
Built environment	Irrigation Landfills, solid waste management, contaminated sites Marine facilities Roads and bridges Rural housing and rural communities Settlements and urban communities Stopbanks and flood management schemes Wastewater treatment plant Water supply infrastructure	Airports (not covered in this work)
Natural environment	Coastal wetlands Groundwater Native freshwater biodiversity Native terrestrial biodiversity Lowland and coastal environment Montane and hill country Natural coastal habitats Surface water availability and quality, water quality and quantity (lakes and rivers) Water quality in marine, estuaries and harbours	Terrestrial, freshwater and marine animal/plant-related diseases and pests Alpine and high country Native marine biodiversity

3.2 Types of adaptation actions in Canterbury

3.2.1 Built environment

Engineering approaches, informational and government policies and programmes are the top three types of adaptation actions being undertaken for risks to the built environment (Fig 3-1).

Engineering approaches are undertaken for 9 of 11 priority risks to the built environment. These primarily include capacity and protection works.

Informational actions are undertaken for 8 of the 11 priority risks to the built environment. These primarily include hazard, risk/impact and capacity assessments.

Policies and programmes are undertaken for 8 of the 11 built environment risks. These primarily include management strategy evaluation, incorporating into 30-year Infrastructure Strategies and community engagement.

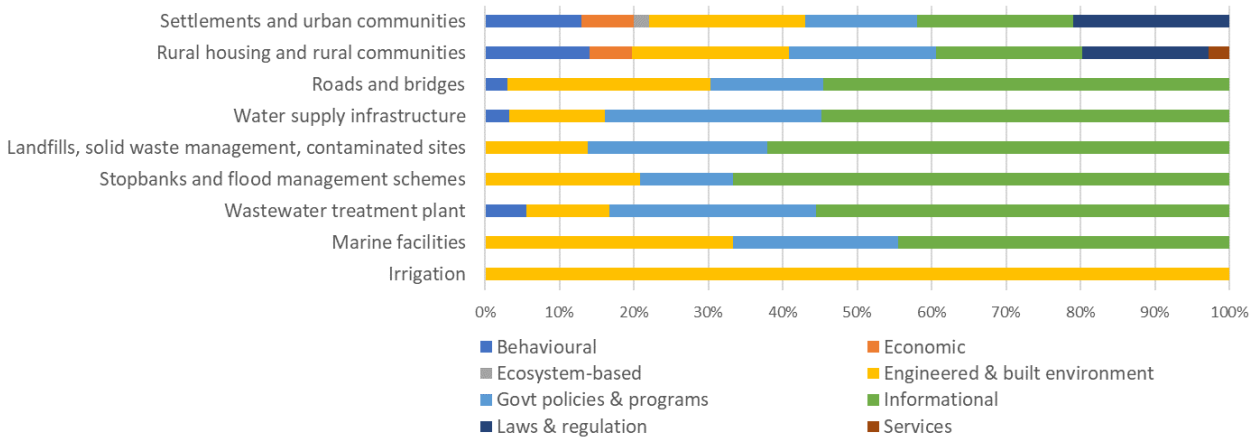

Figure 3-3-1: Proportion of adaptation actions undertaken for each risk to the built environment

3.2.2 Natural environment

Informational, ecosystem-based approaches, and laws and regulations are the top three types of adaptation actions being undertaken for risks to the natural environment (Fig 3-2).

Informational actions are undertaken for 6 of the 13 priority risks to the natural environment. These primarily include hazard and risk/impact assessments.

Ecosystem-based approaches are undertaken for 3 of 13 priority risks to the natural environment. These primarily include projects to enhance natural features that improve water quality.

Laws and regulations are undertaken for 3 of the 13 priority risks to the natural environment. These primarily include planning rules to manage water abstraction.

