MAKING BETTER LONG-TERM COASTAL ADAPTATION DECISIONS UNDER CONDITIONS OF UNCERTAINTY

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THE DESIGN AND EVALUATION OF LONG-TERM COASTAL ADAPTATION POLICIES TAKES PLACE UNDER CONDITIONS OF UNCERTAINTY. THE USE OF SCENARIOS CAN HELP STRESS TEST ADAPTATION POLICIES TO UNCOVER THEIR LIMITATIONS, ALLOWING THE ROBUSTNESS OF CANDIDATE ADAPTATION OPTIONS TO BE IMPROVED.

CHALLENGES FACED IN LONG-TERM DECISION MAKING

- Coastal risks arise from a combination of hazards, community exposure and vulnerability. Often deterministic and stochastic assumptions are used to describe changing hazards over multi-decadal time horizons. This can guide impact analysis and the selection of adaptation policies.

- If these assumptions prove to be incorrect, the community is unlikely to achieve the desired level of resilience. This is an important consideration for adaptation decisions carrying multi-decadal obligations (such as infrastructure or coastal development).

- New decision-making methods such as robust decision making and dynamic adaptive policy pathways are useful when the future is uncertain and the consequences of poor decisions are high.

RESEARCH OBJECTIVES

- To advance the development of long-term community coastal adaptation plans under conditions of uncertainty

- To integrate community preferences into formal decision analysis to identify long-term coastal adaptation pathways (validation through case studies)

RESEARCH METHODOLOGY

This research aims to develop a methodology that can improve the identification of robust long-term adaptation policies in coastal communities (Fig 1).

Metrics based on community needs

Engaging with community residents is important to understand their values, needs and to define successful adaptation. A case study will be used to develop a set of community defined metrics for use in the evaluation of adaptation options.

Testing the limits of adaptation policy through scenarios

Stress testing is a process that uses many scenarios (hundreds/thousands) to evaluate the performance of adaptation options. The process aims to identify those future conditions (including thresholds for uncertain variables) whereby the candidate options no longer meet the objectives of decision-makers. With this information, the robustness of candidate adaptation options can be improved. This research will use GIS-based software and an open source statistical programming language to evaluate the robustness of candidate adaptation policies.
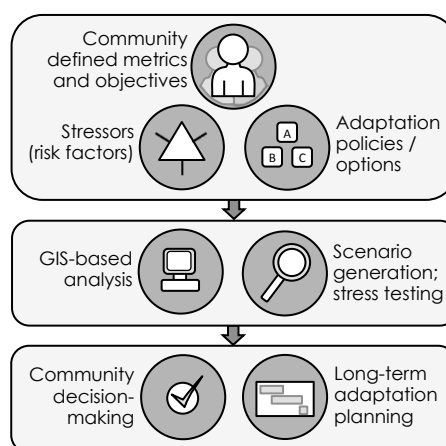

Fig 1 Components of decision analysis being explored by this research to identify long-term adaptation plans

CONTRIBUTING TO END USER NEEDS

This research aligns with the following end-user needs:

- Two focus areas of the Department of Premier and Cabinet's Tasmanian Draft Climate Change Action Plan 2016-2021

- The evaluation of coastal inundation treatment options identified in the 2015 Tasmanian State Natural Disaster Risk Assessment by the State Emergency Service

Photo: Kingston Beach, Tasmania