Adaptation options for managing coastal risks under climate change

Management strategies to address increasing risks from inundation and flooding are avoidance, managed retreat, accommodation, hold the line and loss acceptance. For each of these, we consider the available adaptation options in planning, engineering, environmental management and community awareness and education.

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At a glance

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- Climate change is likely to increase the risks of inundation and erosion in the coastal zone, as a result of sea-level rise (and possible changes to wind and wave climates).
- Organisations such as local councils and small businesses located in at-risk areas are likely to undertake adaptation planning to identify management strategies to address the increased risks.
- These management strategies fall under five main headings: avoidance, managed retreat, accommodation, hold the line and loss acceptance.
- Here we explore, under these five headings, the possible adaptation options available in the areas of planning, engineering, environmental management and community awareness and education.
- Identifying a wide range of options enables you to consider their interactions (i.e. how best to achieve co-benefits and to avoid negative flow-on effects).
- Adaptation options should be considered in the context of core business and existing management plans (e.g. coastal zone management plan, organisational

risk management plan etc.) to ensure they align well with the core goals and activities.

Main text

Indicative adaptation options

Coastal zones face increasing risk of inundation and erosion as a result of sea level rise (and possible changes to wind and wave climates). Organisations such as local councils, infrastructure operators and small businesses are likely to undertake adaptation planning in response to increasing risks.

A typical adaptation plan for coastal areas needs to consider a range of different adaptation options and select one or more that best suits the identified risks, the resources available, and the values that are important to stakeholder groups.

In general, there are five categories of adaptation response to climate change in the coastal zone:

- avoidance
- managed retreat
- accommodation or limited intervention
- hold the line
- loss acceptance.

Within each of the first four response categories there is a range of potential adaptation options in the areas of planning, engineering, environmental management and community awareness and education. If the decision is made to select the final category (loss acceptance), this should be a documented and deliberate decision, and ideally part of a broader strategy or adaptation pathways approach that will, over time, lead to adaptation action at the appropriate time. This being the case, it is worthwhile mapping out potential adaptation options in advance. Useful documents if the 'loss acceptance' category is selected are:

- *Taking minimal action*
- *Pathways approach*.

Here, we provide four documents that outline adaptation options in:

- *Adaptation options: Planning*
- *Adaptation options: Engineering*
- *Adaptation options: Ecosystem management*
- *Adaptation options: Social, community and education measures*.

The information is arranged in a single large table in each document, preceded by a short introductory section. The table provides the following information:

- Column 1: the option, classified according to whether it falls into the category of avoidance, managed retreat, accommodation or hold the line
- Column 2: Climate stressors that can be addressed by the particular option
- Column 3: Examples of benefits from that option (including direct and indirect benefits)
- Column 4: Examples of risks associated with the option (including potential for maladaptation).

The purpose of these tables is to provide users with quick and high-level information on available adaptation options. The list is by no means exhaustive.

Selected options should match the broader goals of the organisation and its stakeholders. It is important to consider any opportunities that might derive from the selected options and any co-benefits that can be achieved. Environmental outcomes should be explored and taken into account, and options that deliver poor outcomes either discarded or given a low priority.

The infographics Why should we adapt to climate change? and What are the options for adapting to sea-level rise? also contain useful information. C-CADS has guidance on developing a suite of adaptation options and how to sequence their implementation (*C-CADS Step 3 Identify options*). Once options have been identified, they should be assessed and those most appropriate for the chosen level of acceptable risk identified. (*C-CADS Step 4 Assess options*). Once options are prioritised, more detailed consideration, planning and design of each option may be required.

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