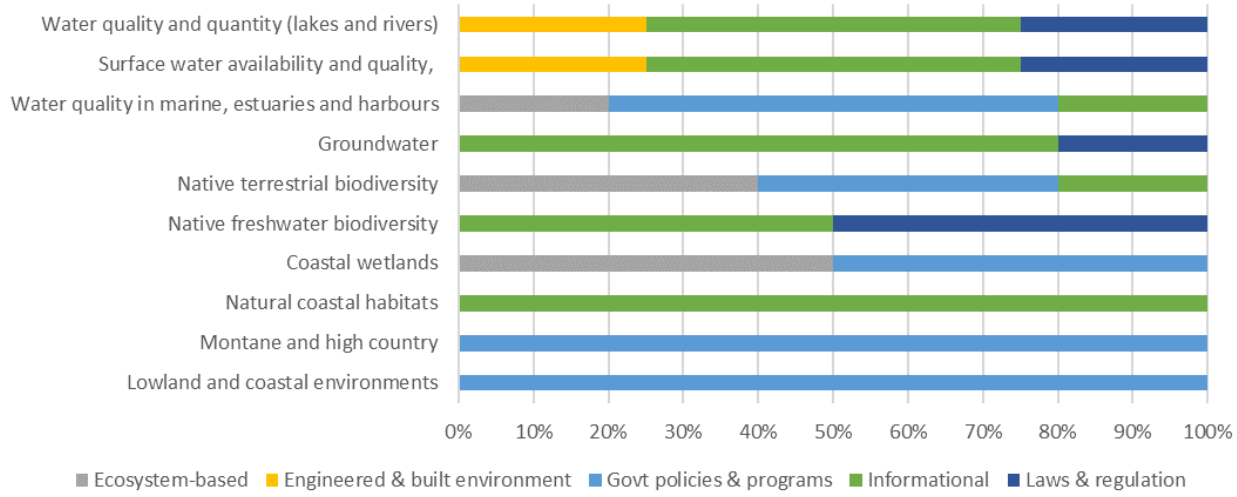

Figure 3-2: Proportion of adaptation actions undertaken for each risk to the natural environment.

4 Conclusions and next steps

This report identifies:

- existing adaptation actions being undertaken for the priority climate change risks to Canterbury's natural and built environments,
- the types of actions being undertaken, and
- adaptation gaps.

While not all local authorities could provide information for this report, it has still been possible to get an indication of existing adaptation actions across the region.

As mentioned previously a suite of adaptation actions are usually needed to manage climate change risks. One existing action being undertaken for a risk does not indicate how well the risk is being managed.

A detailed assessment of the effectiveness of existing adaptation actions is needed as part of next stage of work – a Canterbury Climate Change Risk Assessment. This work aims to assess priority risks in more detail, including spatial analysis where possible, and assess the effectiveness of existing adaptation actions to inform coordinated adaptation planning across the region.

5 References

Noble, I.R., S. Huq, Y.A. Anokhin, J. Carmin, D. Goudou, F.P. Lansigan, B. Osman-Elasha, and A. Villamizar, 2014: *Adaptation needs and options*. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L.White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 833-868.

Appendix 1: Examples of types of adaptation actions.

(Adapted from Noble et al. 2014).

Type	Examples
Structural/physical	
Engineered and built environment	Sea walls and coastal protection structures; flood levees and culverts; water storage and pump storage; sewage works; improved drainage; beach nourishment; flood and cyclone shelters; building codes; storm and wastewater management; transport and road infrastructure adaptation; floating houses; adjusting power plants and electricity grids
Technological	New crop and animal varieties; genetic techniques; traditional technologies and methods; efficient irrigation; water saving technologies including rainwater harvesting; conservation agriculture; food storage and preservation facilities; hazard mapping and monitoring technology; early warning systems; building insulation; mechanical and passive cooling; renewable energy technologies; second-generation biofuels.
Ecosystem-based	Ecological restoration) including wetland and floodplain conservation and restoration; increasing biological diversity; afforestation and reforestation; conservation and replanting mangrove forest; bushfire reduction and prescribed fire; green infrastructure (e.g., shade trees, green roofs); controlling overfishing; fisheries co-management; assisted migration or managed translocation; ecological corridors ; ex situ conservation and seed banks; community-based natural resource management; adaptive land use management
Services	Social safety nets and social protection; food banks and distribution of food surplus; municipal services including water and sanitation vaccination programs, essential public health services including reproductive health services and enhanced emergency medical services; international trade
Social	
Educational	Awareness raising and integrating into education; extension services; sharing local and traditional knowledge including integrating into adaptation planning; participatory action research and social learning; community surveys; knowledge-sharing and learning platforms; international conferences and research networks; communication through media
Informational	Hazard and vulnerability mapping; early warning and response systems including health early warning systems; systematic monitoring and remote sensing; climate services including improved forecasts; downscaling climate scenarios; longitudinal data sets; integrating indigenous climate observations; community-based adaptation plans including community-driven slum upgrading and participatory scenario development
Behavioural	Accommodation; household preparation and evacuation planning; retreat and migration, which has its own implications for human health and human security; soil and water conservation; livelihood

	diversification; changing livestock and aquaculture practices; crop-switching; changing cropping practices, patterns, and planting dates; silvicultural options; reliance on social networks
Institutional	
Economic	Financial incentives including taxes and subsidies; insurance including index-based weather insurance schemes; catastrophe bonds; revolving funds; payments for ecosystem services; water tariffs; savings groups; microfinance; disaster contingency funds; cash transfers
Laws and regulations	Land zoning laws; building standards; easements; water regulations and agreements; laws to support disaster risk reduction; laws to encourage insurance purchasing; defining property rights and land tenure security; protected areas; marine protected areas; fishing quotas; patent pools and technology transfer
Government policies and programs	National and regional adaptation plans including mainstreaming climate change; sub-national and local adaptation plans; urban upgrading programs; municipal water management programs; disaster planning and preparedness; city-level plans, district-level plans, sector plans, which may include integrated water resource management, landscape and watershed management, integrated coastal zone management, adaptive management, ecosystem-based management, sustainable forest management, fisheries management, and community-based adaptation